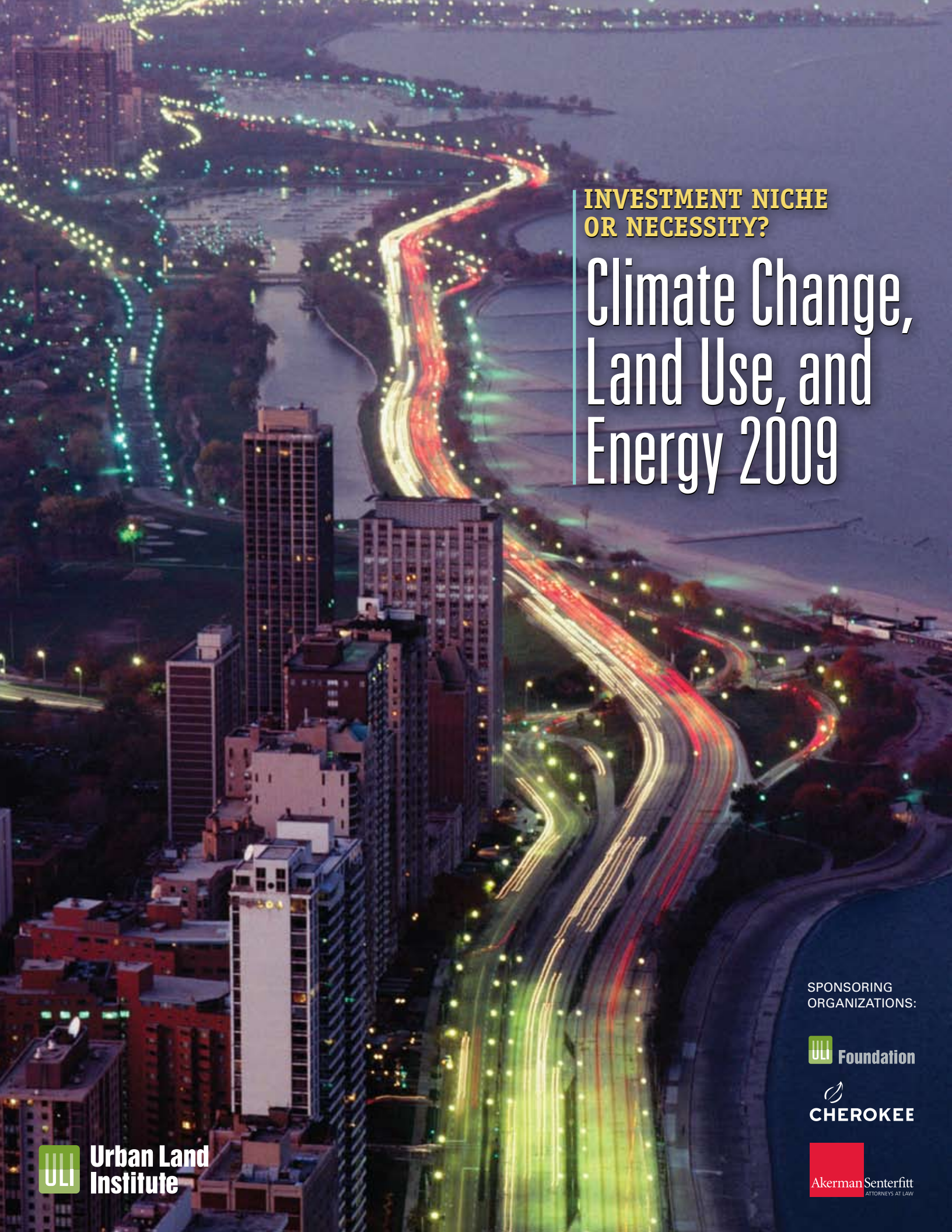

INVESTMENT NICHE OR NECESSITY?

Climate Change, Land Use, and Energy 2009

Urban Land Institute

SPONSORING ORGANIZATIONS:

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Akerman Senterfitt
ATTORNEYS AT LAW

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About the Urban Land Institute

THE URBAN LAND INSTITUTE is a 501(c) (3) nonprofit research and education organization supported by its members. Founded in 1936, the Institute now has more than 32,000 members worldwide representing the entire spectrum of land use and real estate development disciplines, working in private enterprise and public service. As the preeminent, multidisciplinary real estate forum, ULI facilitates the open exchange of ideas, information, and experience among local, national, and international industry leaders and policy makers dedicated to creating better places.

The mission of the Urban Land Institute is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. ULI is committed to bringing together leaders from across the fields of real estate and land use policy to exchange best practices and serve community needs by:

- Fostering collaboration within and beyond ULI's membership through mentoring, dialogue, and problem-solving;
- Exploring issues of urbanization, conservation, regeneration, land use, capital formation, and sustainable development;
- Advancing land use policies and design practices that respect the uniqueness of both built and natural environments;
- Sharing knowledge through education, applied research, publishing, and electronic media; and
- Sustaining a diverse global network of local practice and advisory efforts that address current and future challenges.

ULI Statement on Climate Change, Land Use, and Energy

THE URBAN LAND INSTITUTE WILL BRING ITS ORGANIZATIONAL RESOURCES to the complex issues surrounding energy and climate change, acknowledging that the successful global reduction of greenhouse gas (GHG) emissions requires substantial investments in local communities. We believe ULI has the ability to foster new policies and solutions to address global climate change that are both feasible and effective at the nexus of land use, real estate, energy, and infrastructure.

As an organization, we seek to move forward with new urgency by fostering leadership among ULI members and identifying the tools, techniques, and best practices needed to address difficult choices and tradeoffs, for which there are no precedents to measure decisions. We seek to empower individuals and organizations to solve one of the most important and complex long-term challenges ever faced by communities around the world, in a manner that meets the needs of the present, without compromising the ability of future generations to meet their own needs.

ULI recognizes that effective strategies to combat global climate change will require cooperative effort by all segments of the economy and all segments of society around the globe. Given the multifaceted challenge and the many exemplary efforts by organizations around the world to meet this challenge, ULI does not seek to duplicate the effective efforts of others, such as those focused on transportation technologies or building technologies. By focusing on issues at the core of the ULI mission—the responsible use of land—ULI seeks to make an important contribution within the emerging chorus of collaboration and partnership.

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Dear Reader:

ON BEHALF OF OUR INDIVIDUAL ORGANIZATIONS, we are delighted to have supported ULI's first-of-its-kind report on the combined issues of climate change, land use, and energy. Together we recognize the crucial role land use and real estate must play in addressing this challenge, both in the United States and worldwide.

It is especially appropriate that the first report focuses on the state of investment practices, both with respect to the effects of the economic downturn on sustainable development, and with respect to the assessment of long-term risks and rewards within the real estate investment community.

We hope this report provokes discussion and offers insight into how land use professionals incorporate these complex issues into their business practices.

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Cherokee

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PREFACE

Business is the main delivery mechanism; we are the ones that own the majority of the technology. We are the ones that implement it in the marketplace. So whatever we agree as a plan forward on climate change, it has to make business sense.

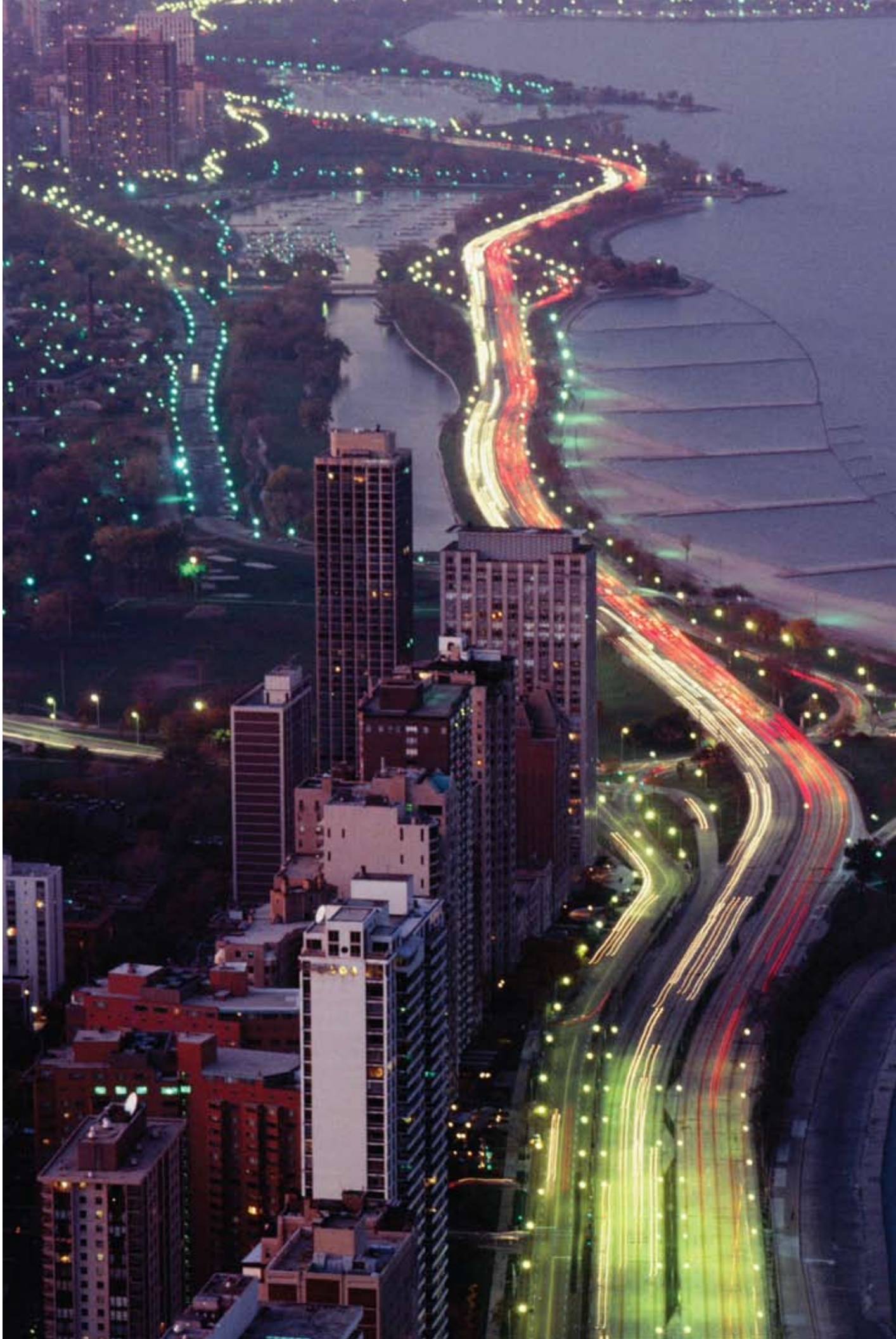
— Björn Stigson, President, World Business Council for Sustainable Development

THE ASCENDANCY OF THE ISSUE OF GLOBAL CLIMATE CHANGE is likely to have numerous and far-reaching effects on real estate business practices. But when does the conversation become numbers in a pro forma? ULI's Advisory Group on Climate Change, Land Use, and Energy (CLUE) recognized this critical question, putting "Making the Business Case" as ULI's top policy and practice priority in the area of climate change and energy. Combining the results of a ULI member survey of senior-level real estate investment leaders, an overview of recent academic research, and highlights of ULI's June *Investing Green* conference, this report provides a status update of how real estate investment and business practices are responding to or incorporating issues related to climate change and energy in the United States. The report explores how the real estate investment community—including individual investors, investment funds, and real estate lenders—generally views or is engaged in specific business practices associated with energy or climate change.

First in a Series of Critical Insight Reports on Climate Change

As a point of departure for ULI, this report is the first in a series that explicitly engages the issue of global climate change. Future reports will review recent or pending changes in public regulatory frameworks and will examine real estate development practices and specific real estate product types.

Given the fast-paced evolution of green real estate practices, each report in this new ULI series is intended to be a tool to access more detailed sources, by including an annotated list of additional resources, specially compiled for readers who seek guidance on primary sources of research. ULI is positioning this series of reports as a hands-on information resource that compiles practical knowledge and critical insight derived from broad sources, including professional opinions and expert knowledge gleaned from land use professionals at a variety of ULI program events.



GLOWIMAGES/GETTY IMAGES

EXECUTIVE SUMMARY

For Investors, "Green" Still Means Dollars and Cents

IN AN ENVIRONMENT WHERE THE NOISE about environment-friendly green development can be distracting, if not deafening, caution reigns in the real estate investment community. In fact, investment leaders show moderate interest in exploring or capitalizing on new opportunities that may be presented by energy and climate change issues. Meanwhile, the longer-term prospects of integrating renewable energy into real estate investments or using investments to mitigate possible climate change risk hold limited appeal as investment necessities. Why not? It's the economy. In ULI's first report on the effect of climate change, land use, and energy issues (CLUE) on real estate investment and business practices, we heard that loud and clear. The global downturn soundly trumped emerging attempts to elevate benefits from green development as a driver of investment. For investors, "thinking green" today refers to bottom line dollars. Environmental issues play a factor only when they produce an immediate return or mitigate a quantifiable investment risk.

About 200 executive-level U.S. finance, lending, and investment leaders weighed in with frank opinions for ULI's survey on energy and climate change. The report finds that while finance leaders recognize the emerging importance of climate change and the new thinking about energy in the life-cycle of their investments, they are not yet aggressively incorporating these issues into their daily business equations or long-range investment strategy.

Even Washington's economic stimulus package, with its promised incentives for energy and climate change investment, has not prompted many to leap on the bandwagon. Instead, many investors say it is too early to tell if it will make much difference, and they are waiting to see how they will be hit by regulations yet to come, on the federal, state, and local levels. Concurrently, the growing importance of the climate change issue in policy-making circles makes the establishment of strong regulatory mechanisms more likely.

Traditional bottom-line factors like interest rates and job growth still lead investment analysis and resulting decisions. And what is the bottom line for energy and climate change issues? Energy is an easier sell and the "energy equals cash" equation resonates with all investors. Consideration of risk presented by climate change is only just emerging, both because the effects are not well understood and because of the indeterminate nature of quantifying long-term risk. Nevertheless, the leaders surveyed recognize that the industry cannot maintain this precarious balance on these issues over the long term, and only a small minority attempts to dismiss CLUE issues as irrelevant. Market innovators are doing what they can on a few fronts, such as adopting energy-efficiency analysis, management, developing internal professional expertise, and developing metrics to define outcomes.

However, as the economy and real estate markets rebound, the future may hold another growing pain for investors—riding out the costs of adapting to a low-carbon economy.

Capturing the Big Picture on Climate Change and Energy Issues

This emerging reality is not without opportunity. For this report, the exclusive survey material has been combined with data and thought leadership gathered at ULI events and through research. In this way, we have built an information toolbox to give the basics on CLUE; new trends in business practices; emerging thinking on valuation, external markets, and quantifying value and risk; and core references.

Selected highlights from the report include:

- **Energy efficiency becomes part of due diligence.** Eighty percent of firms are incorporating energy-related questions into their data gathering before completing a transaction. A minority are beginning to consider secondary location-based energy consumption related to transportation and transit availability.
- **Policy making can cause paralysis.** Many investors are waiting to see what new regulations will require of them before making investments or changing business practices.
- **Certifications are not universal.** From EPA Energy Star to Leadership in Energy and Environmental Design (LEED) certification to other European benchmarks, the widely accepted rating systems do not carry equal weight for all businesses. Instead, many are developing internal metrics to benchmark their progress and define success.
- **Investment in training is on the rise.** More companies are paying for professional development and cultivating internal expertise in sustainability-related issues.
- **Energy analysis is ensconced in property management.** Investors see the value here and have found some best practices to realize additional benefits. The business of capturing energy efficiency represents one of the most creative and entrepreneurial activities in real estate today.
- **Defining and pinpointing risk matters.** Professional liability, regulatory creep, and changes in underlying site assumptions are seen as prevalent factors that introduce CLUE-related risk into investment decisions. The emerging concern is the process of obtaining development entitlements.

In summary, although climate change is not identified as a dominant factor for investors, there is sentiment that it is a growing concern, particularly in the areas of mitigating investment and enterprise risk. In the meantime, real estate investors are looking to reduce operating costs in building assets through modest investments in energy efficiency.

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I THE ULI SURVEY

Risk and Relevance: Insights from the CLUE Survey

CLIMATE CHANGE WILL CHANGE THE BUSINESS OF REAL ESTATE. But how? And how is the real estate investment community preparing?

To find out, ULI surveyed executive-level members of the investment and lending community, including individual investors, investment funds, real estate investment trusts (REITs), and banks, in May 2009. The resulting report outlines our first-ever findings on the business practices, investment trends, and opinions related to climate change, land use, and energy in U.S. real estate markets.

The highlights that follow reveal precisely how leaders are assessing these issues, including which practices they are changing, when they are choosing to wait before acting, and where they see challenges looming.

Who's Talking: Behind the ULI Survey Respondents

This ULI survey was limited to people who hold executive-level positions in finance, lending, and investment companies. All of the more than 200 respondents serve at the Vice President level of their organization or higher, and all are full members of ULI.

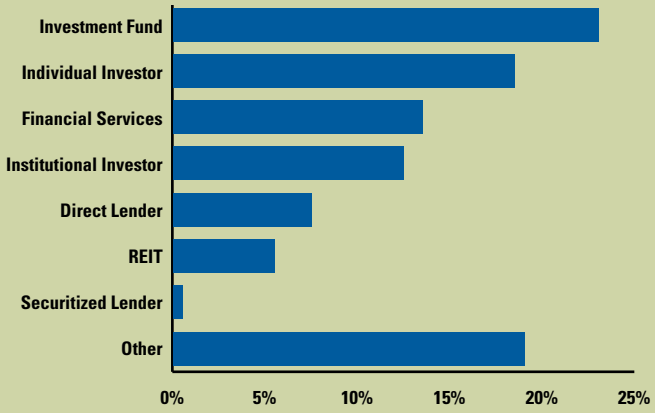
Respondents shared many opinions in addition to their survey answers. Although they are not identified by name, these senior executives provide the voices quoted throughout this report.

"The risk associated with climate change and carbon burden is where green building was five years ago. Anyone serious about development now cannot ignore the concept."

The survey took place in the midst of a historic economic downturn that has affected every aspect of real estate, and it had an overarching effect on survey responses. Most respondents say that the downturn has weakened the business significance of climate change and energy issues. One-third responded that these issues will not affect company decisions in the coming year.

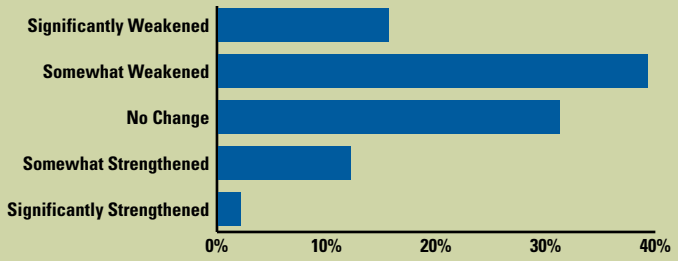
ULI Survey Question 1

Please indicate the primary nature of your firm's business activity.



ULI Survey Question 14

Has the economic downturn altered the business significance of climate change and energy issues?



But what investors will do today and what they anticipate having to do in the future are two separate matters. The survey revealed broad recognition that CLUE issues are increasingly relevant and that there is a great need to determine how best to address them. Some areas of strategic importance where leaders say they might begin to be able to push into—despite the downturn—are the business practices related to property management and the ongoing capture of energy-efficiency gains.

"Know what you own and get in the game of measuring, tracking, and managing information."

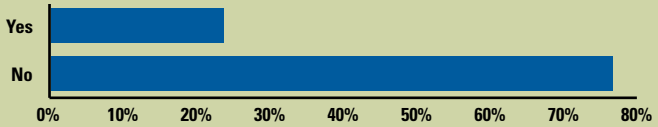
DEAL STRUCTURES LARGELY REMAIN STATUS QUO

Energy efficiency and climate change issues are not altering deal structures or business models, respondents say. Yet, energy is the area to watch for innovation and opportunity. Climate change appears as an unknown quantity, making it less compelling as an investment factor. However, the subject is still wide open for a vigorous conversation about the future of business innovation.

"Energy issues are legitimate and drive much of our decision making process. Climate change is more of a political and regulatory nuisance that forces us to do business in a less efficient manner."

ULI Survey Question 7

Have climate change or energy issues altered your company's business model or your approach to project deal structure?



"Attention to energy efficiency is driven by tenant demand."

"The market is not pricing energy and energy-efficiency data uniformly, despite the availability of reliable information."

KEEPING AN EYE ON THE STIMULUS PACKAGE

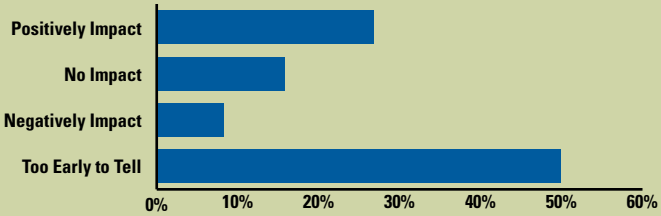
In early 2009, the American Recovery and Reinvestment Act of 2009, the stimulus package, raised hopes, and included significant provisions for investment in energy efficiency. Yet leaders remain cautious. Half of those surveyed said that it is too early to tell if these regulatory measures will positively affect real estate practices, and one in six foresees no lasting effect at all.

"Some owners are less interested in pursuing sustainability due to capital shortfalls. But those who are thinking about going after stimulus monies have, on balance, heightened their environmental concerns."

"I believe sustainable real estate is continuing to outpace the conventional real estate market."

ULI Survey Question 15

Do you think that the energy efficiency investments in the American Recovery and Reinvestment Act of 2009 (the Stimulus Bill) will positively impact real estate practices?



"My biggest fear is that the project I just funded will not be the project that ends up getting entitled and built."

"WE'RE IGNORING THE NOISE"

Looking ahead one year, respondents are split on whether energy and climate change issues will make any difference in their company's real estate decisions. Looking ahead five years, there's an uptick in perceived importance. Yet only one in 20 respondents believes that the issues of energy and climate change will be "critically important" in real estate decisions during the next five years.

"We're completely ignoring the noise on climate change until laws force us not to do so."

"You can think of buildings as 40 percent of 'the carbon emissions problem,' or you can think of them as 40 percent of the solution."

"I work for a large bank, and no one here even discusses climate change. We are way behind the curve."

"Climate change has positive and negative features that are difficult to forecast. I look at energy issues as the much more immediate matter."

"GREEN" COMMITMENT: WALKING THE TALK?

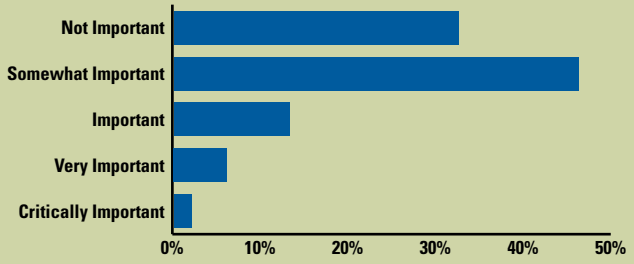
While companies increasingly adopt corporate mission statements and sustainability goals that declare their commitment to being "green," more than half of the survey respondents say that their companies have no explicit energy or climate change mission statement.

Only a small number track and report their company's carbon footprint, and few corporate real estate companies have prepared publicly available sustainability reports.

Sustainable development is still considered to be a marketing or human resources issue, rather than an investment or business practice. Results show that the most popular moves in sustainable development are enhancing marketing materials and paying for professional development.

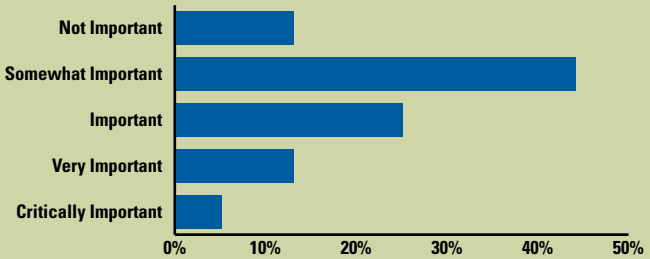
ULI Survey Question 18

Please estimate the general importance of climate change and energy issues in your real estate decisions over the next year.



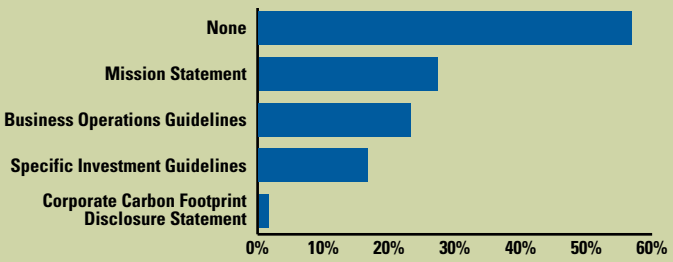
ULI Survey Question 19

Please estimate the general importance of climate change and energy issues in your real estate decisions over the next 5 years.



ULI Survey Question 2

Does your company have an explicit climate change or sustainable development statement? (Select all that apply)

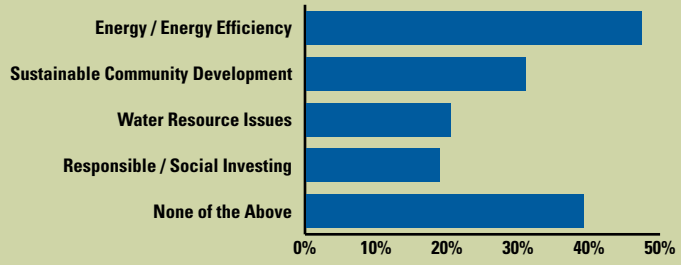


ULI Survey Question 3

Has your company allocated resources with regard to sustainable development issues? (Select all that apply)

ULI Survey Question 4

In which of the following issues has your company developed significant professional expertise?



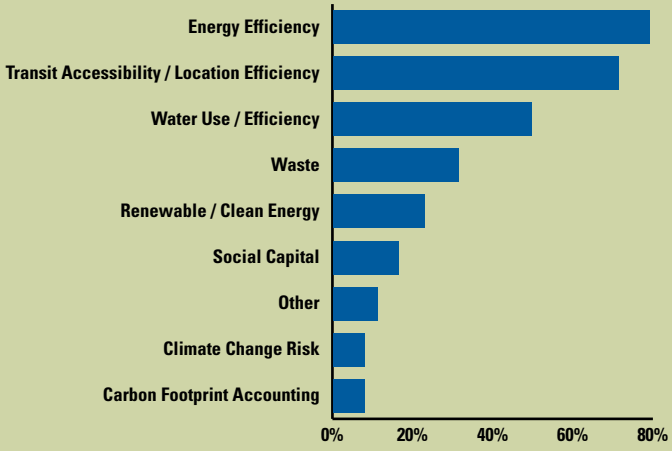
More than one in three respondents have appointed specialized staff, reallocated operating budgets, or reallocated staff priorities. The least common actions included punching up investor relations documents or creating a strong staff position in sustainability.

"We have allocated a significant amount of our resources to attract investment capital to sustainable projects, and we are educating ourselves in ways to develop and redevelop existing projects to conserve energy, land, and water."

Looking closer at professional development, it is clear that respondents are making an effort to work smarter. Nearly half say their company has developed significant expertise in energy or energy-efficiency issues, and one-third have developed professional expertise in sustainable community development. About one-fifth are training staff in water resources issues or responsible and social investing expertise.

ULI Survey Question 5

When completing due diligence review on a project or transaction, does your company perform explicit analysis of the following issues:



MEASURING ENERGY IS LIKE COUNTING CASH

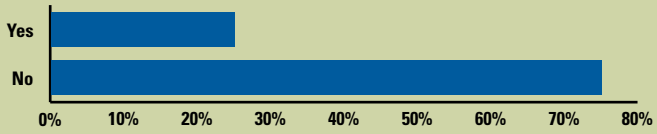
Energy-related analysis is clearly regarded as a good investment. Nearly four out of five respondents say that explicit analysis of a building or project's energy efficiency is part of due diligence. About three-quarters of the respondents perform explicit analysis of transit accessibility and location efficiency. About half conduct water-use or water-efficiency analysis, and one-third do waste-stream analysis.

Investors see less value in explicit analysis of renewable or clean-energy opportunities associated with a project. Issues related to social capital and carbon footprint accounting are rarely seen as part of due diligence. As for climate change risk analysis, less than one in ten factor this risk into transactions in an explicit manner.

"We believe quality and design have become paramount. Many discerning consumers find the 'not-so-big-house' more attractive than 'big and ugly.'"

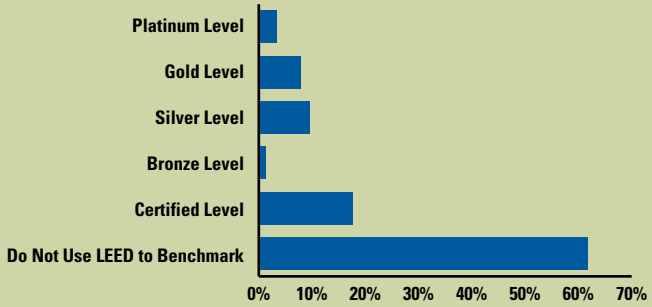
ULI Survey Question 8

Have you developed internal metrics to quantify performance related to climate change or energy issues?



ULI Survey Question 9

Do you benchmark projects according to the performance standards of LEED, and if so, to which certification level?



But what are the standards for these analyses? The challenge and complexity of measuring sustainability have led to a proliferation of alternative indices and metrics for determining progress in energy objectives. Prevailing practices indicate that many companies create their own metrics internally—one in four respondents use this route.

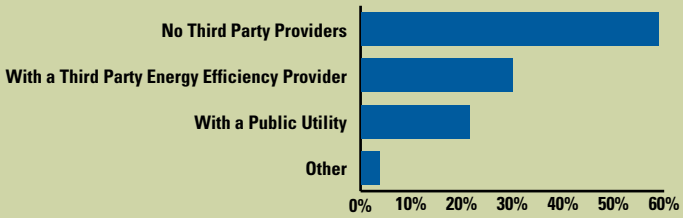
While widely adopted by the design and development community, the United States Green Building Council's LEED rating system remains an auxiliary or alternative evaluation framework among real estate investors. About one-third of respondents say that they use the system's alternative benchmarks as part of internal or external due diligence.

Limited Market Adoption of Energy Services

Most respondents indicated they had not partnered with a third-party energy-efficiency provider in a real estate transaction. It could be that the benefits of reducing energy use are best managed by owners without diluting the upside with an energy service provider or utility.

ULI Survey Question 10

Have any of your real estate transactions included third party energy-efficiency providers?



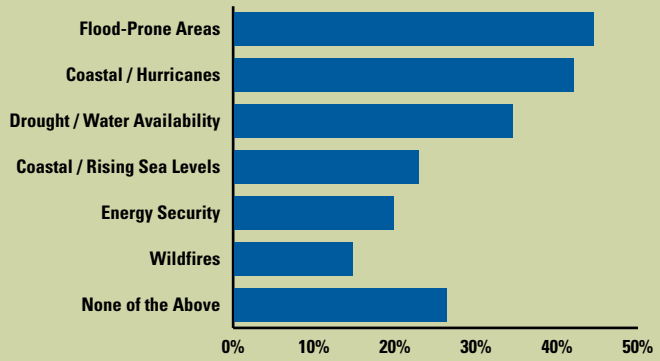
"I'm concerned that the more we conserve, the more utility companies will raise rates to pay their stockholders and their fixed costs of doing business, and therefore, we won't be rewarded monetarily for making an effort at conservation."

Examining New Categories of Risk: Where's the Worry?

Investment Opportunity Risk. ULI survey respondents identified flooding, coastal weather events, and water availability as the three most important long-term climate change impacts that introduce adaptation risk into real estate investment. Sea-level rise, the risk of wildfires, and energy security all represented a secondary level of importance. Approximately one in four respondents stated that these climate change and energy related issues did not introduce risk into future real estate investment opportunity.

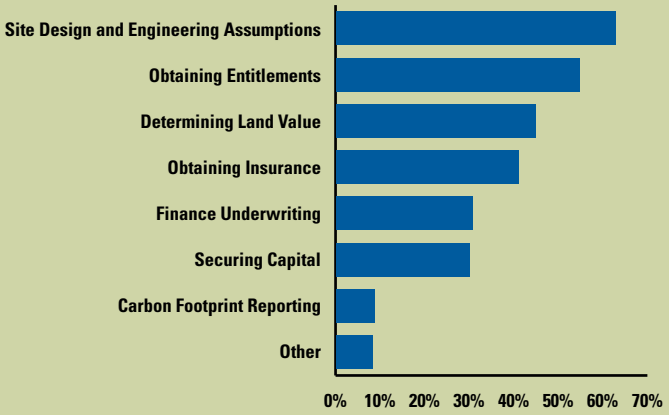
ULI Survey Question 12

Which of the following long-term climate change and energy-related issues introduce risk in your assessment of investment opportunity?



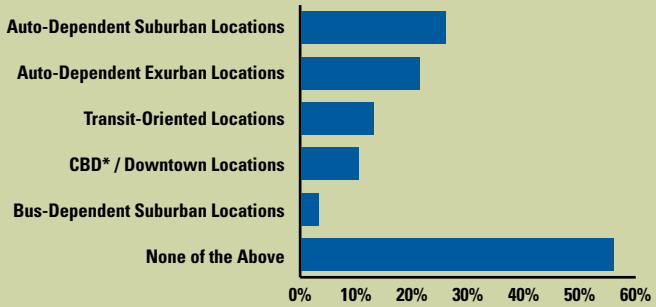
ULI Survey Question 13

Where do you believe climate change and energy issues introduce risk into the development process?



ULI Survey Question 11

Have issues associated with auto-dependency introduced significant investment risk for any of the following locations:



*CBD = Central Business District.

Development process risk. Site design and engineering assumptions are considered the most prevalent factors that introduce risk in the real estate development process, followed by the risk associated with the process of obtaining development entitlements. Approximately one-half of respondents believe that risk is introduced into the land valuation and insurance process. About one-third believe that climate change issues introduce risk into the process of securing capital or underwriting finance.

Automobile dependency risk. The majority of respondents do not see this as a risk at all. One-fourth of the respondents identified issues associated with automobile dependency (traffic congestion, a lack of access alternatives, etc.) as introducing significant investment risk for suburban and exurban locations.

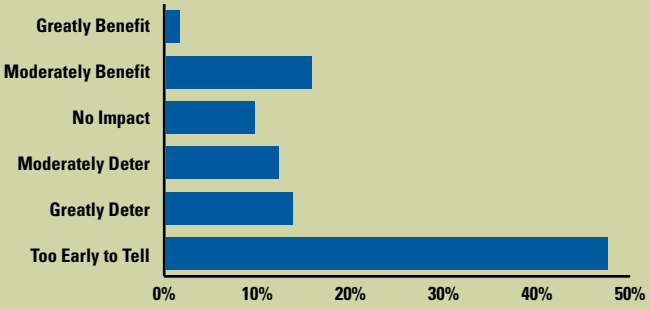
"Expect valuations to recover differentially: prices for outlying suburbs may overcompensate for commute costs, balanced by NIMBYs preventing redeployment of inner-ring parcels. I believe sustainability issues will be underwritten with economic results as proxies, not directly."

Real Estate as the Target of Emerging Climate Change Policy

Market confusion persists in the form of mixed signals in the marketplace and an inconsistent landscape of public policies and incentives. Yet, comprehensive climate change regulations loom as a significant unknown risk to prevailing real estate practices. Policies that mandate end-use emission reductions will by definition affect all aspects of doing business. Emerging regulatory scenarios may directly impact real estate investment markets through a combination of economy-wide carbon pricing through a cap-and-trade market, incentives for renewable energy generation and energy efficiency improvements, and the implementation of less flexible requirements, such as renewable portfolio standards, energy efficiency resource standards, and far more aggressive building energy codes. Will these combined changes be beneficial or burdensome to real estate markets? It is too early to tell, most respondents reply.

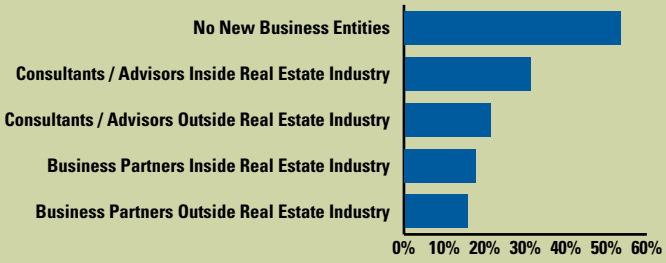
ULI Survey Question 16

To what extent do you believe proposed Cap & Trade legislation will benefit real estate markets?



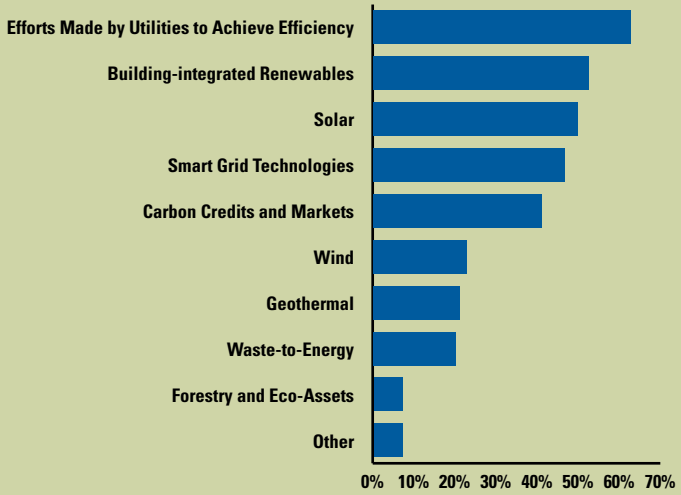
ULI Survey Question 6

Are climate change or energy issues forcing you to do business with new entities?



ULI Survey Question 17

Which segments of the energy, water and waste markets do you believe will alter the approach to real estate investment in the next 5 years?



Some investors are getting ahead of the game, by taking action to make private investment drive market conditions and distinguish product in the marketplace. Nearly 20 percent of ULI survey respondents report doing business with new entities outside the real estate industry in order to do so. But this shift represents a first step toward a potential multitude of non-traditional revenue-generating opportunities that are emerging in real estate's energy marketplace.

Investors Will Not Hunker Down Forever

Despite real estate's current stasis in many areas of energy and climate change, ULI survey respondents know that the pressure to act effectively in response to climate change is rising. More than half recognize that their real estate investments will increasingly become a host to decentralized infrastructure. They know building-integrated renewable energy—specifically solar and smart grid technologies—will change asset values, not to mention their overall approach to project deal structure. The market pause necessitated by the economic downturn offers the industry an opportunity to take stock and strategize for future investment in these areas.

"What gets built post-recession will be much better than if we were steamrolling along like it was 2006. There is now an opportunity for the legislative mandate and actions to get in place, for real estate developers and investors to get smarter, and for the design industry to build the necessary capacity."

LARA SWIMMER PHOTOGRAPHY

II CLIMATE CHANGE, LAND USE, AND ENERGY IN THE INDUSTRY CONTEXT

SECTION 1: Climate Change, Land Use, and Energy: Getting a CLUE

URBAN LAND USE AND REAL ESTATE INVESTMENT DECISIONS must be central to any long-term effort to manage energy consumption. Similarly, any effective strategy to reduce greenhouse gas emissions must consider the dynamic variables of population growth and the demographic trends that underlie consumer preferences and lifestyle behavior patterns.

Dialogue on energy and climate change issues in the United States has permeated the business and legislative communities. With the U.N.'s Kyoto Protocol agreement nearing expiration, the domestic and international dialogue regarding future regulatory frameworks has been vigorous. The conversation about the science behind global warming has now—rightly or wrongly—been incorporated into legislative scenarios, any one of which will shape the U.S. and world economy in profound ways.

This chapter provides the basic background needed to explore the potential effect of climate change and energy issues on real estate investment. It serves to do the following:

- Establish the relationships between climate change, land use, energy, and other resource consumption;
- Propose an integrated approach focused on land use; and
- Introduce the Urban Land Institute's CLUE guiding principles.

The Basics and Benchmarks of Climate Change

According to U.S. Global Change, the research initiative administered within the United States government, the effects of global climate change that are primarily human-induced can already be observed in the United States. Between 1958 and 2008, according to U.S. government peer-reviewed research, recorded climate effects have included the following observations:

- Temperatures have risen on average 2 °F (1.1 °C), with winter temperatures in the northern Midwest increased up to 7 °F (3.8 °C).
- Precipitation has increased on average by 5 percent, with greater increases in the northern Midwest and the Northeast, but with decreases in the Southwest and Southeast.
- Extreme weather events, such as heavy precipitation, tornados, hurricanes, heat waves, and droughts, have grown more intense and frequent on a regional basis.
- Sea levels have risen, with locations along the Eastern seaboard and the Gulf of Mexico documenting up to 8 inches in sea-level rise.

The principal cause of global warming during this period has been the accumulation of greenhouse gasses (GHG)—primarily carbon dioxide—in the earth's atmosphere. Produced largely as a by-product of the combustion of fossil fuels and the clearing of forests, GHG in the earth's atmosphere have caused heat to be trapped and temperatures to rise.

The Push to Mitigate Climate Change

Mitigating climate change—the process of coordinating actions to reduce the emissions of GHGs—includes a variety of activities, such as increasing energy efficiency, increasing the use of low-carbon technologies, reducing fossil fuel emissions, and reducing the demand for emissions-intensive goods and services. At the core of most strategies is the reduction of GHG emissions through a reduction of fossil fuel–based energy use, and a companion strategy of a substitution to non-GHG emitting "clean" energy sources.

Yet the effort to achieve dramatic reductions in greenhouse gas emissions faces a substantial challenge from rapidly increasing global energy demand associated both with economic development and underlying population growth. This growth is directly manifested in real estate development. Moreover, the proposed public policy timeframes and specific benchmarks for achieving dramatic long-term cuts in GHG emissions has not been instituted in either domestic or international public policy frameworks.

The Potential Effects of Climate Adaptation on Real Estate

Evolving climate conditions present new risk factors for land development and real estate investment. In the United States and globally, people are witness to the effects of rising temperatures and the resulting effects on their regions, communities, and quality of life. As the number and intensity of catastrophic weather events increases, including storms, precipitation, wildfires, sea-level rise, and coastal erosion, land use adaptation measures are crucial across a variety of sectors and industries.

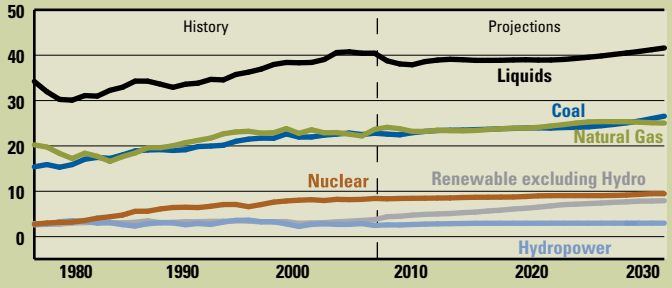
Some regions and localities are more vulnerable to the effects of climate change than others. Specific effects related to drought and drinking water supplies are likely to include greater demand for air conditioning during prolonged heat waves, which puts stress on the capacity of infrastructure systems. Changes in weather patterns might, for example, erode and restrict access to construction sites, slowing productivity in the building sector. Many other secondary and tertiary effects could be imagined.

Adaptation, as it relates to real estate, recognizes the need to factor such risks into long-term investment strategies and assesses the susceptibility of existing assets once assumed to be "fixed." From building methods to infrastructure sizing to coastal development regulations, projected climate changes present the real estate industry with varying degrees of uncertainty. Site selection, regionally appropriate products, economic and political costs, and timing, among others, will all play a part in the adaptation strategies that land use professionals must consider.

Energy: Consumption Projected to Rise

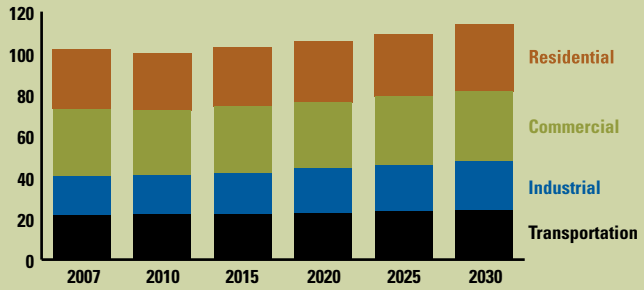
Even with aggressive energy efficiency assumptions in place, the U.S. government projects that total domestic energy consumption will rise over the next decades, not fall, making the reduction of GHG emissions only possible through the substitution of energy sources with low-carbon alternatives. Energy consumed in the United States is dependent on fossil fuel sources, with oil, coal, and natural gas constituting the overwhelming majority. The cumulative market share of all "clean" (non-GHG emitting) forms of energy represents approximately 20 percent of the total energy consumed. Currently, the U.S. Energy Information Agency does not project the composition of this "portfolio" of energy sources to radically change during the coming decades.

Projected Energy Consumption by Fuel in the U.S., 1980-2030
(quadrillion Btu)



U.S. EIA, 2009

Projected Primary Energy by End-Use Sector in the U.S.
(quadrillion Btu)



U.S. EIA, 2009

Energy is consumed in four sectors of the economy, with transportation and industry each representing approximately 30 percent of the total. The residential and commercial building sectors each represent 20 percent, or 40 percent of the total, and this usage is typically described as the end-use energy consumed within buildings.

WATER: SCARCITY ISSUES INTENSIFY

Communities have long been challenged by the costs associated with the provision of water and its treatment. Water scarcity has now increased in communities that rely on precipitation and seasonal snow-pack melt as a primary water source. The energy-intensive nature of conveying water from source to point of consumption has also been revealed as particularly carbon-intensive. In addition, the price of water consumption has been historically undervalued because of traditional public subsidies.

As a comprehensive understanding of water's scarcity and its embodied energy is priced in the broader marketplace, land use and real estate implications will likely lead to a correction in development patterns. To exacerbate the supply and demand relationships in the water marketplace, the communities and regions of the country with the most acute water scarcity projections are often those that also have the highest projected increases in population growth.

Urban Land Use: Developing a Strategic Response

Energy production, its associated greenhouse gas emissions, and energy consumption are typically represented in four economic sectors: transportation, industry, residential building, and commercial building. Decisions about what and where to build—strategic land use decisions—directly engage multiple sectors of the economy and their respective energy and emissions attributes.

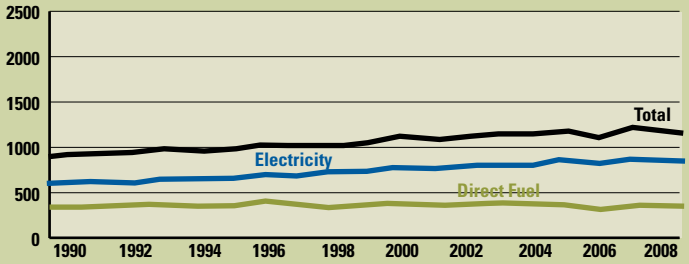
Herein lies the significance of urban land use. The linkages between climate change, land use, and energy consumption make the strongest case ever for the responsible use of land.

An overwhelming amount of research shows that as land use patterns become more compact with an integrated mixture of uses, individual building energy use is decreased and fewer vehicle miles are traveled. Given that the U.S. population is projected to increase by another 100 million people during the next 40 years, strategic land use decisions can have critical consequences in the climate change debate.

Emissions: Understanding Critical Differences

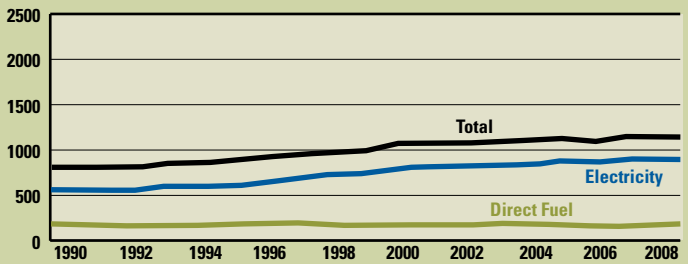
The building sector, commercial and residential, accounts for more than 70 percent of all domestic electricity use, compared to 40 percent of total energy consumption. Electricity is currently most often generated off-site from a given building or real estate asset in a power plant. The relationship between buildings and power plants is therefore critical in managing electricity consumption. Energy costs from both direct and

End-Use GHG Emissions for Residential Buildings in U.S.
(Million Metric Tons of Carbon Dioxide)



U.S. EIA, 2009

End-Use GHG Emissions for Commercial Buildings in U.S.
(Million Metric Tons of Carbon Dioxide)



U.S. EIA, 2009

indirect generation sources collectively represent 30 percent of operating expenses in a typical office building and are considered one of the largest, most manageable operating expenses.

Collectively, the building sector, including existing buildings and future new construction, holds vast potential for reducing energy demand through improved efficiency. Commercial and residential building represent roughly equal portions of energy demand, so each sector has a strategic role to play.

As managers approach these strategic challenges, they must remember an important distinction. There is a critical difference in the contribution to climate change between the primary or "direct" carbon emissions associated with the combustion of fossil fuels within buildings and "end use" emissions of power plants, which are associated with the electricity consumption in buildings:

- Direct emissions refer to those that occur as a result of on-site fuel combustion at a building (e.g., heating via natural gas, oil heater, or fireplace).
- End-use emissions occur after energy (such as electricity) is delivered to a building from elsewhere (such as a coal-fired power plant); in emissions calculations, these are attributed to the energy used in buildings.

GHG emissions associated with direct fuel use in buildings have remained generally constant since 1990. But electricity use and its associated GHG emissions have increased

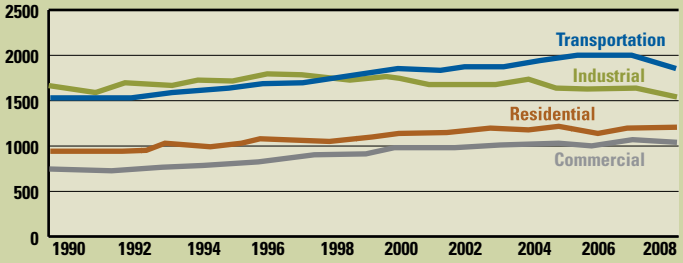
The difference between direct and end-use emissions has become a significant policy issue that is often confused in both language and regulatory intent. It is also a major contributing factor to the "split incentive" dynamic between building owners and their tenants.

Transportation: Emissions Peak or a Recession's Dip?

2008 represents the first year in decades when transportation emissions have actually declined, which is a direct reflection of the economic recession. However, historic increases in how much we drive on a per capita basis—vehicle-miles traveled (VMT)—have far outpaced the rate at which technology has made vehicles more energy efficient. This gap has resulted in increasing emissions from the transportation sector. Furthermore, the household cost burden of transportation expenditures has become a critical housing affordability factor. For every dollar a working-class household saves on housing, it spends 77 cents more on transportation. On average, working families in major metropolitan areas spend about 57 percent of their incomes on the combined costs of housing and transportation; a by-product of "drive until you qualify" housing markets.[1]

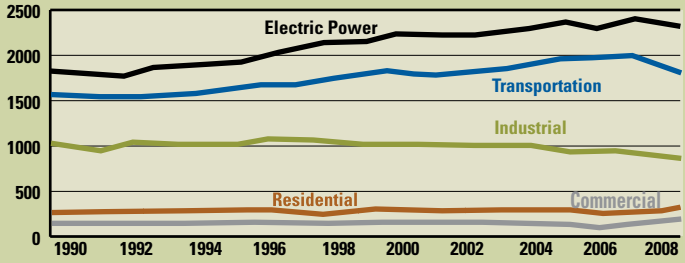
According to the U.S. Energy Information Agency, 28 percent of all U.S. GHG emissions come from transportation; of which two-thirds are from cars and light trucks, driven in low population density suburbs. As documented in ULI's *Growing Cooler* publication, the manufacturing of more fuel-efficient cars will not eliminate

End-Use Sector CO_2 Emissions in the U.S.
(1990-2008)



U.S. EIA, 2009

Direct-Fuel Use Sector CO_2 Emissions in the U.S.
(1990-2008)



U.S. EIA, 2009

enough GHG emissions to mitigate climate change by 2050. Reducing such emissions in the transportation sector must also involve managing overall transportation demand, by reducing overall VMTs through more compact land use patterns. This is the subject of ULI's recently released publication titled *Moving Cooler*.

A combination of fuel efficiency and sustainable development in the form of more compact land use will reduce transportation sector emissions. But the recent analysis published by ULI indicates that it is economy-wide pricing that elicits significant behavior shifts. Recent reductions of VMT, while not a direct function of rising gas prices, mark the first time in decades that Americans have, on a per capita basis, reduced the amount of miles driven.

Land Use: At the Nexus of Sustainable Development Practice

Long-term demographics, projected through the year 2050, indicate that some 1.5 million homes per year will be required to keep up with population growth. In the commercial office market, approximately 127 billion additional square feet are needed to meet projected demand. In some communities, as much as 80 percent of new building development is projected to occur at the edge of suburban areas on "greenfield sites," while other communities have sufficient "brownfield or greyfield sites" to accommodate growth.

Demographic forecasts put land use professionals in a strategic position to affect climate change outcomes. The growing concern over greenhouse gas emissions and energy efficiency is spurring demand for the inclusion of sustainable practices in the planning, design, and development of buildings and communities worldwide.

The beneficial outcomes of energy-efficient land use strategies are many, and are only now being broadly recognized. At a minimum they include reduced energy use, preserved open spaces, better water quality and availability, improved public health, increased physical activity, and fewer infrastructure costs. The list of such benefits continues and broad-based efforts are underway to quantify these impacts and internalize them in real estate valuation. Unlike many technological solutions, compact development provides a low-cost climate change strategy by reducing upfront and ongoing infrastructure and transportation expenses. Typically, they represent investments that were going to be made anyhow.

Both housing choice, location of employment, and especially the mixed-use integration of retail and community services are crucial to mitigate the forces of sprawl and reduce the amount of emissions from VMT. Concentrated areas of civic uses and employment situated near a diversity of housing types can form a land use framework for efficient regional transportation. Creating mixed-use, mixed-income livable communities recognizes that while employment is the cornerstone of community vitality, it is housing choices and mixed-use neighborhoods that can sustain a workforce in an energy-efficient manner.

"Where you build is as important as what you build."

— Peter Calthorpe, ULI Nichols Prize Winner

ULI'S CLIMATE, LAND USE, AND ENERGY (CLUE) GUIDING PRINCIPLES

■ **Foster a Global Response at the Local Level.** While the challenges are global in scope, effects and actions will vary from region to region. Each community must adapt in unique ways and rise to the challenge of mitigating existing trends with bold and transformational long-term solutions. The effort to achieve a low-carbon global economy will rely on local communities around the world.

■ **Empower Strategic Regional Coordination.** Public and private investments made throughout our communities cumulatively define a region's sustainability. Transportation, energy, industry, housing, and agriculture must be coordinated as part of an effective regional vision. Success is dependent upon all levels of government being engaged in the effort to effect change.

■ **Reduce GHG Emissions.** Greenhouse gas emissions must be reduced in a verifiable manner, as communities and organizations make the transition to a low-carbon economy. The real estate sector should have the ability to participate in carbon markets, by generating emissions reductions through investments in community revitalization and sustainability.

■ **Conserve Natural Resources by Using Land Wisely.** Land use strategies should foster the conservation of water and energy in our communities, preserve ecological integrity, and minimize waste and pollution. Sustainable development should be generally compact and mixed-use, and conserve or restore land for its value as green infrastructure and to sustain biodiversity. New land use models should be pursued that allow communities and economies to grow, without sacrificing the coherence, quality, or capacity of natural resource systems.

■ **Create Mixed-Use, Mixed-Income Livable Communities.** Employment is the cornerstone of community vitality, and housing choice is necessary to sustain a workforce. Concentrated areas of civic uses and employment can be organized with housing to form a land use framework for efficient regional transportation. Housing must include a diversity of types and a choice of locations to provide easy access to employment and daily needs. Housing choice mitigates the forces of sprawl and reduces the amount of VMT.

■ **Promote Accessibility and Choices in Mobility.** Enhance ongoing innovations in automobile efficiency by reducing the overall amount of VMT. Encourage communities and regions to make moving people, rather than cars, a priority by promoting emissions-free and public modes of transportation, and by locating daily destinations in easily accessed places. Reduction of VMT is a cornerstone of overall emissions reductions and will result in the enhanced health of citizens.

■ **Track Progress and Explore Feasibility.** Define the metrics of community sustainability, measure ongoing performance, and transparently communicate real progress with all stakeholders. Recognize that sustainable development relies on exploring feasible and practical opportunities grounded in reality, and incorporate a reasonable investment return. Sustainability grows from a culture of sound business practices, equitable fiscal management, and accountability.

■ **Cultivate Leadership, Invention, and Entrepreneurship.** Growth is inevitable; sustainable growth is a community's choice. We can grow into a sustainable future through partnerships that transform markets and achieve the necessary economies of scale to mitigate existing effects. Sustainable innovation is achieved through deliberate decisions that are made iteratively at every stage of projects and endeavors.

Selecting a site is at the core of the art of real estate investment. Even the best market analysis is only an educated guess about what conditions and economic forces will affect a site for years to come. With investments made on a seven- to ten-year hold basis and mixed-use development timelines approaching ten to 12 years, evaluating long-term market conditions for a site requires establishing several assumptions. Access to public transportation is one key indicator in how energy-efficient a site may be with respect to the transportation sector.

Location efficiency has started to be quantified through a series of metrics, including the measurement of indirect GHG emissions that users produce when accessing a site. As an extension of conventional traffic analysis methodology, these metrics are now being incorporated in the land entitlement approvals of select jurisdictions, notably in California and Massachusetts.

Achieving a Triple Bottom Line

Whether coined as "sustainable development" or "responsible property investment (RPI)," land use decisions can provide a framework for dozens of location, property, community, design, management, and investment strategies. However, long-term definitions of success depend on achieving two potentially divergent principles, as follows:

Sustainable development must be understood as meeting the needs of the present, without compromising the ability of future generations to meet their own needs.

Property investment must produce outcomes beyond minimum requirements, to better manage environmental, social, and governance issues in ways that are consistent with investor goals and fiduciary responsibilities.

Achieving triple bottom line returns in the form of economic, social, and environmental outcomes requires a directed land use strategy, with balanced development variables associated with each outcome. The location and attributes of a selected site and its proposed future composition of uses represent the embodiment of the triple bottom line thinking.

SECTION 2:
Emerging Business Practices

SUSTAINABILITY: GETTING DOWN TO BUSINESS

Business strategy that responds to climate change, land use, and energy has become a reality in many industries. Companies have begun to embrace sustainable thinking and practices relevant to their business models.

Fifty percent of Fortune 500 companies now practice voluntary carbon emissions disclosure. The nonprofit Carbon Disclosure Project counts 475 institutional investors and 3,700 corporations as partners. Investment firms worldwide are establishing practices to green their real estate operations through both investment and tenancy criteria. Corporate social responsibility (CSR) and sustainability agendas are growing out of substantive actions and perceived risks.

How exactly are real estate practices moving beyond business as usual? Marketing and communications around green issues have certainly

"LOCK-IN" EFFECT

LAND USE SOLUTIONS to energy and climate change produce permanent supply-demand relationships that are inherently resilient over the long term. It is called the "lock-in" effect. For example, as a walkable mixed-use neighborhood reduces the demand for fossil fuel–based transportation, it is no longer susceptible to fluctuating gasoline prices or dependent on further technological advancements.

The lock-in effect has wide-ranging potential to reduce GHG emissions because it eliminates, rather than substitutes, energy demand in the economy. If a consumer has the ability to drive to a mixed-use town center to take care of weekly errands, the consumer can eliminate additional driving while shopping at multiple stores. This behavior reduces VMT, as compared to the behavior patterns fostered by strip malls lined with single stores. Nationally, more than 75 percent of the car trips are not work-home commutes, but rather trips to access daily services.

The reduction in the resulting emissions profile is achieved, irrespective of the fuel or fuel-efficiency of the car the consumer drives. This effect is compounded over time and has been shown to reduce a community's overall per capita energy use by up to 12 percent.

gone mainstream—enough to suggest widespread change. But do not be fooled. In 2009, the real estate industry can be grouped into:

- Entities not addressing green issues at all;
- Entities "testing the waters" by addressing green through isolated activities; and
- Entities that have structured fundamental business strategies around climate change, land use, and energy issues.

"Sustainability has to be seen as a core business issue that impacts the bottom line. That's when things happen."

— Mindy Lubber, CERES

This chapter highlights the evolving business practices of the third group, who are some of the industry's leading innovators. These firms are making changes to mission statements, resource allocation, staffing plans, due diligence, practicing building commissioning, reporting and disclosure, and finance and capital structure.

A Transitioning Marketplace Full of Push and Pull

The role of finance and business accountability in environmental sustainability efforts has moved into the center from the sideline. The era of isolated demonstration projects being completed on a stand-alone basis has given way to a more diversified—and more complex—understanding of how corporate business practices and broad investment strategies tie into a broad spectrum of both tangible and still intangible outcomes. It should then come as no surprise that the brokerage community has given voice to corporate sustainability objectives in the commercial leasing process, by introducing pressures related to competition, globalization, regulation, energy costs, and climate change into tenant space requirements, especially in Class A office space.

MISSION STATEMENTS AND MARKETING: PUTTING IT IN WRITING

More and more corporate tenants are adopting corporate mission statements and sustainability goals, and declaring their goals and objectives to being green. Typically a reaction to a consumer trend in the context of Corporate Social Responsibility (CSR), these statements can range from "greenwashing" to core business drivers.

Confusion and inconsistency abound. But the drive toward transparency is undeniable. Finance executives, in particular, play a crucial role in articulating how sustainability creates value for the company and its business. They ensure that their companies' strategic and financial focus extends beyond the superficial to the substantial. For-profit companies are have formed transparent alliances with environmental organizations, partnerships once considered unfathomable, to take on sustainability challenges.[2] Definitions of CSR include:

> "Successful CSR identifies ways to harmonize social and environmental considerations with the profitability and sustainability of business operations. The very act of CSR can be argued to have business value by proactively identifying potential liabilities, opportunities for new profits through product innovation, or new avenues of investment while fostering employee loyalty and enhanced corporate governance."
>
> *—CERES 2008*

Despite widespread ambiguity, CSR and sustainability reporting have become common among large corporations. Wal-Mart's recent announce-

INVESTMENT BEGINNING TO ARTICULATE GREEN MISSION

HAS THE RUBBER HIT THE ROAD in the real estate industry? No—at least not yet. According to ULI's survey, few respondents have developed energy or climate change mission statements. Sustainability does not make it into many business or investment guidelines either. Only a handful of real estate companies track their carbon footprint. And even fewer publish sustainability reports.

Survey responses suggest that the tide is turning. Professional development funding, reallocated budgets, specialized staff, and enhanced marketing materials are among the first steps real estate companies are taking.

ment to develop a worldwide sustainability index among suppliers suggests that reporting is likely to progress beyond isolated corporate actions—and fast—and real estate's contribution to the carbon footprint of a product's production supply chain will have to be made explicit. As more companies come to understand the social and environmental effects of the economic supply chain, they move toward voluntary goals for improvement beyond what the law requires. Reporting is extensive and usually includes customers, shareholders, employees, the broader community, and the environment.

INTERNAL TRAINING AND DEVELOPMENT: ADD TO THE EXPERTISE

The rate of market penetration for green certified buildings is rising, but remains low—approximately 3 percent of all new commercial construction in 2007. In contrast, the number of firms gaining expertise in green construction techniques and certification is increasing dramatically, as is the number of pipeline projects awaiting certification at the U.S. Green Building Council (USGBC).

ULI survey findings reflect this move to additional training, with real estate companies and related members of the investment community reporting significant expertise in energy-efficiency, sustainable community development, water resources, and responsible and social investing. The trend also signals growth potential for trained professionals to gain accreditation and help their firms build sustainable real estate portfolios. Since 2001, more than 75,000 persons have gained USGBC accreditation, with most in the design and construction professions.

EVALUATION AND ASSESSMENT: ENERGY AND THE SEARCH FOR ROI

To define the process of investment due diligence is to define the degree to which the three legs of the sustainability stool—economic, social, and environmental issues—are valued and priced. If investors do not believe a return on investment (ROI) is possible, chances are the issue will not make it to the table.

The ULI survey reveals which variables are deemed important in the determination and assessment of property performance. Energy

BUILDING COMMISSIONING: DUE DILIGENCE ESSENTIAL?

Commissioning is invaluable. The process is straightforward, and the biggest challenge we face is getting the message out.

BUILDING COMMISSIONING—making sure a building is properly "tuned" for optimal operations—provides documented confirmation that systems function according to equipment specifications and to an owner's needs. In existing buildings, "recommissioning" or "retrocommissioning" may require new functional criteria to address the owner's current requirements for system performance. Each one is a systematic process for investigating, analyzing, and optimizing the building performance by improving operation and maintenance to ensure continued performance over time.

Smart operations and building management can easily trump the performance gains associated with reskinning a building or a complete window replacement project.

Firms that typically perform commissioning services include independent third-party commissioning providers, contractors, consulting engineers, design-build firms, and manufacturers. The commissioning market for new buildings increased from $114 million in 2001 to $806 million in 2004, a growth of more than 600 percent. Despite continued rapid growth, commissioning still makes up a fraction of the total construction market. However, if a building is pursuing LEED certification for new construction or an existing building project, commissioning is likely required.

Even LEED-rated buildings don't mean efficient buildings unless you can track performance data. I had one owner tell me, "We built the best, most efficient building possible … and then the people moved in."

Commissioning is imperative as a quality assurance measure for today's complex building designs, equipment, and accelerated construction. The economic ramifications for delayed occupancy and the early detection of design and installation faults can provide economic justification for many, if not most, commissioning projects.[3]

efficiency, not surprisingly, tops the list, with almost 80 percent of respondents using energy analysis as part of the due diligence process. Transit accessibility ranks a close second.

About half of the respondents evaluate water use and efficiency, while a third conduct waste-stream analyses. Fewer consider renewable and clean energy opportunities. What does not get much attention in due diligence valuation and pricing are the issues related to social capital, climate change risk, and carbon footprint accounting.

GREEN PERFORMANCE DEMANDS: TENANTS WANT IT ALL

Major corporate tenants are seeking greener facilities to attract and retain workers, differentiate their products, improve their image to consumers, and satisfy shareholder demands—all of which have ties to environmental concerns. Firms increasingly set minimum energy-efficiency and green standards for the buildings they occupy, and these standards often exceed the norm in their local markets.

"Attention to energy efficiency is driven by tenant demand."

To date, the vast majority of green building has been initiated and is owned by government and corporate owner-occupants. This trend is likely to continue, as evidenced by the aggressive agenda the federal government has set for itself, including the U.S. General Services Administration's drive to zero-net-energy buildings by 2025, as required in the 2007 Energy Act. A slower response in private property markets, on the other hand, reflects an industry that has widely underestimated tenant demands for greener facilities, while overestimating actual green construction costs. It may also suggest risk aversion that results from limited performance data for green buildings.

"A green building is not a separate property type."

CARBON DISCLOSURE: MEASURING UP?

BUSINESSES HAVE BEEN CALLING for robust, consistent, and common standards for measuring the carbon footprint of their goods and services. But products and supply chains are often global, which makes emissions difficult to assess.

Nonetheless, carbon has clearly emerged as a metric that leading companies are tracking, measuring, and looking to understand. While myriad "carbon calculators" have been created, the following mechanisms are beginning to be adopted among corporate entities that seek to publicly disclose their own end-use production of GHG and carbon footprints.

- **The Carbon Disclosure Project** (CDP) sets out to collect and distribute high-quality information that motivates investors, corporations, and governments to take action to prevent dangerous climate change. Through annual climate change information requests issued on behalf of 475 institutional investors, more than 35 purchasing organizations, and U.K. government bodies to more than 3,700 corporations across the globe, CDP plays a vital role in encouraging private and public sector organizations to measure, manage, and reduce emissions and climate change effects.

- **The Global Reporting Initiative** (GRI) has pioneered the development of the world's most widely used sustainability reporting framework and is committed to its continuous improvement and application worldwide. To ensure technical quality, credibility and relevance, the reporting framework is developed through a consensus-seeking process, with participants drawn globally from business, civil society, labor, and professional institutions.

- **The Chicago Climate Exchange** (CCX) is the world's first legally binding, rules-based greenhouse gas emissions allowance trading system, as well as the world's only global system for emissions trading based on all six greenhouse gases. CCX began trading in 2003. Its members are leaders in greenhouse gas management and mitigation, including offset providers and offset aggregators, and are located throughout the United States.

The shortage of green building space relative to tenant demand is demonstrated by the operating performance premiums that many green buildings yield, as well as by the growing trend of corporate carbon offset purchases that result in net greenhouse gas emissions reductions. These revenues could allow building owners to better position themselves to increase by keeping pace with

tenant demand for either new or retrofitted green facilities.

The United States, with its large stock of aging real estate, population growth, increasing green business practices, and rising government mandates, offers the greatest opportunities for green building investment.

The biggest move to green buildings will be in properties that do the following:

- Confer the greatest benefits to users and owners relative to conventional buildings;
- Align landlord and tenant interests in the property; and
- Offer tangible benefits that matter to tenants.

SUSTAINABILITY PERFORMANCE METRICS: WHOSE YARDSTICK WORKS BEST?

Building owners and developers are increasingly using voluntary certification and rating systems to certify their buildings and justify investments in energy efficiency–driven retrofits. LEED and EnergyStar in the United States and BREEAM in Europe are among the most common rating systems.

Although LEED and EnergyStar have been subject to vigorous critical debate regarding bias and effectiveness, each one has inspired building design and construction that push beyond legal minimum performance benchmarks established by local building codes regulations, by laying a foundation for future progress.

The degree that these systems contribute to more sustainable land use patterns and energy and water consumption remains a subject of debate, but there is no dispute as to their effectiveness in catalyzing a market response. Each one is now well understood among real estate and land use professionals, and is actively employed among a recognizable segment of the marketplace.

One in three ULI survey respondents employs the LEED rating system for either internal or external due diligence, which leaves ample room for increased use. Many others presumably develop their own performance benchmarks to quantify their progress toward climate change or energy objectives. Indeed, the complexity of measuring sustainability has led to a proliferation of alternative indices and metrics.

"Not all buildings qualify for LEED due to their age, character, or location. We have to pursue investment metrics that are going to change our business practices."

Recently, USGBC has moved aggressively to diversify its ratings systems, to respond to the unique conditions of various building types and real estate activities. Individual ratings are now established and are being employed in the marketplace for the following types of projects and activities:

- New building construction;
- Operations and maintenance of existing buildings;
- Commercial interiors;
- Core and shell;
- Schools;
- Retail;
- Health care;
- Homes; and
- Neighborhood development.

EnergyStar tools benchmark energy use in buildings and portfolios as a first step to assess energy performance and measure ongoing progress. The EPA's online Portfolio Manager enables building owners and managers to rate their individual commercial buildings on a scale of 1 to 100 against similar buildings, track energy performance over time, and target investments in energy efficiency.

The Portfolio Manager currently includes almost 12 billion square feet of building space, with a rapid annual adoption rate that pushes this figure higher. This adoption rate makes EnergyStar an industry standard for energy benchmarking and evaluating relative performance.

GREEN LEASES: GETTING TENANTS ON BOARD

If you build green, they will come, or so the thinking goes. But will tenants hold up their end of the bargain? Demand seems to be holding constant, but appropriate tenant behavior is critical to the ongoing management and continual improvement of any building.

"The downturn has not ushered in an era of collegial relationship between landlord and tenant. However, we are learning that we are in business together."

The Building Owners and Management Association (BOMA) has worked to "green" the industry benchmark: *The Guide to Writing a Commercial Real Estate Lease*, first published in 2005. Working clause by clause, BOMA changed language long accepted as common practice. The result, which is the new Green Lease Guide, which distills the complex language of commercial real estate leases to:

- Green the operations and management practices;
- Educate brokers and prospective tenants about what it means to occupy a high-performance green building; and
- Communicate the responsibilities of all parties in the ongoing efforts to keep the building green.

Lease terms provide tenants with incentives to reduce consumption of energy, water, and materials; produce less waste; recycle as much as possible; and choose energy-efficient and environmentally friendly products, furnishings, and office equipment. The lease also includes enforceable language, where appropriate, to ensure that tenants comply with the building's green practices.[4]

"Building performance [benchmarking] can communicate how an asset performs and can be used as leverage for a number of tenant issues—retention, recruitment, and ongoing landlord-tenant relations."

The BOMA Green Lease Guide offers an alternative to the typical triple net lease, in which the landlord pays for capital improvements but the tenants, who pay the utility bills, reap the benefits of energy savings. The terms give owners the right as standard procedure to pass through to tenants any capital costs that result in lower total operating costs. The language ensures that maintaining, managing, reporting, commissioning, and re-commissioning the building to conform to a green certification or rating program is included in the pass-through costs.

New Finance Products: Balancing Risk and Return

Investment and finance outfits are making strides to adapt their business models to the risky realities of energy price volatility and climate change. As consumers continue to push for more efficient homes, cars, and communities, regulators and shareholders expect investors to respond with products and services that match the customer preferences, while appropriately assessing risk.

Cost is the perennial barrier to green corporate investments in energy efficiency, whether it is by upgrading equipment or replacing inefficient lighting. Although these types of capital expenditures can actually save companies money in the long run, the factor that often determines whether a project will advance is its payback period. Companies that do not evaluate what gains can be made from investments in energy efficiency are missing opportunities to increase their bottom line.

Despite the economic downturn and continuing credit crunch, real estate capital providers have developed a new group of investment and financing products for the sustainable real estate asset class. Of course, projects touting sustainability, just like conventional ones, must prove their market worth in a slow economy.

Such projects are doing just that. The evidence of mainstream appeal for green real estate is increasing, thanks to robust data on tenant demand and financial feasibility. The result is increased tenant demand, tax benefits, energy-efficiency regulations, and better underwriting tools. Together, these objectives are fostering a growing interest in green real estate funds, green lending initiatives, and even sustainable mortgage-backed securities.

Third-Party Providers: Energy Service Companies

Energy service companies (ESCOs) are third-party providers that offer a range of energy-saving solutions, including capital improvements to real estate assets to achieve energy efficiencies. Those wary of entering into the efficiencies game find that ESCOs offer an appealing feature. Unlike consulting firms and equipment contractors, ESCOs use performance-based contracting to tie their compensation to the amount of energy saved by a given facility.

ESCOs serve as a nontraditional source of capital for financing sustainable development features, ranging from high-efficiency lighting and HVAC (heating, ventilating, and air conditioning) systems to centralized energy management systems. To offset upfront capital costs, ESCOs structure the deals so that incremental energy savings effectively cover the higher debt service payments. With guaranteed energy savings, ESCOs can improve a project's financing outlook.

"ESCOs are focusing on hospitals, schools, large institutions, and federal buildings—submarkets active during the recession while commercial real estate is not."

ON THE RADAR SCREEN: GREEN LENDING

A VARIETY OF FINANCIAL MECHANISMS introduce energy and location advantages in the determination of residential mortgage loans. Fannie Mae has explored these mechanisms as pilot programs in the past, but to no avail. Recent Obama Administration announcements, however, suggest renewed interest among public policy makers.

- **Location Efficient Mortgages** (LEM) seek to increase the principal on a typical mortgage, based on lower household transportation costs associated with an efficient housing location. Each LEM is unique, calculated by a formula that weighs population density, public transit locations, car ownership rates, and driving levels.

- **Energy Efficient Mortgages** (EEM) offer homebuyers credit for a home's energy efficiency, by giving them opportunities to take out larger loans in anticipation of future energy savings. To secure an EEM mortgage, borrowers are required to have a home energy rating conducted to verify its efficiency. Most often, homes qualifying for the program are new, including EnergyStar-certified homes.

- **On-Bill Finance** has been used by utilities as a mechanism to finance improvements. By simply adding a payment on a consumer's utility bill, the approach avoids any alterations to the legal structure of residential mortgages, while maintaining long-term certainty for the lender. Several market players have described this mechanism as "ready to go."

- **Tax Lien Financing** experiments are taking place in residential retrofit markets, where municipalities proactively use their property tax instruments to finance capital improvements. While requiring additional legislation, once passed, this strategy does not interfere with the legal constraints of a property's first or second mortgage and "stays with the asset" if the property is sold.

- **Tax-Increment Finance** (TIF) becomes a viable and creative strategy in communities or jurisdictions with an appetite to publicly finance energy-efficiency investments. Applications will likely be within a geographic district, such as a downtown or central business district, where the TIF mechanism is already in widespread use.

- **Municipal Revolving Loan Funds,** typically capitalized with energy grants received from the federal stimulus bill, are being creating in several cities.

A consortium of partners has introduced a standardized contract that seeks to introduce the performance-based process into the commercial real estate sector. Introduced by BOMA, this lease provides a standard legal lease, called "Building Efficiency Investment Agreement" between a building LLC, an energy service provider, and an investor.

However, the majority of ULI survey respondents report no involvement with a third-party energy-efficiency provider in a real estate transaction. Challenges in expanding the ESCO market into commercial real estate include the following:

- **Scale.** Typically, individual projects are considered to be too small to be commercially viable for private-sector providers. For this reason, the ESCO market has focused on industrial, institutional, and government assets. Market penetration in the commercial real estate sector is low.
- **Asset.** Capital improvements necessary to underpin the usual ESCO business proposition (HVAC equipment, building controls, lighting, etc.) are not a conventional asset against which a bank will lend. In other words, cash flow from energy savings is not a familiar revenue to back lending, even though the additional equipment provided is an asset.
- **Size.** Today's guarantee arrangements are for larger amounts and involve a long, tedious approval process. Lean credit guarantee mechanisms tailored to smaller-scale projects would help address this deterrent to energy-efficiency lending activities.

SECTION 3:
Valuation and Markets

As we have seen, business has developed innovative solutions to these very real challenges. But how can these solutions be applied to today's market environment? This chapter extends the discussion of business practices to a review of the current marketplace, emerging market preferences, and issues related to value and valuation. Given the changes in the marketplace during the past year, all projections of market activity associated with green buildings and sustainable development prepared before spring 2009 have been eliminated from this review and analysis.

Integrated Asset Management: Working with What You've Got

With energy representing approximately 30 percent of the operating expense of commercial office buildings, cutting operational costs and finding efficiencies are the top concern of owners and investors. This effort has given rise to a broad hunt for operational inefficiencies or wasteful discretionary spending with limited or only long-term returns.

The strategic management of existing assets has risen to importance, as new investments to develop new properties decreases. With 72 percent of the commercial building stock constructed before 1990, the prospect of "harvesting" energy efficiency in existing buildings is a lucrative activity.

"Energy efficiency and water efficiency are two of the most important issues facing building owners. Superior management creates value. It's about continuous improvement."

With ULI's forthcoming *Retrofitting Office Buildings to be Green*, two examples—one from each coast—were presented at ULI's "Investing Green" conference that clearly demonstrate hard returns.

- **Historic.** In Seattle's 1929 Vance Building retrofit, Jonathan Rose Companies pursued a strategy that included a $3.5 million investment in new systems, plumbing and electrical fixtures, and other improvements, such as light shelves and bicycle and recycling facilities. The project did not include replacing windows or the building's steam system. Heating costs have dropped 43 percent, and electricity costs have declined 20 percent. The building is 90 percent occupied, which is a 15 percent increase. While rents have slipped during the recession, they still hover around $20 per square foot—up from $16 to $18 when the building was bought in 2006. A post-retrofit tenant survey revealed that 85 percent of the building's occupants either walk, bike, or use transit to get to work.

- **Modern.** In Boston's One Boston Place retrofit, CB Richard Ellis working on behalf of TIAA-CREF and SITQ Immoblier, pursued a strategy to reposition an aging 40-year-old office tower into a modern, green building. The 800,000-square-foot space has recently been certified as the world's first LEED Gold-rated building under USGBC's Existing Building Operation and Maintenance rating system. A $280,000 total investment yielded a 1.3 Year ROI, or $213,000 in annual cost savings. Annual savings included 18 million kWh of energy, 3,000 metric tons of CO_2 emissions, 12 million gallons of potable water, and 182,500 pounds of trash. Incremental improvements were made to HVAC and the plumbing and electrical systems, but the retrofit did not include replacing the buildings' single-pane windows.

"One of the great ironies is that the industry was beginning to engage the complexities of sustainable development just as the market peaked."

In another example, the recent news of the Empire State Building retrofit included aggressive due diligence that sought to define state-of-the-art energy use reduction produced by positive investment returns during a 15-year period. The resulting 38 percent reduction in end-use energy consumption will likely become an industry mile marker.

Factoring in the time necessary to implement the project, the overall reduction of end-use carbon emissions at the end of the 15-year period is about 28 percent. The project will add an incremental $13 million investment to the $107 million in energy-efficiency measures required by building codes. The overall project

ENERGY EFFICIENCY AND SUSTAINABILITY OVERVIEW

AS OF SUMMER 2009, we can report the following:

- Roughly 1,700 buildings have been certified through USGBC's LEED rating system.
- About 7,700 buildings, representing more than 1 billion square feet, have been rated with the EPA's EnergyStar label, which reflects annual utility savings of $1.7 billion and reduces end-use greenhouse gas emissions equivalent to those of more than 2 million cars.
- Cities with the most EnergyStar labeled buildings include Los Angeles; San Francisco; Houston; Washington, D.C.; Dallas–Fort Worth; Chicago; Denver; Minneapolis–St. Paul; Atlanta; and Seattle.
- About 11.5 billion square feet of building floor area, predominately in office buildings and schools, is being monitored for energy use. The intent is to benchmark on EPA's 1–100 performance scale, relative to similar buildings.
- 81,000 people have gone through the LEED Accredited Professional education program.
- More than 18 million homes have been tested for radon since 1970, resulting in modifications that save 575 lives annually due to radon mitigation and radon-resistant new construction.
- Since 1970, the vast majority of American households have safe drinking water and receive annual reports on the quality of their drinking water.
- The nation's stream miles assessed as safe for uses such as fishing and swimming have increased from 36 percent in 1972 to about 60 percent.

is a component of a complete building repositioning, aimed at attracting larger corporate occupants at higher rents.

Valuing Green: What's Sustainability Worth?

The argument over green versus conventional construction costs has decreased. An increasing number of academic studies and project-based testimonials clearly quantify only a marginal difference. With the architectural, engineering, and construction trades largely conquering the learning curve, the cost of new construction is valued between 0 and 2 percent.

The "green premium" question now becomes whether the differentiation of the product in the marketplace translates into transaction value. *Doing Well By Doing Good? Green Office Buildings*—published in 2009 and the most comprehensive academic research completed to date—takes up this question. While the benefits of green buildings are discussed in broad terms—including human health, worker productivity, and environmental effects—the premium returns and values are driven by and controlled according to their energy-efficiency characteristics alone.

"It's premature to say that the current market is appropriately pricing energy performance."

Less energy consumption translates into more comparable value. The research broadly positions "green rated" buildings with a comparable 3 percent rent premium (corresponding to a 6 percent effective rent premium) and a 16 percent sales price premium. Variations in the premium are the greatest in markets where heating and cooling expenses are a large part of total occupancy cost.

"Too few buildings produce real, robust numbers to relieve the confusion that 'efficient' buildings can range in terms of savings—both in dollars and in energy efficiency."

Criticism of this study is prevalent and focuses on the academic methodology of defining market comparables for each case study. The study does not complete the level of due diligence in finding market comparables that would be at the standard level of care in any representative market transaction, but market practitioners agree that the results of this study and others tend to be important indicators of longer-term market trends.

Housing and Transportation Costs: Infill as Foreclosure Protection

In ULI's *Beltway Burden*, the relationship between housing location and household living expenses highlights a geography of economic variation across a metropolitan area. On average, working families in major metro areas spend about 57 percent of their incomes on the combined costs of housing and transportation. While the share of income devoted to each portion varies from area to area, the combined costs of the two expenses are surprisingly constant. In areas where families spend more on housing, they tend to spend less on transportation, and vice versa.

Among other policies, infill development is an important, often energy-efficient strategy that can increase the supply of housing in metro areas at inner-city or inner-ring suburban neighborhoods that already have good access to job centers. With household energy use nearly twice as high in single-family homes, compared to multifamily units, the combined effect of location and building type in determining a value premium in multifamily residential product may be only partially recognized in valuations.

Thirty-five metro areas, some of which contain more than one county, account for half the nation's home foreclosures. Most foreclosures have been concentrated in California, Florida, Nevada, and Arizona, and a modest number of metropolitan counties in other states. In fact, 66 percent of potential housing losses in 2008 and subsequent years may be in California, with another 21 percent in Florida, Nevada, and Arizona, for a total of 87 percent of national declines in these four states.

More than half of foreclosures are concentrated in 35 counties that, until recently, represented the fastest growing communities in the nation, with nearly all of them located in outer location exurbs poorly serviced by public transportation or not at all.

Location Efficiency: Walking Drives Value

The U.S. EPA recently released a report that details 17 years of residential building permit data for the nation's 50 largest metropolitan regions. Collected by the U.S. Census, results indicate that across the county, center cities and older suburbs are experiencing a striking transformation. Residential construction—condos, apartments, and townhouses—are rapidly replacing former industrial sites, underutilized commercial property, and parking lots.

Several regions in particular are showing clear signs of the shifting geography of residential construction, where central cities have more than doubled their shares of new housing. In the past six years, New York City has issued 44 percent of the region's residential building permits, which is a nearly 30 percent jump since the early 1990s.

During the same 15-year period, Chicago experienced a 16 percent increase in its share of regional permits. The cities of Portland, Oregon, and Atlanta have also seen 13 percent and 9 percent increases respectively. The EPA data also reveal that, despite the real estate market downturn, through 2007, the shift to metropolitan areas is continuing.

"In a recessionary environment—where no discretionary investment can be justified—sustainability remains a core issue. If you can make investments that lower operating costs in energy, water, and facilities management, you're creating a great performance benchmark for your real estate portfolio."

These market shifts reflect a clear acceleration of urban residential construction. Changing demographics, greater total numbers and an influx of young professionals, lower crime rates, and employment opportunities, are cited as the primary drivers of this trend. Other studies corroborate these findings, including ULI's 2007 *Emerging Trends in Real Estate* report, which cites rising demand for homes in communities that are both walkable and close to employment centers. In fact, the report, researched during the months of highest energy prices in the summer of 2008, highlights infill and mixed-use development as "best bets" for development:

> "Higher energy costs add fuel to the fire—consumers want greater convenience in their time-constrained lives. Far-flung greenfield homes may cost less, but filling the gas tank burns holes in wallets. Both empty nesters and their young adult offspring gravitate to live in more exciting and sophisticated 24-hour places—whether urban or suburban—with pedestrian-accessible retail, restaurants, parks, supermarkets, and offices. Transit-oriented development at subway or light-rail stations almost cannot miss."

Policy Moves: An Uncertain Stimulus

The American Recovery and Investment Act of 2009 represents an unprecedented federal investment in energy and sustainability. By targeting more than $100 billion explicitly to green programs, the bill was intended as a down payment on a new green economy and will serve as a precedent for future policy and spending. Interviews with several municipal energy offices confirm that funds earmarked for energy-efficiency have been mostly allocated to ongoing projects; with notable exceptions such as New York City, all are designated for public sector projects such as street light replacement.

Energy is a recurring theme in the stimulus bill, with nearly $60 billion in federal investment or tax incentives being offered. Areas of investment include energy efficiency tax credits for homeowners and producers of green energy, R&D grants, and grants to state and local governments to produce energy plans and make investments in long-term sustainability.

The Government Services Administration (GSA), with nearly $4.2 billion earmarked for energy-efficiency improvements to federal facilities, is poised to make a tangible difference in real estate practices, by giving it a boost toward the "net-zero" energy benchmark Congress identified in the 2007 Energy Bill. Additional funds dedicated to public housing assets across the country are being spent on swapping out aged boilers and weatherizing units, which produces little increase in local real estate markets.

How will it all shake out for the real estate industry? About 25 percent of ULI survey respondents expect the bill's energy-efficiency investments to have positive effects on business practices. Another 10 percent predict an overall negative effect. More than half think it is still too early to tell.

Institutional Investors and REITs: Green Funds Taking Root

Green real estate funds represent an interest area for real estate capital providers. But most funds are private equity vehicles, often with the partnership of public pension funds. Investments from public equity markets have been minor, held back by the extremely limited availability of certified green building product for purchase and the lack of common green product definitions throughout the industry.[5]

Select examples include:

- Launched in September 2006, the Hines/CalPERS (California Public Employees Retirement System) Green Development Fund leveraged $120 million in equity financing to develop four office properties with an estimated market value of $500 million.
- The Rose Smart Growth Investment Fund, created by Jonathan Rose Companies, targets the acquisition and renovation of existing properties in urban locations. When fully invested, the fund estimates equity of nearly $100 million to $400 million in market value.
- The California State Teachers Retirement System (CalSTRS) has invested more than $100 million to date in Thomas Properties' new co-mingled investment fund. The fund seeks to raise $250 million to $300 million to invest in ground-up development and renovations for office and other green projects nationwide.
- JP Morgan is completing a $500 million capital drive for its Green Urban Renaissance Fund, which will focus on sustainable urban projects.
- Morgan Stanley has launched a $200 million fund to invest in solar power installations developed by Recurrent Energy for institutional real estate projects across the country.

There is evidence in the commercial real estate industry that investments in energy efficiency require much higher internal rates of return than do other capital investments. Asset managers will often make decisions with larger immediate payoffs because of periodic performance rewards and pressures to meet annual budgets. Further, managers may be inclined to invest in larger transactions, rather than smaller ones, even though the smaller ones produce larger returns over time. At a minimum, institutional investors should require their asset managers to make all investments in energy efficiency that can be expected to meet or beat the property's targeted internal rate of return.

Insurance Trends: Recognizing Climate Change as Risk

Recognizing climate change as an issue of "enterprise risk management" that threatens underwriting, asset management, and corporate governance, the insurance industry, valued at $16 trillion, has begun to address the issue with a variety of products to help reduce energy use. Lower premiums on homeowner and property or auto insurance for people who build green homes, drive fewer miles, or own hybrid cars are now common.

As of March 2009, insurance companies with annual premiums of $500 million or more were required by regulators to adopt mandatory cli-

mate-risk disclosure standards. These standards require firms to disclose to both regulators and investors the variety of payout risks climate change may introduce.

TRENDS IN MANAGING RISK FOR INVESTORS

CONCERNS ABOUT CLIMATE CHANGE, energy, and the environment directly challenge companies' reputations and brands. Firms in carbon-intensive sectors—real estate, as well as power and utilities and transportation—that don't account for these issues could risk their reputations as well as revenues. To manage the risks associated with climate change and energy, investors are growing strategically conscious of several key trends.

At least three major types of risk are material to investors:

- **Market.** Rising green standards will make inefficient buildings increasingly obsolete over time.
- **Regulatory.** Governments may quickly alter the playing field and cost/benefit calculations.
- **Environmental.** Physical damages can be attributable to climate change.

Each type of risk will present challenges to owners who fail to adapt quickly to new standards, and threaten reversion values. Markets will be flipping from a premium for green buildings to a discount for obsolete construction. How fast this switch happens depends on the amount of construction relative to the standing stock, the strength of tenant preferences for greener space, and the extent of government penalties on energy inefficiency, among other factors.

Supply-constrained markets with significant barriers to entry will be protected longer than more dynamic, faster-growing markets. But in many markets, especially the most desirable markets for tenants and investors in Northern Europe, Asia, and North America, the tipping point should be well within the traditional ten-year institutional hold period for investment real estate.

The immediate risks are to older, inefficient buildings, whose obsolescence will be reflected in diminished performance potential (lower rents and occupancy rates) and property value (equal to the cost to cure to the new market standard). Longer term, the risk will shift more broadly to institutions slow to change and will cultivate the competency required to convert to more sustainable buildings.

From Risk to Opportunity: Insurer Responses to Climate Change produced by CERES, cites property insurance companies as most active among all insurers. Liability insurers are also responding, a suggestion more insurers might voluntarily assume the responsibility of climate-related litigation costs borne by policyholders. These companies are pursuing initiatives and streamlining products that look to new technologies and practices to mitigate climate change. Green buildings are popular among insurers' products and services, especially those targeted for new construction, but also for retrofitting existing buildings, either after a loss or in the course of standard renovations.

Successful coverage of energy providers that deliver solar and wind power make renewable energy an industry with attractive market potential for more and more insurance companies. These providers are gaining in popularity, but are still at the margins of insurer financing; investments are low and no carbon technologies are included. AIG is the only notable U.S. insurer to broaden its portfolios beyond renewable energy and strategically assess climate risk in this area.

Carbon markets, which include carbon trading, insurance for credit risks, political risks, and carbon neutral products, are seeing an increase in participation by insurance companies. A handful of insurance companies are also now preparing CSR reports, demonstrating the industry's attempt to improve corporate citizenship.[6]

What's Ahead: Green Real Estate as Mitigation of Risk

Supporting the integration of climate change considerations into land use planning is another natural role for insurers, although the public sector clearly has lead responsibility. In 2006, post-Hurricane Katrina analysis by the University of North Carolina at Chapel Hill's Raymond Burby revealed that per-capita economic losses were three times lower in areas where building codes and comprehensive land-use planning were in use. Examples from many countries support the same conclusion.

Tremendous concern has been expressed about the potential for "correlated risks" from climate change. Such risks simultaneously increase an insurer's underwriting losses, while negatively affecting the invested assets that the insurer uses to pay off those claims.

Though adverse effects on investments might be temporary in some cases, considerable liquidity problems could nonetheless arise. Examination of the sustainability of investment practices must begin with looking at the resilience of an insurer's portfolio to climate change.

External Value and Risk: Uncertainty and Opportunity

External sources of value and risk are beginning to be quantified and incorporated in valuation, although with some uncertainty. Even as these opportunities arise in real estate, there is still likely to be significant resistance and passive response to the changing landscape. Here is a look at some of what is ahead and the opportunities and challenges in external markets.

THE CHANGING REAL ESTATE PRO FORMA

The global transition to low-carbon emissions will require an economy-wide push in the United States to reduce greenhouse gas emissions through both conservation and cleaner energy. The big GHG generators—transportation, industrial, and building sector emissions—will remain the lead actors. But the effect and opportunities will be realized across the energy marketplace.

The real estate industry will face direct and indirect effects of a cleaner economy through:

- Higher operating costs; and
- Increased opportunities, in providing cost-effective and competitive ways to reduce carbon emissions.

Issues related to energy and water use are increasingly entering into the real estate pro forma.

AN INSIDE-OUT LOOK AT COSTS

THE COSTS ASSOCIATED WITH ENERGY and water use rarely account for the full effect on human health and ecosystems. Economists call these costs direct and indirect "externalities." Buildings create indirect externalities through the use of fossil fuel-based electricity, which generates externalities in its production. Buildings also generate direct externalities from construction emissions and impervious and heat-trapping surfaces, which lead to stormwater runoff and contribute to urban heat island effects.

While the private benefits from environmentally friendly design continue to grow, the external costs persist within the marketplace. Consequently, developers and owners find little economic incentive to further mitigate environmental effects in buildings. As a result, legislators seek to internalize costs by putting a price tag on those activities that generate externalities.

The mechanisms to price externalities can be direct (such as a fuel tax) or indirect (codes and ordinances that effectively raise prices through costs of compliance). Policy instruments can include:

- Rigid command and control type rules that prohibit development, such as those under the Endangered Species Act; and
- More flexible, market-based mechanisms, such as wetlands mitigation banking, which allow the environmental effects of development to be offset by the protection of land elsewhere.

All eyes will be on buildings when it comes to climate change and energy use issues. The operation of buildings accounts for nearly 40 percent of energy use in the United States—more than 70 percent of electricity and almost 40 percent of CO_2 emissions. In select cities, the building sector represents up to 80 percent of end-use CO_2 emissions. In addition, the U.S. Energy Information Agency projects a 29 percent increase in total sales of electricity by 2030. Clearly buildings will continue to play a critical role in energy management as demand and prices rise.

Climate change and energy may not affect business practice today. But operating under that mindset will not serve investors well, especially as the effects of climate policies and energy efficiencies work their way into project evaluation and asset management.

THE LOOMING CHALLENGE OF POLICY EFFECTS

Climate policy, in one form or another, promises to affect the real estate sector, as follows:

- Incentives for clean energy generation;
- Renewable energy portfolio standards;
- Carbon pricing through a cap-and-trade market;
- Energy-efficiency resource standards; and
- Greener building codes.

It is hard to predict the effect of any one piece of legislation, but the clear result is an economic incentive to change the way buildings are constructed and operated.

"It's hard to keep track of the incentives offered to address climate and energy in construction and real estate—though the industry has been unresponsive to pursuing them."

This is the real estate community's cue. Developers, financers, investors, and other leaders have a significant opportunity to get involved and shape the industry's future. Many options have become available to indirectly reduce carbon. Some reduce energy consumption. Others replace energy purchases through on-site generation using low-carbon inputs. And no doubt more innovation, and incentives, will be delivered to the marketplace.

Still other opportunities exist as the federal government pursues a market-based cap-and-trade program for carbon emissions. Under the proposed legislation, allowances will not be held or traded by developers or building owners. That fact may explain why nearly half of ULI survey respondents think it is too early to tell if cap-and-trade will benefit real estate markets.

"The building code provisions in the emerging climate bill are a huge shift which enables the federal government to dictate energy codes to the states."

However, the real estate sector will be affected by the cap-and-trade program in other ways. The legislation will invoke carbon prices that affect direct fossil fuel users. Those users, mainly power companies, will pass on at least part of the carbon prices to energy consumers as higher energy costs. The response by both power companies and energy consumers—the real estate industry, for example—will be to reduce the amount of energy used through energy-efficiency upgrades or on-site renewable energy generation.

"The carbon cap-and-trade system is important but so are complimentary policies to reduce GHGs in all sectors, specifically transportation."

The Importance of Utilities in Driving Market Change

Recognizing efficiency as a significant means to manage user demand, utility companies offer performance incentives in many states. Though sporadic, these programs have proved effective in promoting energy-efficiency investment. California has been the most successful, by reducing per-capita energy use to well below national averages through a series of performance incentives, audits, and consulting services, and decoupling utility profits from the amount of energy sold.

"The energy-efficiency provisions in the climate bill will turn utilities into rebate providers. The real estate industry has to get ready to capitalize on legislative elements that will directly impact them."

Growing interest surrounds the on-site generation of energy as well. For instance, nearly three-quarters of ULI survey respondents expect building-integrated renewable energy, specifically solar power, to alter their approach to real estate investment in the next five years. Nationally, the existing electric infrastructure is ailing and the guarantee of a smart grid for the transmission of renewable energy puts an even greater emphasis

on building-integrated renewable energy. While there is significant effort in the development of a smart grid design and new transmission lines, siting and costs remain major obstacles.

Utilities also rely on green pricing and net metering to manage renewable energy. Green pricing allows customers to pay more for renewable energy purchases by their electricity provider. Net metering allows small-scale renewable energy generators to sell excess power back to the utility. The options vary by state and by utility, but 46 states currently offer green pricing.

"In terms of reducing energy consumption, new buildings are low-hanging fruit compared to the challenges we face in transforming existing buildings."

Utilities, too, are rewarded for promoting reduced energy use. The real estate community can therefore expect to see more opportunities for utility-based incentives and funding for energy-efficiency improvements into the future. Building tenants can benefit from reduced operating costs by using less energy and generating better sustainability rankings. Building owners can benefit from higher occupancy rates that eventually translate to higher rent premiums, as energy prices continue to rise.

The Market Barrier to Energy Efficiency

It is widely accepted that energy-efficiency improvements provide significant returns—the less energy you use, the lower your energy bill. In addition, energy-efficiency upgrades can come at little cost and with little or no sacrifice by tenants. Such high-return investments in energy-efficiency are widely considered to be the cheapest way to reduce global greenhouse gas emissions.

A recent report by the McKinsey Global Institute shows that investments in energy productivity could cut energy demand in half, provide an estimated 17 percent average rate of return, and reduce spending on energy infrastructure. Gains in energy productivity can also generate half of the global emissions reductions recommended by the Intergovernmental Panel on Climate Change.

One opportunity to achieve these improvements lies in the investment of "negawatts," a term coined by Amory Lovins of the Rocky Mountain Institute to refer to electricity that is saved by using it differently. In other words, electricity used more efficiently or at a different time can achieve the same outcome at a lower cost. This thinking redefines energy conservation away from a notion of sacrifice to one of optimization with no net change in the quality of life.

The generation of negawatts provides cost savings, by generating profits at virtually all levels of development. Given these returns, negawatts have the potential to change the way buildings use energy. To date, however, such investment has been slow to take hold in real estate.

Why? To date, the principal agent (developer-operator) problem of split incentives is the chief market barrier. Developers make energy-saving investments. Tenants then accrue the benefits of lower energy bills. The beneficiaries of the investments are not the same parties that bear the costs, thereby splitting the incentives across users. Leasing structures, time horizon issues, and price volatility can also hinder the large-scale generation of negawatts in the building sector, as can the small proportion of energy costs to overall operating costs.

The New Urgency in Water Pricing and Allocation

Water availability is another major concern related to climate change. Arid regions in the United States experience continued droughts and water shortages. Even the Great Lakes region—abundant in freshwater supplies—fears declining water levels, urban runoff, and invasive species. Water already enters into the real estate pro forma in many parts of the country.

The real estate industry will be significantly affected by changes in water availability, as well as policy changes in water pricing structures and markets, water allocation laws, and stormwater and wastewater treatment regulations. Again,

opportunities exist to change the way properties use water, which will provide cost-effective alternatives to large engineering projects to change water flows.

The costs of water provision continue to rise in the face of aging infrastructure, changes in water flows from diversions for development, threats to freshwater quality, and increased water scarcity concerns from climate change. In addition, stormwater and wastewater management is becoming increasingly costly and burdensome, as urbanization and extreme rain events lead to property damage from flooding and human health risks from contaminated sewer overflows.

Municipalities have long been challenged by both water treatment and water provision for expanding metropolitan areas. Data from the U.S. Census Bureau confirm historical increases in local government expenditures on water and sewer provision, with recent annual increases of close to 6 percent.

The full costs of water provision, as well as the external costs of water use, are rarely reflected in the price of water. Cost-recovery schemes and policies to internalize the external environmental costs of water provision and treatment could greatly affect future prices of water for developers.

The increased focus on water quality and supply has led to more conservation-based water pricing structures throughout the country. These structures include:

- Block rate pricing, which has been adapted in many cities; and
- Marginal cost pricing, which is designed to recover costs of management agencies for infrastructure maintenance and operating costs, including energy costs.

Policy makers are beginning to better understand the relationship of development to water flows and, as a result, seek more development restrictions and protected land agreements (e.g., Catskills, Everglades). Better use of water within properties and developments can alleviate the burden on municipalities, and at least partially offset the need for costlier development and water use restrictions.

- Water efficiency is analogous to energy efficiency in some respects.
- Water-saving appliances are readily available in the marketplace, but water costs are often not high enough to generate large-scale changes in building design and operation.
- Opportunities exist in managing water on-site in buildings.
- Often the costs of the energy required to treat and pump water are used as a proxy to the costs of water, which are artificially low.
- Neither the price of water nor energy reflects the full external costs of their usage.

With changes in rainfall, development diversions, and municipal budget shortfalls, the costs of water have the potential to dramatically affect real estate.

The Emerging Opportunity of Infrastructure Decentralization

Several factors affect the potential for real estate as a "host" of decentralized infrastructure. On-site energy generation through wind, solar, geothermal, or co-generation requires space for equipment. Most urban centers are dense and would require significant changes to existing buildings and associated land use to incorporate the necessary facilities. Rooftops often have significant unused space that can be used for solar generation or converted to green roofs for cooling, water management, and carbon mitigation.

In dense urban areas, on-site energy generation is more prevalent in new buildings, where it can be directly incorporated into the designs. Further, in developing urban centers where there is little existing infrastructure, such as Abu Dhabi, an entire city can be planned in a more holistic way. Residential on-site generation in homes is becoming increasingly popular, because of fewer

DECENTRALIZATION CHALLENGES

WHILE INCENTIVES WILL CONTINUE to arise for building owners to seek energy and water-saving practices, any new building operation or existing retrofit is subject to a performance and financial assessment. While energy efficiency investments are fairly low risk, on-site energy generation, waste-to-energy, and water-reuse and recycling investment returns are less certain. Much of the technology is relatively new or evolving, and building owners and tenants do not have the necessary experience or skills to operate the facilities.

Performance and maintenance uncertainty can lead to unknown payback periods for costly upfront investments. The split incentive problem of developers and operators persists for energy and water use, and the market signals from tenants are not entirely clear yet. Nevertheless, the growth in green building technology is significant. There are numerous examples of complex building systems, which will help to overcome many of these challenges.

space constraints and performance-based incentives from utilities.

Both solid waste and wastewater can be considered valuable inputs to building operation. By converting waste to an energy source, using advanced-technology gasification or incineration, fewer resources are devoted to waste disposal, while small-scale energy is generated for on-site use.

Water supplied to buildings is generally used once and disposed as wastewater. Similarly, rainfall is often treated as stormwater, rather than a resource for human and economic activity. Through recycling and reuse, the costs of waste and stormwater treatment and compliance can be significantly reduced. Additionally, as water scarcity increases, on-site water recycling and reuse can create a more sustainable building operation.

"Think about the pounds of waste generated by your entire portfolio—if you can develop the programs and partnerships to recycle these waste streams, there is massive potential."

On-site renewable energy generation and waste management may require a larger scale of operation than any single building can offer, so the creation of a small market through the integration of several buildings may present significant potential. Commercial buildings can also be linked through creative offset programs and better cooperation.

Real Estate as Carbon Sink?

Land use will play an important role as power companies and utilities seek cost-effective ways to mitigate carbon. Given the potential to sequester carbon in soil, plants, and trees, rural landscapes will offer large opportunities to store carbon. Within urban settings, buildings and developments can also use green spaces and trees, not only to provide recreation areas and aesthetic improvements, but also to generate positive externalities associated with carbon sequestration. Further, improved building materials are entering into the marketplace to mitigate carbon, reduce urban heat island effects, and manage water. While green roofs provide many environmental benefits, it has been demonstrated that even simple reflective or light-colored roofing material can provide significant reductions in surface temperatures.

Emerging markets lie in the provision of ecosystem services as ways to create flexible mechanisms to internalize externalities associated with land use. The notion of payments to property owners for ecosystem services has traditionally been applied to farmers in the United States or to rural landowners in developing countries. However, there are an increasing number of examples of business-environmental partnerships to facilitate the development of these markets. There is significant economic value in the mitigation of carbon, the recharge of groundwater aquifers, and the management of stormwater, for example. The investment in these emerging markets will follow the cost-effective approaches, most of which lie within the real estate community.

What's Ahead: Price, Demand, and Threats All on the Rise

While uncertainty remains about the future effects of climate change on real estate, several key issues are well known. Global energy demand is increasing at a rapid pace, threats to freshwater supplies and aging infrastructure are placing significant burdens on water managers, and there is global consensus on the need to reduce greenhouse gas emissions.

The real estate industry is both directly and indirectly involved in the generation of negative externalities associated with energy and water, and can be a significant player in the emerging demand for cost-effective ways to generate carbon mitigation and water conservation. Energy and water prices likely will continue to rise as a result of these issues. What makes good business sense for real estate investment professionals? Efficiency improvements and on-site decentralized infrastructure for renewable energy and water management.

Notes

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3 English, Michael. *What Owners Need to Know About Commissioning Buildings*. (2005), http://www.bcxa.org/downloads/WhatOwnersNeedtoKnowAboutCx.pdf (accessed on June 9, 2009).

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5 Nelson, Andrew J. *Globalization and Global Trends in Green Real Estate Investment*. (San Francisco: RREEF Research, September 2008), iv.

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SOLARA COMMUNITY HOUSING WORKS

III ADDITIONAL RESOURCES

REAL ESTATE INVESTMENT AND BUSINESS PRACTICES will continue to evolve rapidly, as climate change and energy issues become increasingly competitive priorities for companies in the United States. This report is therefore a snapshot of how the real estate investment community—individual investors, investment funds, and real estate lenders—currently view or are engaging in specific business practices associated with energy or climate change at this unique period of market adjustment. The literature is constantly emerging and will continue to be produced as market forces and regulatory inertia shape the future of green real estate development. The following primary research references, listed chronologically from 2006 to the present, are a sample of academic research, industry reports, and market studies and can guide readers who are interested in seeking further conclusions.

Stern, Nicholas H.
The Stern Review: The Economics of Climate Change.
Cambridge, UK: Cambridge University Press, Great Britain Treasury, 2006.
This study examines evidence on the economic effects of climate change itself, and explores the economics of stabilizing greenhouse gases in the atmosphere. In addition, it considers the complex policy challenges involved in managing the transition to a low-carbon economy and in ensuring that societies can adapt to the consequences of climate change that can no longer be avoided.

McKinsey and Company and the Conference Board.
Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?
Washington, DC: McKinsey and Company, 2007.
This study concludes that there is significant potential to reduce greenhouse gas emissions in the U.S. and that these reductions would involve pursuing a wide array of abatement options available at marginal costs. The average net cost of such options to the economy is far lower, if the nation can capture sizable gains from energy efficiency.

Nelson, Andrew J.
The Greening of U.S. Investment Real Estate—Market Fundamentals, Prospects, and Opportunities.
San Francisco: RREEF, 2007.
This paper provides a brief overview of the green movement in business generally, and in real estate specifically, and then explores and documents trends in green building. It also focuses on the key drivers for green building investment, as well as the barriers that have limited this investment. The paper highlights potential green building investment opportunities, and practical and strategic considerations for major real estate portfolio owners.

McGraw Hill Construction and Siemens Building Technologies, Inc.
The Greening of Corporate America.
Washington, DC: McGraw Hill Construction, 2007.
This research from McGraw Hill Construction, in partnership with Siemens, offers insights from 190 of America's largest corporate leaders on such topics of sustainability as green building investment, socially responsible investing and reporting, and corporate leadership in a changing regulatory landscape.

Rocky Mountain Institute and CoreNet Global.
The Energy Challenge: A New Agenda for Corporate Real Estate.
Denver, CO: Rocky Mountain Institute, 2007.
This report describes and recommends two action plans—one for corporate real estate and one for service providers. Recommendations vary by strategic nature and by duration and immediacy; however, each plan targets a 60 percent energy use reduction in commercial buildings, compared to a 2006 baseline as an immediate goal.

Pivo, Gary.
"Exploring Responsible Property Investing: A Survey of American Executives."
Corporate Social Responsibility and Environmental Management, 15(4): 235–248, 2007.
This paper examines corporate responsibility in the U.S. property investment industry.

United Nations Environment Programme (UNEP).
Buildings and Climate Change: Status, Challenges and Opportunities.
Nairobi, Kenya: UNEP, 2007.
This publication outlines the salient features of energy use and greenhouse gas emissions from building use and construction, and assesses factors that affect the ability and willingness of the building and construction sector stakeholders to adopt energy efficiency and consequently greenhouse gas emission reduction measures.

Nelson, Andrew J.
Globalization and Global Trends in Green Real Estate Investment.
San Francisco: RREEF, 2008.
This study concludes that real estate developers and managers are adopting greener business practices in all regions of the world, at all stages of economic development, driven by the favorable financial returns for greener buildings, owing to soaring energy costs and the significant savings afforded by thoughtful green designs or renovations. Globalization is reinforcing and accelerating these sustainable property development and operating trends. However, in developing regions, rapid wealth creation and economic development are simultaneously causing significant growth in energy consumption and greenhouse gas emissions. Multinational corporations and global investment firms are especially important in establishing greener real estate business practices worldwide, through their tenancy and investment criteria.

Jones Lang LaSalle and CFO Research Services.
The Role of Finance in Environmental Sustainability Efforts.
Boston: CFO Publishing Corp., 2008.
In February 2008, CFO Research Services (a unit of CFO Publishing Corp.) conducted a survey among senior finance executives in North America to examine the role of executives in their companies' environmental sustainability efforts. The survey asked about the priority of activities related to sustainability, the integration of finance with sustainability activities, the barriers to improvement, and the benefits of sustainability.

Tobias, Leanne.
Toward Sustainable Financing and Strong Markets for Green Building: U.S. Green Building Finance Review.
San Francisco: Malachite LLC, 2008.
This study surveys the progress of the key actors influencing the financing of green buildings and proposes a set of recommendations for both private and public sectors to mainstream the delivery of green buildings to the U.S. market.

United Nations Environment Programme (UNEP)—Finance Initiative Property Working Group.
Building Responsible Property Portfolios.
Nairobi, Kenya: UNEP, 2008.
This report, jointly developed by the UNEP Finance Initiative (UNEP FI) Property Working Group and the Principles for Responsible Investment (PRI) initiative, highlights international best practice examples of leading UNEP FI and PRI signatories on how to apply the Principles for Responsible Investment to property assets.

Green Building Finance Consortium.
Quantifying "Green" Value: Assessing the Applicability of the CoStar Studies.
San Rafael, CA: Green Building Finance Consortium, 2008.
This report provides guidance to the real estate industry on the interpretation and use of data and research supporting green building investment.

Carbon Trust.
Climate Change—A Business Revolution? How Tackling Climate Change Could Create or Destroy Company Value.
London: Carbon Trust, September 2008.
This report sets out a range of global carbon mitigation scenarios and related assumptions for the transition to a low carbon economy. It further demonstrates how these assumptions and scenarios could affect projected company cash flows and company value.

Miller, Norm, Jay Spivey, and Andy Florance.
Does Green Pay off? CoStar Data Analysis.
San Diego: University of San Diego, Burnham Moores Real Estate Center, 2008.
This preliminary study calls for further research and provides some comparison data on EnergyStar versus non-EnergyStar rated office property from the entire United States, using CoStar data.

Building Design + Construction Magazine (Online)
Climate Change and the Built Environment.
Building Design and Construction, November 2008. New York: Reed Business Information.
This paper offers an objective overview of climate change and what it means to those who shape the built environment—architects, engineers, builders, property owners, and real estate developers. Beyond providing information, it presents practical suggestions to engage AEC professionals and firms in addressing climate change.

Urban Land Institute and Price Waterhouse Coopers.
Emerging Trends in Real Estate 2008.
Washington, DC: Urban Land Institute, 2008.
The report provides an outlook on U.S. and Canadian real estate investment and development trends, real estate finance, capital markets, property sectors, metropolitan areas, and other real estate issues.

Urban Land Institute.
Growing Cooler: The Evidence on Urban Development and Climate Change.
Washington, DC: Urban Land Institute, 2008.
This publication reviews existing research on the relationship among urban development, travel, and the CO2 emitted by motor vehicles. It also provides evidence on and insights into how much CO2 savings can be expected with compact development, how compact development is likely to be received by consumers, and what policy changes will make compact development possible.

Nelson, Andrew J.
How Green a Recession?—Sustainability and Prospects in the U.S. Real Estate Industry.
San Francisco: RREEF, 2009.
This report concludes that the current recession will only slow, but not fundamentally alter, the market shift to sustainable real estate. Savvy, cash-rich investors will find numerous opportunities to capitalize on these trends, even during the recession, while owners who fail to adapt quickly to the new standards may find their viability jeopardized.

McKinsey and Company.
Pathways to a Low Carbon Economy.
Washington, DC: McKinsey and Company, 2009.
McKinsey and Company's greenhouse gas abatement cost curve provides a quantitative basis for discussions about what actions would be most effective in delivering emissions reductions and what they might cost. It provides a global mapping of opportunities to reduce the emissions of GHGs across regions and sectors.

Eichholtz, Piet, Nils Kok, and John M. Quigley.
Doing Well by Doing Good? Green Office Buildings.
Berkeley, CA: University of California at Berkeley, January 2009.
This paper provides credible evidence on the increased economic value of the certification of "green buildings"—value derived from impersonal market transactions, rather than engineering estimates.

U. S. Environmental Protection Agency (U.S. EPA).
Residential Construction Trends in America's Metropolitan Regions.
Washington, DC: U.S. EPA, 2009.

In response to the question, "Do such examples add up to a fundamental shift in the geography of residential construction?" this working paper examines U.S. Census residential building permit data for the 50 largest metropolitan regions during an 18-year period (1990 to 2007). Specifically, the number of permits issued by central cities and core suburban communities is compared to the number of permits issued by suburban and exurban communities to clarify if there has been a shift toward redevelopment, and in which regions the shift has been most significant.

Pivo, Gary, and Jeffrey D. Fisher.
Investment Returns from Responsible Property Investments: Energy Efficient, Transit-Oriented and Urban Regeneration Office Properties in the U.S. from 1998-2008.
March 2009.

This paper details how investors could have purchased a portfolio consisting solely of responsible property investment (RPI) office properties during the past 10 years and had performance that was better and at less risk, than a portfolio of properties without RPI features. The analysis also breaks down the ways that various RPI features affect income, property values, capitalization rates, price appreciation, and total returns.

Ernst & Young and Oxford Analytica.
The 2009 Ernst & Young Business Risk Report: The Top 10 Risks for Global Business.
New York: Ernst & Young, 2009.

The 2009 Ernst & Young Business Risk Report, published in conjunction with strategy consultancy Oxford Analytica, focuses a wide variety of risks facing companies, ranks the top ten based on interviewee responses from leading global firms, and explores how companies around the world are realizing the importance of a thorough and robust risk management effort across various sectors.

Mills, Evan.
From Risk to Opportunity—Insurer Responses to Climate Change.
Boston: CERES, 2009.

Drawing on responses from 246 insurers, reinsurers, brokers, and insurance organizations from 29 countries, this report outlines the insurance industry's significant progress in developing wide ranging products and services to help global consumers and businesses reduce their exposure to climate change and to reduce the emissions that cause global warming.

U.S. Climate Action Partnership.
A Blueprint for Legislative Action.
Washington, DC: U.S. Climate Action Partnership, 2009.

The Blueprint for Legislative Action provides decision makers in the 111th Congress with a framework for legislation to achieve the objective of "slowing, stopping, and reversing the growth of greenhouse gas (GHG) emissions in the United States over the shortest time reasonably achievable."

United Nations Environment Programme (UNEP) Finance Initiative–Climate Change Working Group.
Energy Efficiency and the Finance Sector: A Survey on Lending Activities and Policy Issues.
Nairobi, Kenya: UNEP, 2009.

Strictly from a financial services perspective, this report probes the reasons for a failure to recognize and integrate energy efficiency, and broader resource efficiency disciplines, across the broad sweep of business, industrial, commercial, and construction activities. The document offers practical, pragmatic, and market relevant recommendations for both the financial sector and policy makers to take into consideration, as we move towards the landmark UNFCCC CoP 15 in Copenhagen, Denmark, in December 2009. The report should be read in conjunction with UNEP FI's broader climate change work undertaken in recent years and is being prepared to inject the financial services view into the Copenhagen process.

Karl, Thomas R., Jerry M. Melillo, and Thomas C. Peterson, eds.
Global Climate Change Impacts in the United States,
Cambridge, UK: Cambridge University Press, 2009.

This report summarizes the science of climate change and the effects of climate change on the United States, now and in the future. It is largely based on results of the U.S. Global Change Research Program (USGCRP), and integrates those results with related research from around the world. The report discusses climate-related effects for various societal and environmental sectors and regions across the nation. It is an authoritative scientific report written in plain language, with the goal of better informing public and private decision making at all levels.

World Business Council for Sustainable Development (WBCSD).
Towards a Low Carbon Economy: A Business Contribution to the International Energy and Climate Debate.
Washington, DC: WBCSD, 2009.

This publication aims to share business experience in technology development and deployment, finance and carbon markets, cooperative approaches between business sectors, and adaptation and proposes policy recommendations for a future agreement.

World Business Council for Sustainable Development (WBCSD).
Energy Efficiency in Buildings: Transforming the Market.
Washington, DC: WBCSD, April 2009.

This study and analysis models three scenarios for global response to the climate challenge in buildings: (1) complacency and inaction leading to a failure to tackle climate change; (2) inadequate action resulting in only incremental improvements in energy efficiency and a substantial failure to curb climate effects; and (3) coordinated, intensive action that transforms the building sector and contributes proportionately to solving climate change.

McKinsey and Company.
Unlocking Energy Efficiency in the U.S. Economy.
Washington, DC: McKinsey and Company, 2009.

This report offers a detailed analysis of the magnitude of the efficiency potential in non-transportation uses of energy, a thorough assessment of the barriers that impede the capture of greater efficiency, and an outline of the practical solutions available to unlock the potential. The research shows that the U.S. economy has the potential to reduce annual non-transportation energy consumption by roughly 23 percent by 2020, by eliminating more than $1.2 trillion in waste—well beyond the $520 billion upfront investment (not including program costs) that would be required. Such energy savings will be possible, however, only if the United States can overcome significant sets of barriers.

World Business Council for Sustainable Development (WBCSD).
Business and Ecosystems: A Scoping Report—Corporate Ecosystem Valuation.
Prepared for the World Business Council on Sustainable Development by Environmental Management Group and Ecosystem Economics LLC. Washington, DC: WBCSD, 2009.

This scoping study report reaches the conclusion that any attempt to advance corporate ecosystem valuation should focus on new ways of valuing ecosystem dependencies and effects, and incorporating these values within existing financial and business planning tools, drawing where relevant on the existing methods that have been developed specifically to value ecosystem services.

Tobias, Leanne et al.
Retrofitting Office Buildings to Be Green and Energy-Efficient: Optimizing Building Performance, Tenant Satisfaction, and Financial Return.
Washington, DC: Urban Land Institute, October, 2009.

This book presents the compelling business case for green and energy-efficient retrofits by detailing the specific decision points and technologies from planning to investing to operations. Case studies on the retrofits of corporate headquarters, multi-tenant buildings, and leased space provide insights, lessons, and knowledge drawn from practical application.

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Cherokee is the leading private equity firm investing capital and expertise in brownfield redevelopment. The firm has invested in more than 525 properties worldwide and currently has more than $1 billion under management.

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Akerman Senterfitt is ranked among the top 100 law firms in the U.S. by *The National Law Journal NLJ 250* (2008) in number of lawyers and is the largest firm in Florida. With more than 500 lawyers and government affairs professionals, Akerman serves clients from major business centers in Florida, New York, Washington, D.C., California, Virginia, Colorado, and Texas. Recognized for its market leading practices in the areas of real estate, land use, construction, and environmental law, Akerman has one of the top five legal teams in number of LEED accredited lawyers and regularly advises clients on sustainability issues impacting real estate and infrastructure projects as well as alternative energy developments in the U.S. and abroad.

Climate Change, Land Use, and Energy 2009: Investment Niche or Necessity? concentrates on the real estate investment community's outlook, preferences, and business practices associated with climate change, land use, and energy. This publication has been researched through a ULI member survey, a dedicated ULI conference, and a review of the existing literature.

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