

NEW TOOLS. NEW RULES.

Climate Change, Land Use, and Energy 2010



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Climate Change, Land Use, and Energy 2010

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All first-person quotations in this publication were made by participants at the Urban Land Institute's policy and practice forum titled Energy Finance in Real Estate, held June 8, 2010, in New York City. In keeping with ULI practice for such events, the Urban Land Institute has not attributed these quotations to individuals.

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1025 Thomas Jefferson Street, NW
Suite 500 West
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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 has nearly 30,000 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 the effectiveness of 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.

Dear Reader:

MARKET REALITIES and recently implemented environmental policies have brought the real estate industry to a pivotal point, one at which land use decisions are as much or more about the management and redevelopment of existing real estate as they are about the development of new buildings and communities. This emphasis on reinvestment and reuse of existing buildings illustrates how the “use of land”—central to ULI’s mission—affects all assets in the built environment, including their use, operation, and performance over time.

On behalf of ULI, I am delighted to thank Wells Fargo and the ULI Foundation for supporting ULI’s second annual report on the combined issues of climate change, land use, and energy, or CLUE. After last year’s survey of industry attitudes toward climate change and energy, this year’s report provides an overview of new areas of finance innovation and emerging frameworks of regulation. In order to be successful, both new “tools” and new “rules” will have to overcome market barriers that are preventing strategic energy efficiency investments in the existing building stock.

This report builds largely on the June 2010 ULI policy and practice forum titled Energy Finance in Real Estate, which, with special thanks to Anthony E. Malkin, was held on the 61st floor of the 79-year-old Empire State Building. The transformation of this international icon serves as a most resonant example of how practical retrofit measures can combine to dramatically reduce the energy use of a building, reduce its carbon footprint, and contribute to the vitality of an urban community. I would also like to extend a special thanks to Johnson Controls, BASF, Cisco, ConEdison, Lutron, and Skanska for helping make the June forum possible.

Building-retrofit activities hold much promise in creating new real estate value, producing jobs, and effectuating reductions in greenhouse gas emissions. These activities will play a big part in shaping future land use and all aspects of real estate practice—especially financing. For ULI, being a force for this change is an opportunity not to be missed.



Patrick L. Phillips
Chief Executive Officer
Urban Land Institute

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Building undergoing retrofit.



EXECUTIVE SUMMARY



The issue of energy efficiency reminds me of 30 years ago when somebody asked me to give the definition of affordable housing and there were 35 different definitions.

A Year without Precedent

IN 2009, annual U.S. carbon dioxide emissions associated with energy consumption declined by an unprecedented 7 percent as a result of factors that included—but extended beyond—the economic recession, which represented a 2.4 percent decline in total gross domestic product (GDP). Two additional factors played a part in this reversal of a long-term trend of ever-increasing greenhouse gas (GHG) emissions: a decrease in the carbon content of primary fuels and, notably, the impact of investments in reducing the energy intensity of the economy. This report explores the latter factor—energy efficiency—in the context of the commercial building sector.

With broad economic recovery far from sight, many unknowns hang over the commercial real estate markets, feeding speculation about future market trends. Speculation is not limited to real estate markets. Environmental policy-making circles have seen the United Nations' Copenhagen Summit and legislative initiatives in the U.S. Congress come and go without producing milestone frameworks for greenhouse gas reduction policies.

Meanwhile, the federal government has commenced a variety of executive branch initiatives aimed at reducing carbon emissions, which, while broad and far reaching, have not yet had significant impact on private commercial real estate markets. Local, state, and regional levels of government have been the platform where markets are being shaped to align intended environmental outcomes with economic development strategy. But today, the dominant regulatory forces shaping energy investments in real estate remain a lack of predictability and certainty in policy.

If you look at the reality of the market, there's not a whole lot of demand for new buildings out there. That's not going to be forever. But right now, if we want to change the game, we've got to focus on the existing building stock.

This report explores an issue that has risen to become one of the most immediate challenges for sustainable development: financing energy efficiency improvements in real estate. It also seeks to provide an overview of how emerging public policies combine to form a new backdrop for real estate investment.

More than 1,000 mayors in the United States—spanning every major real estate market in the country—have now made a pledge to reduce greenhouse gas emissions to 60 percent to 80 percent below 1990 levels. More than 35 governors have directed their staff to produce a climate change action plan. Cities and states have

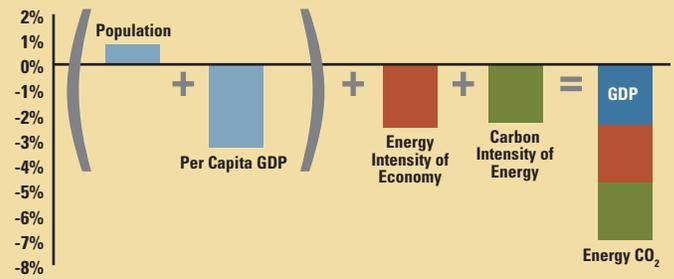
received dedicated U.S. Department of Energy (DOE) grants to transform existing energy efficiency strategies into market action with federal stimulus spending. Energy efficiency within existing buildings has placed real estate at the center of emerging climate change policies at all levels of government.

Selected highlights from this report include:

■ **A “New Normal” of Emissions Reduction?** The impact of the market downturn on energy demand reduction is obvious. Less obvious is the downturn’s impact on consumer preferences and behavior, which is just beginning to be understood. While energy costs hover near historic lows, there is broad consensus that costs will bounce back higher as long-term demographic trends and booming emerging markets drive new demand. **Detailed analysis of the variables behind last year’s unprecedented reduction in energy-related carbon emissions shows that it has resulted as a combined function of reduced energy demand, ongoing investments in energy efficiency, and investments in cleaner fuels.** This meaningful two-year-old trend breaks the seeming inexorable historic rise of greenhouse gas emissions in the United States. Overall carbon emissions are now on par with the 1990 level, the United Nations benchmark from which an additional 60 to 80 percent reduction is targeted by 2050.

The individual consumption and investment factors behind this reduction are undoubtedly complex, but may reflect the growing recognition

2009 Decline in U.S. Energy-Related CO₂ Emissions



Note: Energy intensity is defined as energy consumed per unit of economic activity (Btu/GDP). Carbon intensity of energy is defined as carbon dioxide emissions per unit of energy consumed (CO₂/Btu). The term carbon intensity is sometimes used elsewhere to describe the overall carbon intensity of the economy (CO₂/GDP).

Population growth was estimated as 0.9 percent, the same growth rate as 2008.

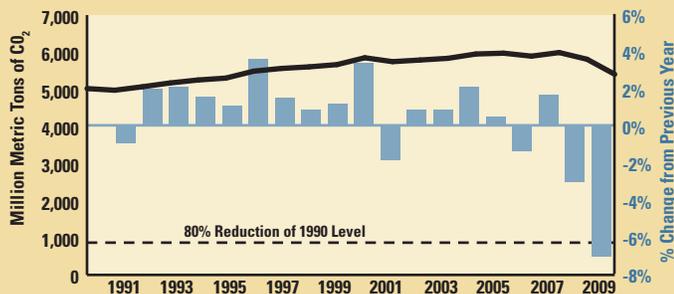
Sources: U.S. Bureau of Economic Analysis, *CO₂ Emissions Monthly Energy Review*, April 2010; U.S. Energy Information Administration, *Monthly Energy Review*, June 2010.

of the economic and domestic risks associated with fossil fuel dependency. While media reporting and political rhetoric associate domestic energy use with economic and geopolitical uncertainty, it is the weakness of the short-term real estate markets that has put the spotlight on reducing building operating costs. Across the real estate industry a new mindset prevails, where the more one can manage to reduce energy use, the better. As quoted in the last year’s report, “measuring energy savings is like counting cash.”

■ **Energy Efficiency in Buildings: Investing in “Nothing.”** Investors demand a return, but what that return is “less” rather than “more”? Extensive technical analysis shows that achieving energy efficiency in buildings represents the lowest-cost path to short-term reductions of energy use and greenhouse gas emissions. Yet, popular mindsets and energy policy frameworks often favor supply-side investments in renewable or “clean energy” strategies, i.e., strategies that “produce something.”

Elevating energy efficiency incentives to be on par with incentives for wind, solar, and other clean fuels continues to be among the most significant opportunities to catalyze market investment in producing new and retrofitted high-performance buildings. While investing in “nothing”—that is, an investment in consuming less—does produce a reduction in the operating costs in buildings, several market barriers must

U.S. Energy-Related CO₂ Emissions and Annual Percentage Change, 1990–2009



Source: U.S. Energy Information Administration, *Monthly Energy Review*, April 2010.

be overcome to produce the targeted 80 percent reduction in building energy use that DOE has set for all existing buildings by 2050.

We need the same kind of incentives as solar and wind, but we don't have it.

■ **Climate Change Policy, Energy Policy, or Real Estate Investment Policy?** Recent efforts to catalyze investments in retrofitting existing buildings have challenged how policy makers and market participants view real estate finance and valuation practices. Are investments in energy efficiency within existing buildings to be approached as a discrete value, capable of being financed independently of the underlying real estate asset and then traded as “efficiency-backed” securities on secondary markets? Or is an energy efficiency investment more like upgrading a lobby or installing granite countertops in a kitchen, whereby the investment enhances the underlying value of the underlying real estate asset? The answer is emerging to be both, as policy makers work on both sides of energy demand and supply.

After 25 years of making incremental efficiency improvements, we know that our tenant churn is less, our occupancy beats the market, our energy costs are lower, and our net operating income is higher than our competition.

■ **Transparency Mitigates Uncertainty.** Market innovation requires new evidence or new guarantees of real costs and real investment returns. Although all market participants broadly acknowledge the value that energy efficiency represents, the standardized practices necessary to integrate that value into individual market transactions continues to support a gap between market reality and possibility. The challenge in financing energy efficient retrofits of existing buildings lies in generating objective, accessible, peer-reviewed information for the tools, technologies, and full costs associated with the energy savings over specific payback periods.

One of the ways we're going to build back real estate value is by bringing back a strong bottom line by bringing operating costs down and really doing our knitting correctly.

■ **Lease-by-Lease Market Transformation.** Many factors taken together make the business case for green retrofits of the existing building stock, not the least of which is tenant demand for such space. New building codes, growing investor demand, and the need to drive savings to the bottom line of operational expenses all contribute as well. All these factors and many more are playing a part in the transformation of the marketplace.

Step one is that tenants need to care about where they work and where they live. We need to look at sustainability holistically.

■ **Marching Orders for the Nation's Largest Real Estate Portfolio.** With an annual energy budget of \$24.5 billion and an annual purchasing budget exceeding \$500 billion, President Obama issues an executive order in January 2010 that the federal government will reduce its greenhouse gas pollution by 28 percent by 2020. By September, all federal agencies submitted plans to the White House on how they will achieve this goal, with the General Services Administration—the government's real estate specialist, whose carbon footprint resides largely in more than 8,300 existing buildings—submitting its plan to exceed the president's target. Other large corporations and institutional real estate owners have similar plans, creating a dynamic of top-down directive within segments of the marketplace.

Philadelphia skyline.



II ENERGY EFFICIENCY IN THE REAL ESTATE MARKETPLACE

Real estate finance is the stage where the value and risk associated with innovative technologies and management practices are either embraced or rejected.

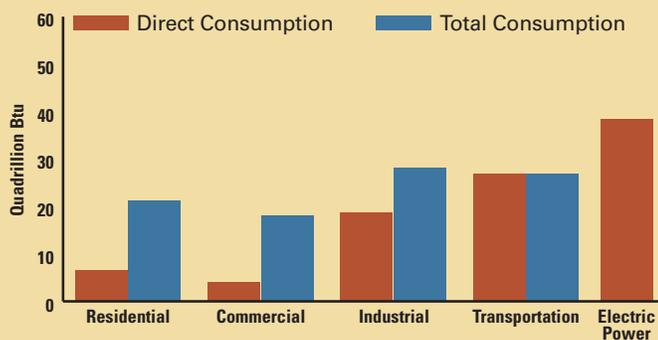
IN A WORLD LOOKING TOWARD INVESTMENTS in energy efficiency to help solve intractable economic and environmental problems, markets and policy alike turn an eye to buildings. Residential and commercial buildings together consume nearly 40 percent of energy in the United States.

The occupancy of the nation’s approximately 5 million individual commercial buildings makes up about 18 percent of total annual energy consumption in the United States. Lighting, space heating, and space cooling represent the three largest building operations that consume the most energy. Taken together, these “big three” account for roughly half of overall commercial-building energy consumption. The total energy bill for all commercial buildings amounts to about \$170 billion per year.

The high percentage use of electricity in buildings is a distinguishing characteristic in the economy of energy and emissions. Because buildings consume both direct and indirect energy, the “on-the-grid” nature of the existing building stock stands out in an economy-wide breakdown of direct and total energy consump-

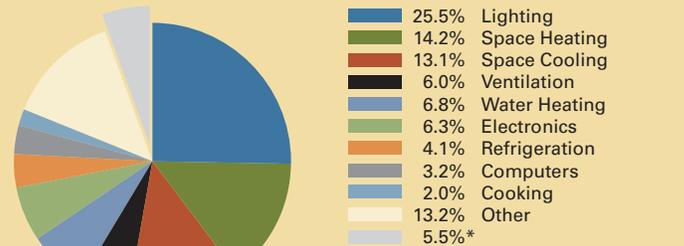
tion. This can be easily contrasted with the transportation sector, where nearly all energy is consumed in a direct manner. The fact that the majority of electricity is generated by combusting coal underscores that in terms of greenhouse gas emissions, not all energy consumption is equal.

Direct and Total U.S. Energy Consumption by Sector, 2009



Sources: U.S. Energy Information Administration, *Annual Energy Review 2008*; U.S. Department of Energy, *Transportation Energy Data Book*, Edition 28; 2009.

Primary Energy Use in U.S. Commercial Buildings



*This chart includes 1 quad of energy (5.5%) that is a statistical adjustment by the Energy Information Administration to reconcile two divergent data sources.

Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, 2008.

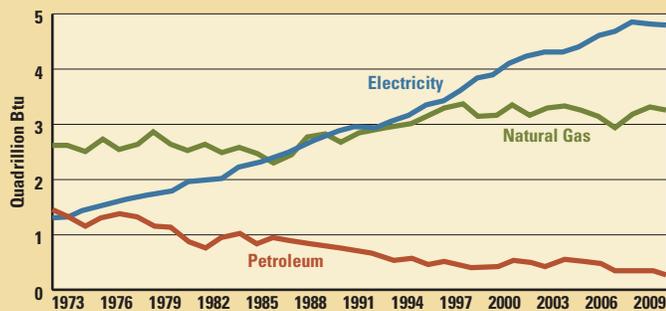
DIRECT AND INDIRECT ENERGY IN COMMERCIAL BUILDINGS

While the overall magnitude of energy used in commercial buildings has grown steadily over the last three decades, it is the striking rise in electricity use that has driven that overall increase. Concurrent to the rise in electricity use, direct use of fossil fuels has remained essentially flat with the only change being that natural gas gradually has come to replace oil. Taken together, this total energy use, in turn, generates greenhouse gas emissions both directly (on-site emissions) and indirectly (off-site emissions through the on-site use of electricity, or, in some cases, use of thermal heat). Greenhouse gas emissions associated with the use of energy in commercial buildings totals about 18 percent of all energy-related GHG emissions in the nation.

The difference in overall energy efficiency between these two energy sources—direct and indirect—becomes sharply apparent when comparing overall energy used in commercial buildings to related carbon emissions. Given the vast inefficiencies inherent in electricity generation and distribution, the greenhouse gas emissions for electricity consumed in commercial buildings has grown to be far greater than GHGs related to direct energy consumption. However, both 2008 and 2009 mark an unprecedented yield in a decades-long trend of growing electricity consumption.

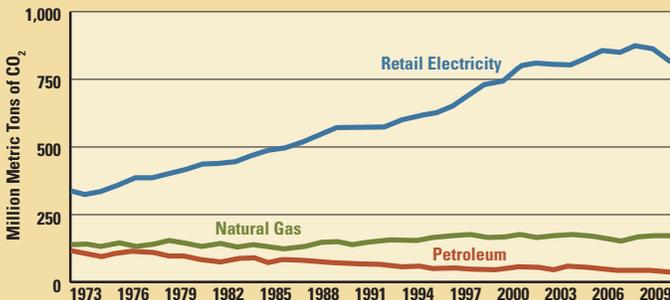
It is critical to note that carbon emissions related to electricity vary greatly across regional real estate submarkets, depending on the carbon content of primary fuel sources as well as generation and distribution efficiency factors. Atlanta’s coal-based electricity, for example, has a very different carbon content than Seattle’s hydro-based electricity.

Energy Consumption in U.S. Commercial Sector by Major Source



Source: U.S. Energy Information Administration, *Monthly Energy Review*, June 2010.

End-Use CO₂ Emissions in U.S. Commercial Sector by Major Energy Source



Source: U.S. Energy Information Administration, *Monthly Energy Review*, June 2010.

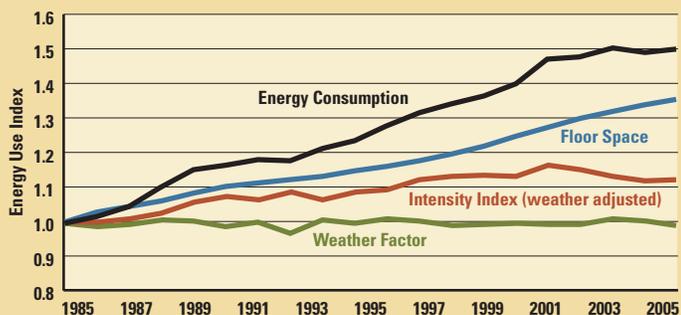
Note: Emissions from energy consumption in the electric power sector are allocated to the end-use sectors in proportion to each sector’s share of total electricity retail sales.

I don’t see “green” buildings and “not green” buildings. Our strategy is to look at all the assets we own and assess how we can improve them over time, to determine which ones we can improve the most quickly and for the lowest cost.

IMPROVEMENTS IN ENERGY INTENSITY

A decades-long trend has shown that as commercial floor space has been added to the overall building stock, overall absolute energy consumption within commercial buildings has grown as well. However, this growth in consumption has been compounded by a historic growth of “energy intensity,” best understood as ever-greater energy consumption as measured on an individual floor-area unit basis. Starting around 2001, the overall energy intensity of commercial buildings peaked, and afterward it began to decline.

Energy Use Intensity in U.S. Commercial Buildings



Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, 2008.

The Action Is in Existing Buildings

Even at the peak of recent building cycles, only 2 percent of the total existing floor space annually is added by new commercial building construction. In the years ahead, this portion is likely to remain below 1 percent. New building construction is delivered at the performance standards of applicable building and energy codes, in contrast to older buildings. It is the balance of buildings—the overwhelming majority of the existing building stock—that remains the dominant untapped market opportunity to invest in energy efficiency.

In 2009, the overall market value of major commercial retrofit and alteration projects initiated in the United States was approximately \$41 billion. About two-thirds of that investment

related to energy efficiency improvements, according to McGraw Hill. While at first this sounds like a robust number, this translates to about 50 cents per existing square foot of commercial space in the United States.

Almost three-quarters of existing commercial floor space was constructed more than 20 years ago. These older buildings are likely to contain outdated lighting, HVAC, and building envelope technologies. Another major criteria is building size. A majority of the floor area of the commercial building stock is concentrated in a relatively small number of individual large buildings. More than 50 percent of the total commercial building floor area can be found in only 7 percent of individual buildings. These buildings, larger than 50,000 gross square feet, represent a great concentration of energy demand and related greenhouse gas emissions. Increasing the energy efficiency of these roughly 250,000 buildings is the most feasible and cost-effective strategy for reducing short-term carbon emissions.

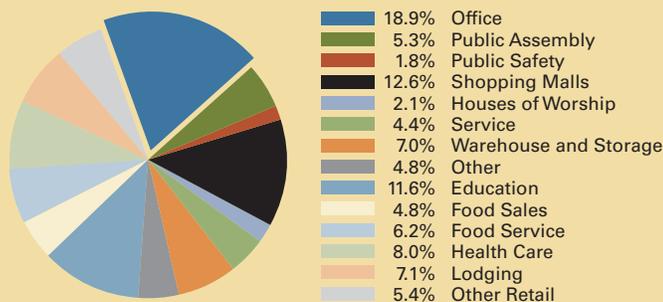
If you look at San Francisco, there are 16,000 commercial properties. Only 321 of them are over 100,000 square feet, and two-thirds of those are office. That's where a lot of carbon is.

THE EXISTING BUILDING STOCK AND ASSOCIATED CARBON EMISSIONS

Sector	Number of Buildings	Total Building Area	% of Total U.S. GHG Emissions
Commercial	4.9 million	72 billion gsf	18.2%
Smaller 50,000 gsf	4.6 million (93%)	36 billion gsf (50%)	—
Larger 50,000 gsf	255,000 (7%)	36 billion gsf (50%)	—
Built before 1990	3.6 million (73%)	51 billion gsf (68%)	—
Residential	111 million	256 billion gsf	20.8%
Single Family	87 million (78%)	233 billion gsf (91%)	—
Multi-Unit	24 million (22%)	23 billion gsf (9%)	—
Built before 1990	84 million (76%)	180 billion gsf (70%)	—

Sources: U.S. Energy Information Administration, Commercial Buildings Energy Consumption Survey, 2003; U.S. Energy Information Administration, Residential Energy Consumption Survey, 2005.

End-Use CO₂ Emissions by U.S. Commercial Building Type



Source: U.S. Environmental Protection Agency, Energy Star Program, 2010.

THEY SAY COMMERCIAL SECTOR; WE SAY COMMERCIAL REAL ESTATE

The industry sector described as the “commercial sector” by the U.S. Energy Information Administration is actually an aggregate of diverse real estate submarkets and includes public sector and nonprofit sector buildings such as universities and hospitals. It does not include multifamily buildings. The top four uses by floor area in this sector—office, retail, warehouses, and education—make up 60 percent of total commercial building floor space and represent about half of all individual commercial buildings. Additional commercial uses include health care, lodging, places of public assembly, and government facilities.

While each of these industry submarkets can be uniformly analyzed in terms of energy use and related emissions, each resides in a unique system of remarkably diverse ownership structures and financial interrelationships ranging from pure public sector to pure private sector and with several variations of public/private and nonprofit in between. The process of valuing energy efficiency within this kaleidoscope of commercial buildings requires moving beyond building types to place energy within the economies of individual real estate submarkets.

We’re in an exciting place and seeing an exciting example of how financial performance can intersect with investments in technology and energy efficiency.

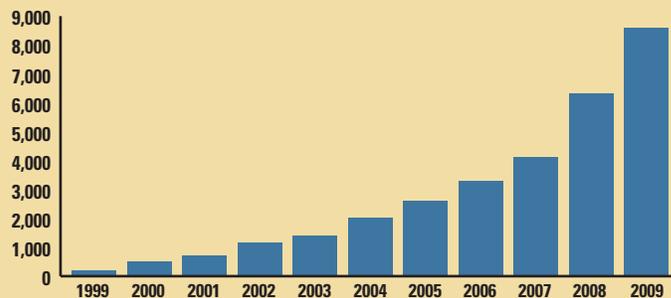
HIGH PERFORMANCE, EFFICIENT, INEFFICIENT, OR OBSOLETE?

Energy performance information is introducing into the marketplace evaluation metrics that are further diversifying property classification and associated value. A building may function—it may keep tenants warm, dry, and safe—yet it may not be effective from a competitive obsolescence point of view. A building that is not energy efficient might be considered obsolete when compared to one with dramatically lower energy costs. Owners clearly see Leadership in Energy and Environmental Design (LEED) certification as creating an enhanced value in the marketplace—today. But will it prove out tomorrow? The Energy Star story provides a cautionary note, because it is a tool for relative measurement, not absolute performance.

Investing in “Less”

With the economic downturn shifting business attention to the management of existing real estate assets and away from building new product, private owners of real estate have demonstrated heightened emphasis on maximizing building operation and management activities. A recent survey conducted by Johnson Controls indicates that about 85 percent say energy efficiency is a priority for them as they plan to make capital improvements to their projects over the coming year.

Energy Star–Labeled Commercial Buildings in the U.S., 1999–2009



Source: U.S. Environmental Protection Agency, Energy Star Program, 2010.

INVESTING IN LESS: THE BUSINESS CASE FOR ENERGY EFFICIENCY IN COMMERCIAL BUILDINGS

ENERGY EFFICIENCY means producing the same economic outputs using less energy input. The business case for immediate and long-term investments includes:

- Operating-cost reductions through energy savings in an era of tighter budgets;
- Reputational advantage in the context of evolving voluntary and regulatory emissions reductions targets;
- Creation of new markets or lines of service leading to economic expansion;

- Improved tenant well-being, leading to higher productivity, employee retention, and enterprise value;
- Greater tenant retention, resulting in lower building vacancy rates and turnover rates;
- Reduced business risk in the midst of energy price volatility and radical changes in associated consumer market preferences;
- Reduced reputational risk in a globalized, transparent marketplace.

SAVE MONEY ANYWHERE NOW!

Accentuated by massive losses in underlying real estate value over the past 24 months and a spike in vacancy rates, energy cost savings feed directly into the bottom line. Even in the context of frozen and slashed budgets brought on by the recession, more than half of owners stated that they invested the same or more in energy efficiency in 2009 than they did in 2008, according to Johnson Controls.

We talk about it in terms of building performance. We don't talk about it in terms of energy efficiency or climate change. We really just talk about saving money and reducing energy.

CULTIVATING GREEN REPUTATIONS

Brand image and reputation in the marketplace are powerful motivators for energy efficiency. Consistent with broad growth in corporate and social responsibility, many companies are in the process of publicly stating their progress toward voluntary carbon-reduction goals—and have identified energy efficiency in existing buildings as the simplest way to begin meeting these goals.

Tenants can drive energy efficiency in buildings very easily: ask for what you think is important and vote with your feet to find the kind of building you want to be in and the kind of participation you want to have in occupying it in a sustainable manner.

NO COST, HIGH RETURN, HIGH RISK: ALTERING BEHAVIOR

Altering tenant and staff behavior for energy efficiency gains has the advantage of being low-cost while producing significant savings. Yet these strategies are also high risk unless properly institutionalized. If these measures are embraced by building occupants, owners and tenants can expect high returns on investment. If ignored, programs are wholly ineffective and become a waste of time and resources. Educating operations staff and building occupants can deliver one of the highest returns on investment available in the energy efficiency area.

Our student and senior housing assets are historically our worst abusers of energy. Even if you're putting all of these fantastic technologies into your building, if you don't handle tenant education correctly, you're doomed.

CHERRY-PICKING IMPROVEMENTS

Depending on where a building asset is in its investment and finance cycle, owners are funding incremental improvements out of operating budgets with quick returns. They might start with lighting, for instance. Several in-depth studies have documented that typical energy efficiency improvements in private buildings have a maximum finance term of two to three years or less. These investments are typically not financed through a lending vehicle.

People are out there doing very sensible, logical things that generate very easy-to-obtain returns just by being good operators and practical investors.

SYSTEMS THINKING

The broad identification of energy value in buildings is leading owners to consider replacing building equipment even when it is functional. In the case of a boiler or chiller, this means that even though it is operating as intended, the owner stands to benefit if the equipment is replaced. This can be true even in buildings standing as little as 15 years. For instance, the retrofit of the Adobe corporate headquarters in San Jose, highlighted in ULI's 2009 book *Retrofitting Office Buildings to Be Green and Energy-Efficient*, shows that replacing some elements of functional building technology within five to ten years of original construction can have a positive return.

We're fortunate to have the financial resources to invest in energy efficiency on our projects at multiple scales. It's been a luxury.

HOW DEEP CAN YOU GO?

Upgrading building management systems, replacing HVAC equipment, swapping windows, and exploring on-site clean energy production—how deep can retrofits go in today's marketplace? Impacts of individual projects vary, but energy

cost savings can be reduced by 30 to 60 percent. While these investment opportunities are all around, they also come with a number of market barriers, discussed in the next chapter. Submarkets making these investments are typically in the public or nonprofit sector, where owner-occupied buildings with little or no debt offer easy financing of improvements over time periods ranging from 15 to 25 years.

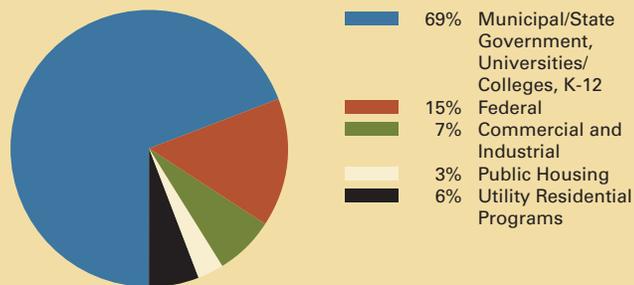
Until the owners of properties can clear the decks and feel like they have a reasonably leveraged loan on a property, it's going to be difficult for them to seek meaningful improvements in energy efficiency and green building.

WHERE DOES \$5 BILLION AND A PRESIDENTIAL MANDATE TAKE YOU?

The U.S. General Services Administration (GSA), the federal government's real estate specialist, is armed with more than \$5 billion from the 2009 federal stimulus bill—money dedicated for retrofitting federal facilities. This provides the departure point to respond to the executive order to reduce carbon emissions in its buildings by 28 percent over ten years.

GSA is single-handedly creating hundreds of precedents for how aggressive energy reduction strategies, including solar and geothermal systems and integrated space planning that leverages telecommuting habits, can be executed in building retrofits. How low can GSA take energy reductions in this round of funding? The answer may lie in the degree to which it is able to leverage existing funds with increasingly sophisticated energy service companies. While in years past large institutional investors were at the tip of the spear of innovation, the GSA will determine avenues of innovation in the retrofit marketplace.

Energy Service Company (ESCO) Market Activity in the U.S., 2008



Source: Lawrence Berkeley National Laboratory, 2010.

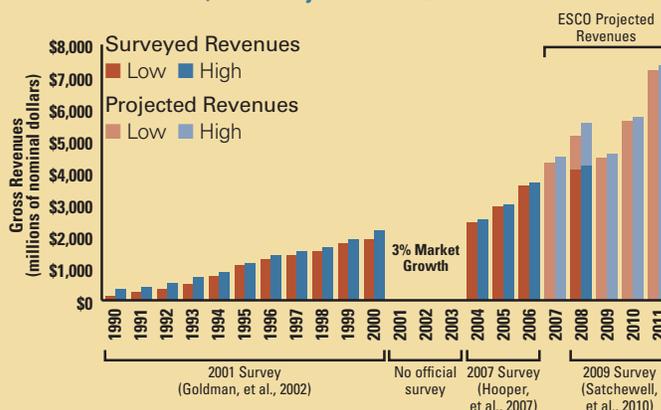
Energy Services Market Overview

The energy service company (ESCO) market includes companies providing a variety of individual or comprehensive energy solutions, including energy savings projects, energy management, energy supply, and risk management. ESCOs typically perform an analysis of a given property, formulate an energy efficiency strategy, install energy elements, and maintain the implemented system to ensure energy savings during the project payback period. The savings in energy costs are often used to pay back the capital investment of the project. In some cases, if the project does not provide the intended returns, the ESCO may be responsible for the difference.

DOMINATED BY MUSH

ESCOs are dominated by a handful of established services providers. About 84 percent of ESCO revenues are in the public sector “MUSH” market—municipalities, universities, schools, and health care. Gross volume in the ESCO market, currently at \$4 billion, continues to grow rapidly,

Energy Service Company (ESCO) Industry Revenue Growth in the U.S., with Projections to 2011



Source: Lawrence Berkeley National Laboratory, 2010.

and did so even during the economic recession. Current growth rates are between 18 and 22 percent compounded annually. A critical distinguishing characteristic of the energy services marketplace is that revenues from private commercial real estate account for only 7 percent of overall market activity.

MUSH buildings give investors circumstances and structures they can count on for the long haul—such as a creditworthy entity, buildings without mortgages, and long-term owner-occupants. However, in private buildings, the quick turnover of property ownership and utilities paid by tenants combine to make energy efficiency lending less appealing. And why would private property owners give the energy value away to a service provider such as an ESCO when they can perform the functions themselves?

FROM 2010 TO 2020: THE COMMERCIAL BUILDING RETROFIT MARKET POTENTIAL

- The market potential for commercial building retrofits is projected to be \$190 billion over the next ten years, or roughly \$19 billion annually;
- Annual energy costs in the existing commercial building stock total \$100 billion or roughly \$1.40 per square foot over 72 billion gross square feet;
- Achievable energy savings at any one building may typically range from 5 percent to 60 percent depending on building age, type, design, condition, and maintenance;
- Achievable energy savings across the existing commercial building stock is estimated to potentially reach 22 percent.

Source: Johnson Controls.

THE EMPIRE STATE BUILDING A GLOBAL ICON OF RETROFITTING

RETROFITTING AN ICON is not to be taken lightly, but with deliberation and care. When the Empire State Building was ready for a major upgrade, a trailblazing energy efficiency strategy became part of the plan. The result is a market-driven outcome producing an estimated 38 percent reduction in energy use. Completed in 1931, the building has already been granted an Energy Star rating of 90, and estimated energy use reductions have been verified within completed office tenant fit-outs.

The base project budget was supplemented with an incremental \$13.2 million investment dedicated to increasing energy efficiency performance beyond applicable building codes and will save \$4.4 million a year in reduced energy costs. The energy efficiency strategy was not only to explore the market feasibility of energy retrofits, but to document the process in a way that it could be replicated anywhere. The result shows that energy efficiency retrofitting is not only viable, but also makes business sense. The Empire State Building Company, LLC, has made project documents, contracts, and decision-making tools publicly available at www.esbsustainability.com.

The retrofit is composed of eight key initiatives:

- **Window light retrofit:** Refurbishment of approximately 6,500 thermopane glass windows, using existing glass and sashes to create triple-glazed insulated panels with new components that dramatically reduce both summer heat load and winter heat loss.
- **Radiator insulation retrofit:** Added insulation behind radiators to reduce heat loss and more efficiently heat the building perimeter.
- **Tenant lighting, daylighting, and plug upgrades:** Introduction of improved lighting designs, daylighting controls, and plug load occupancy sensors in common areas and tenant spaces to reduce electricity costs and cooling loads.
- **Air handler replacements:** Replacement of air handling units with variable-frequency drive fans to allow increased energy efficiency in operation while improving comfort for individual tenants.
- **Chiller plant retrofit:** Reuse of existing chiller shells while removing and replacing “guts” to improve chiller efficiency and controllability, including the introduction of variable-frequency drives.
- **Whole-building control system upgrade:** Upgrade of existing building control system to optimize HVAC operation as well as provide more detailed submetering information.
- **Ventilation control upgrade:** Introduction of demand-control ventilation in occupied spaces to improve air quality and reduce energy required to condition outside air.
- **Tenant energy management systems:** Introduction of individualized, web-based power usage systems for each tenant to allow more efficient management of power usage.



Source: Empire State Building Company, LLC, www.esbsustainability.com.

There are very few building owners today with current cash positions who are eager to have an energy service company go out and earn a 17 percent or 20 percent IRR on their property. We're seeing a stall there.

STIMULUS BILL-FUELED GROWTH

Overall growth of ESCO revenues is projected to jump 26 percent annually, largely due to federal government efforts to green its own building stock using American Recovery and Reinvestment Act (ARRA) funds. Service contracts tend to

be structured over long payback terms—15 or 20 years is typical; contracts with the federal government can reach up to 25 years. Long contract terms allow for much deeper retrofit programs. About a third of the investments made through ESCOs now include renewable energy technologies, such as solar, geothermal, and biomass systems; these projects move beyond energy reduction and into clean energy production. All these activities represent business practices that vary from the norms, commitments, terms, and accustomed paybacks in private commercial real estate investment.

NEW TOOLS

It's hard to make financial sense out of a lot of things out there today, not just capital expenditures for energy retrofits. It's tough to figure out how to pay leasing brokers, let alone how to fund improvements the market might be looking for.

HOW DO FINANCE TOOLS AND BUSINESS PRACTICES facilitate the retrofitting of existing buildings? What business practices seek to broaden market transformation? In this section, we explore how new practices are helping to catalyze investments and overcome historic market barriers.

FINANCE IS THE GREAT INTEGRATOR

Finance is the science of funds management: saving money, investing money, and lending money with respect to time, value, and risk. Integrating these variables is what justifies an individual financial decision and forms the basis for creating broader financial strategies. Core finance questions are central to creating a marketplace where energy and real estate decisions create value.

When advancing market transformation strategies, we must ask: Who is making the finance decision? Within what market context is the decision being made? What is the quality and transparency of available information regarding both the energy variables and real estate variables in the given transaction? What are the distinguishing characteristics of—and perceptions of—equity, debt, value, and risk in any given transaction? How does an energy objective relate to other sustainable development and livability objectives? How does an energy objective relate to the enhancement of value of the underlying real estate asset?

Overcoming Market Failure

In commercial real estate, investors face a stock of older buildings constrained by outdated design, equipment, and infrastructure. In terms of finance alternatives, many mechanisms and practices investors turn to may be verging on obsolete as well. Building operating funds are usually inadequate for financing comprehensive systems retrofits. Most investments are limited to one-, two-, or three-year payback periods. Commercial lenders are reluctant to provide three- to five-year financing periods. All of this is discouraging for project developers who realize that there is value available in the marketplace if they can find buildings ready for deep energy retrofit investments.

Investors and lenders point to additional challenges. In underwriting, the inability to lend without subordination of existing debt has brought dedicated energy efficiency finance initiatives to their knees. The biggest of the market challenges is a lack of easily accessible and standardized data, metrics, and verification practices, making it difficult for the marketplace to act in an efficient manner.

We need more investments that are data heavy, analysis rich, transparent, replicable, and nonproprietary—and that provide a return that can be guaranteed by the contractor doing the work.

VALUE AND RISK ACROSS PRODUCT TYPES

As investors evaluate alternative project opportunities, they report seeing value and risk break out by property type. Each of the major real estate submarkets represents a different level of achievable value and opportunistic investment potential. In energy efficiency, the market needs to recognize that ownership structures, tenants, and building management all represent unique variables. In some markets, investors may be looking to extend energy goals beyond core real estate value by pursuing far-reaching investments in renewable energy, but this may only make the most sense in certain asset types, such as warehouse and big-box retail locations.

Investors are going to have much more aggressive energy goals for certain property types. How do we incorporate energy efficiency into opportunistic-style investing?

CAPITAL IN TWO SHADES OF GREEN?

Market forces are putting downward pressure on asset values, sending energy advocates to seek dedicated “green capital.” Investors are looking for information on the market value of energy efficiency in order to understand the opportunity cost. Standardization of benefits would make improvements scalable across the marketplace, and market specific performance data can make investments bankable. Currently, the only dedicated capital remains government and utility incentives, and these are not adequate to catalyze the marketplace.

THE WINDOWS OF FINANCE OPPORTUNITY

MOST INVESTORS’ SOURCE OF FUNDS is limited to these basic transactional opportunities:

- **Annual operating budget:** Some funds can be taken from operating expenses.
- **Property refinance:** Investors are using refinancing as an opportunity to make energy improvements.
- **Acquisition finance:** Investors are building into the acquisition budget some funds for improvements.
- **Finance locked in:** Once the property is financed, obtaining additional vehicles to make energy improvements is very difficult.

If I don’t hit the energy efficiency value in a building on a refinance, will I have another chance to access capital?

WHO AND WHEN?

Regional diversity of lease types has produced a wide-ranging discussion around green leases. Underlying this conversation is not who benefits—existing gross and triple-net lease structures ascribe this in great detail—but who is going to take the initiative to act? The question of where the drive for energy efficiency is recorded on the balance sheet is responsible for much of the stasis in retrofit investment. Owners who want to take action are left with the option of modifying leases or making marginal investments out of operating budgets. Renegotiating leases with tenants takes time and resources.

Regardless of lease type, owners and tenants need to realize that they are in business together.

INFORMATION DEFICITS

Easy access to reliable information is needed on behalf of all stakeholders—financers, tenants, staff, and investors alike. The need for strong data becomes critical in valuation and developing financing models. Given prevailing concerns regarding privacy and proprietary data, the utility and energy service industries have not been regarded as facilitators helping open up this access to data. Some municipalities now seek to collect and provide more robust data on energy use through mandatory energy benchmarking. Without regulatory support for disclosure of information, data will not be collected or revealed. Transparency is the essential foundation to financing.

There is a lot of data that has been collected over the years, but it's not transparent. It's not available for all of us to see.

BROKERS AT THE FRONT LINE OF EDUCATION

Brokers are ahead of the market in educating clients and building owners about the energy efficiency market. National and international brokers have become a source of great knowledge regarding energy and sustainability issues—with insight extending well beyond whether a property is certified or not. Most brokers have developed new lines of sustainability consulting services, advising on where opportunities are, how to help clients identify opportunities, and ways owners can work with tenants to move the needle.

FIRST GLANCE AT RETROFIT TRACKING IN NEW YORK STATE

2010 MARKS THE FIRST YEAR of post-retrofit occupancy data collected by the New York State Energy Research and Development Authority (NYSERDA). Among 19 projects in 93 buildings totaling about 3,900 units of multifamily housing, about two-thirds of the buildings attained savings of 20 percent or more. This result was based on billing analysis. While it is valuable and considered a good result, other energy analysis methodologies might need to be applied to future projects to obtain more robust data.

Seeing the clear demand in the marketplace, brokers have approached energy and sustainability education in a systematic manner. While the lines between marketing and education have been blurred, the challenge remains on how to tell a compelling story to multiple stakeholders—the client, investor, owner, and user.

This is not a watershed situation where you say there are “haves” and “have-nots.” Everybody who owns real estate—or occupies it—has to participate in this transition in some form or another.

Emerging Tools Integrating Energy into Finance

FRUSTRATION MOUNTS AS CONVENTIONAL LENDING PRACTICES FALL SHORT

Even though conventional lending practices are not catalyzing broad energy efficiency investment, some owners have simply gone back to square one. They have requested that their loans be reopened and more debt simply be added on. This has worked in cases where original covenants have been maintained and where lenders have recognized the retrofit value. These examples are isolated and anecdotal.

There's a disconnect in the market between the huge amount of capital available to develop great new innovations in technology and the finance tools available to deploy them in real estate.

VOLUNTARY INDUSTRY-BASED INITIATIVES ADDRESS DATA GAPS

Collaborative, industry-based initiatives are beginning to address recurring barriers in appraising the value of energy efficiency investments. While large real estate portfolio owners have been doing this on an internal basis for several years, new consortiums seek to mainstream performance and investment metrics. These efforts are greatly benefited by the Energy Star

program but seek to move beyond benchmarking relative performance. Examples of these consortiums are:

- Public reporting initiatives from municipalities and institutional investors;
- Regional utility-based initiatives such as the “Better Bricks” initiative of the Northwest Energy Efficiency Alliance, and post-retrofit building benchmarking analysis being conducted by New York State Energy Research and Development Authority (NYSERDA).
- Greenprint Foundation, an association of financial institutions, including Allianz, Deutsche Bank, Prudential Realty, Hines, Jones Lang LaSalle, and others, whose goal is to benchmark individual assets on an absolute performance basis.

LEVERAGING THE CHURN OF REFINANCING

Anecdotal evidence already points to education and information initiatives having an impact on conventional commercial real estate refinancing practices. Examples include internal reassessments regarding due diligence procedures for energy. The market activity in refinancing and working out debt represents an opportunity for these new valuation and appraisal practices to make a difference. If lenders are willing to work with third-party experts to determine and verify costs and potential savings of energy efficiency, this information can be rolled into underwriting and enhance security.

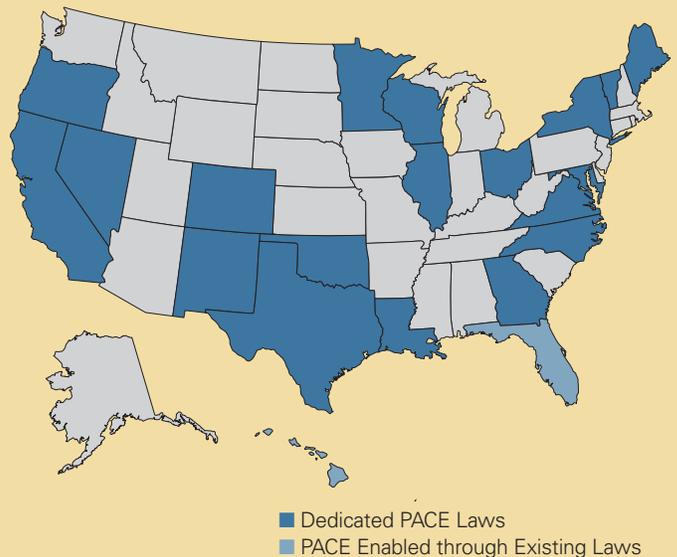
I don't know that you've got to prove quantitatively to the capital markets that there is a measurable return on your investment on day one. Integrating energy into real estate investment practices is going to be an evolutionary process. In hindsight, you always know the value was there. Investors are paid to take that risk.

KEEPING PACE

Recent months have witnessed a great amount of activity around the potential of broadly instituting Property Assessed Clean Energy (PACE) programs. This mechanism allows private property owners to accept a voluntary priority tax lien on their property, which becomes the basis for a municipality to aggregate liens to issue bonds and provide capital to the lienholder to make energy efficiency or clean energy improvements to the property.

The establishment of PACE programs has been one of the most innovative methods to work around longstanding market barriers in the private property sector. In 2010, DOE's competitive grant cycle under the Energy Efficiency Community Block Program allocated \$150 million to support these programs across the country. Many states, counties, and municipalities have passed enabling legislation, and a small number have stood up early lending programs. The most notable examples of existing programs are Sonoma County, California; Boulder, Colorado; Palm Desert, California; and Babylon, New York.

State Property Assessed Clean Energy (PACE) Laws



Source: Pew Center on Global Climate Change, 2010.



CODDING ENTERPRISES

SONOMA MOUNTAIN VILLAGE MIXING COMMUNITY AND ENERGY AS A STRATEGY

SONOMA MOUNTAIN VILLAGE is a new mixed-use community being developed by Coddling Enterprises on a greyfield site. Its aggressive plan has made Sonoma Mountain Village the first One Planet community named in North America, and only the fourth so named in the world.

Being developed on a former Agilent Technology campus, the project includes 800,000 square feet of retrofitted commercial buildings and 1,800 new residential units. All buildings at Sonoma Mountain Village will exceed Title 24 energy code by at least 50 percent by using ultra-efficient appliances, passive lighting, and passive heating. After aggressively pursuing energy efficiency, the community will meet all remaining demand with renewable energy. A 1.14-megawatt solar photovoltaic (PV) array has already been constructed, and a second similar system, costing about \$6 million, will move the community to 100 percent clean energy.

Financing strategies are unique to the California market, where the California Solar Initiative provides an incentive of nine cents per kilowatt-hour of electricity produced. Lending a boost is the federal 30 percent tax credit for renewable energy. In addition, Coddling Enterprises is looking

to Sonoma's county-level PACE financing program for all energy retrofit components, one of the first such programs to be initiated in the country. Sonoma's PACE requirements limit financing to existing buildings to which the financed equipment must be permanently attached. Within these requirements, 100 percent of equipment and installation cost can be financed over 20 years at a fixed 7 percent interest rate.

In what will be a precedent-setting project, Coddling's biggest challenge in securing PACE financing is obtaining the mortgage lender's consent. This was hampered by unfamiliarity with renewable energy economics and recent fireworks regarding tax lien priority status. Coddling Enterprises is seeking to overcome this hurdle by producing additional financial assurances.

Sonoma Mountain Village is an ambitious project that has made clean energy a high priority. Although there are challenges to be overcome, Coddling Enterprises CFO Greg Saunders says, "When we put in the cost of tying up these cash resources and the higher fees, we find that when taken together, the clean energy image, the energy savings, and the incentives are still compelling us to move forward."

Many states have targeted the residential markets with their programs, bringing considerable attention to the issue of debt seniority in the context of residential mortgage securitization. Fannie Mae and Freddie Mac have stated that they will not buy any mortgage with a PACE lien in a priority position over the first or second mortgage. This has effectively brought most PACE programs to a halt and has directed attention to potential federal legislation that would address this impasse.

PACE is not the be-all and end-all. Even when the debt prioritization issues are worked out, PACE will represent a useful tool for select markets. We'll need more tools beyond PACE.

A number of municipalities continue to develop PACE programs with the intent to focus on the commercial real estate sector, which currently requires that lender consent be obtained to place the tax lien. Additional variations of PACE include “owner-initiated” models, which allow single owners of multiple real estate assets to work with the local jurisdiction on a single bond issuance and bypass the lien aggregation process.

CREDIT SUPPORT MECHANISMS

Federal loan guarantees can help the lending picture, but the federal government is still in the stage of trying to determine where to place credit enhancements for energy efficiency investment. Loans are already in place that allow for alternative energy, and loan structures are pending that would cover retrofit.

CONTINUOUS COMMISSIONING AND UTILITY DECOUPLING

Without decoupling utility profit from energy sales, there is little short-term incentive for utility companies to get on the energy efficiency bandwagon, although managing long-term demand increases makes energy efficiency a strategic component of any utility’s business plan. Decoupling, in theory, makes the utility disinter-

ested in how much electricity it sells, because amounts are not tied to profit. Energy efficiency and distributed generation thereby become valued within the utility environment. In California, Massachusetts, and Connecticut, all electric utilities must have some form of decoupling program in place, or include a decoupling plan in their next rate case. Other states with decoupling laws include Wisconsin, Vermont, Oregon, New York, Maryland, and Idaho.

Continuous commissioning, or collecting and using data to monitor a building’s energy use, is a technology tool that opens the door to encouraging the incremental improvements that many owners already make. The data collected are accurate and transparent, which will likely help overcome barriers to energy efficiency financing. The data are “hard,” not projected, and can be used as an analytical foundation for activities ranging from setting building management objectives to changing marketplace practices.

Why isn’t this market churning energy efficiency into its value stream? The message we get from our lenders is that energy is not part of the financial equation, even though we are trying to use it as a longer-range differentiator.

MANAGED ENERGY SERVICES AGREEMENTS (MESA)

A variety of market approaches, in various stages of implementation, seek to structure an off-balance-sheet investment in building equipment by means of a third-party agreement. This third-party entity functions as an intermediary between owner and the utility and may bring capital to an asset in exchange for long-term guaranteed cost savings—or, in the case of renewable energy, guaranteed revenue.



BAE SYSTEMS HEADQUARTERS' MANAGED SERVICES AGREEMENT **PARTNERING TO MAKE RETROFITTING WORK**

BAE SYSTEMS HAS ABOUT 130 PROPERTIES in its real estate portfolio and an eye toward executing energy efficiency retrofits. Recently, it moved toward this goal through an innovative financing arrangement through a partnership with Metrus Energy, which specializes in third-party energy efficiency financing, and Siemens Industry, which served as the energy services companies (ESCOs).

At 450,000 square feet, the Merrimack, New Hampshire, facility is an owner-occupied corporate campus. Metrus contracted with Siemens Industry, which will design, implement, and maintain energy efficiency measures. Metrus will own all the upgraded equipment for the duration of the ten-year agreement, with periodic buyout options for BAE. Metrus, through Siemens, will provide ongoing maintenance and verification of the upgrades and an ongoing performance guarantee.

Upgrades, totaling about \$1 million, include lighting retrofit and controls, demand-control ventilation, air compressor replacement, energy management for the IT department, and trans-

former replacement. These changes save approximately \$200,000 in annual utility expense—by saving 1 million kilowatt-hours of electricity, 30,000 therms of natural gas, and 400 tons of carbon dioxide emissions.

BAE Systems' service charge is calculated based on a fee per actual energy units saved, plus an additional percent of non-energy savings attributed to project operation. The service charge escalates at a fixed annual rate less than or equal to the expected utility rate increase, providing savings to BAE Systems. Savings are experienced immediately, due to a first-year service charge less than or equal to avoided utility cost. Basing payment on actual cost savings provides BAE with immediate and ongoing savings over business as usual.

Beyond avoiding the capital outlay, the contract reduces operating expenses and enhances reliability. In addition, this financing strategy makes the capital upgrades achievable for customers with an interest in keeping such charges off their own balance sheet.

Everyone is very busy doing their job. I've seen more than one CFO or COO too busy with other challenges to think about the day-to-day incremental change available to them to create real value.

“Negawatts,” the term coined by Amory Lovins of the Rocky Mountain Institute, is being codified in utilities across the country through energy efficiency resource credits. These credits should be viewed as a supply-side resource on a par with generation of solar or wind energy—with the added attraction that it requires no plant development or transmission. Building owners wanting to do retrofits represent an enormous resource in this market, effectively turning the tables on real estate and utilities. When negawatt sales are structured to be similar to energy power purchase agreements (PPAs), they become a cash-flow stream that can permit deeper, long-term retrofit projects with longer payback periods.

What's key to making negawatt sales work? Energy savings must be reliable, auditable, and measurable. For this reason, two essentials to success emerge: continuous commissioning and a robust monitoring and verification (M&V) technology.

Emerging examples of these activities include:

- **Equipment leasing:** Born out of both the energy services industry and the need for progress toward state-mandated renewable portfolio standards (RPSs). Intermediaries finance, install, and lease renewable energy equipment (such as solar PV) to a property owner, delivering clean energy to the utility under a PPA.

EXISTING THERMAL ENERGY DISTRICTS

THERMAL ENERGY DISTRICTS in the United States include over 5,800 campus-based systems, 68 urban systems, and New York's Con Edison Steam system, the largest district energy system in the world. Many are private companies or municipal utilities, some designated as special taxing districts. Building owners can look to adding cogeneration to a deep retrofit, which will create thermal energy that can be used for onsite applications.

Opening up to district energy requires rethinking energy and its delivery. The potential for district energy is seen, for example, in Copenhagen, where 30 percent of the city's electricity comes from municipal waste. Biomass fuel plants, solar panels on roofs, geothermal resources, reduced transmission inefficiencies—all can combine to reduce carbon footprint, but putting these into effective action requires a cohesive urban planning strategy. Steam systems may be used for cooling in the summer months, something that can be accomplished with the installation of absorption chillers, which in dense urban areas have the potential to lessen peak-loading dynamics on hot summer days.

- **Comprehensive Managed Energy Agreements:**

Third-party capital provides an off-balance-sheet structure for capital improvements and management services.

- **Group PPAs:** A potential market opportunity for groups of real estate owners to negotiate with utilities in a “demand response” framework. Several initiatives of this type are under way, notably in the Chicago Loop, which seeks to leverage the concentration of energy demand in existing commercial office buildings and, through a series of agreements, to establish dynamic pricing to alter both the supply and demand variables of an energy efficiency investment.

DISTRICT-BASED ENERGY FINANCE STRATEGIES

Beyond the coordinated demand-response strategy outlined above, a second strategy focuses on a thermal district or cogeneration model, where energy is being produced and distributed on a decentralized basis. These structures exist in many forms today, with hospitals and universities being good examples of this model. District-based energy is typically thermal energy derived from waste heat in power generation and shared through a district.

District-based energy strategies face regulatory hurdles only when they seek to generate and

distribute electricity. Even if using the strategy for only a single building, an owner might have to obtain a utility franchise and follow state public service commission regulations. However, thermal energy networks can be structured in a number of typical alternative legal structures, or can be public/private partnership entities that can benefit from special tax districts. Despite regulatory considerations, district energy systems are actually simpler to execute when it comes to financing, because they generate cash flow that becomes a reliable security.



Retrofitted building boiler.

IV NEW RULES

We would not be talking about energy finance in real estate if we weren't motivated by the risks of climate change. But the one thing we can all agree on: there is a value proposition to energy-efficient improvements, if we can find ways to finance those improvements.

Coming to a Market Near You: New Rules

NEW RULES AND REGULATIONS—federal, regional, state, and local—are beginning to change the game for land use and development professionals by creating new avenues of due diligence and placing increasing value on ongoing performance standards across real estate. Several of these public sector initiatives will not hit the private marketplace for some years, but the groundwork is being laid for increased attention to defining community sustainability and resilience.

Whether related to the ongoing investment of the stimulus bill or to climate change and energy regulation, initiatives are reshaping land entitlement and building regulations, at least within a couple of markets across the country. What will these requirements mean for existing properties? Will these regulations be effective in moving communities toward livable and sustainable outcomes?

A GLOBAL CONTEXT FOR PUBLIC SECTOR ACTION

Even without a legally binding agreement or an agreed global emission reduction target following the Copenhagen Accord, the global effort to reduce greenhouse gas emissions is advancing. Progress, however, varies greatly from country to country. Examples of astounding action are becoming models for U.S. initiatives. Denmark and Portugal have successfully navigated their economies to low-carbon standards. Of the large economies, China in 2010 marks becoming the world leader in energy consumption; it has led in CO₂ emissions since 2006. China announced plans to close nearly 2,100 energy-intensive factories as part of a campaign to improve energy efficiency and to fast-track its national plan to reduce emissions by 40 to 45 percent by 2020.

European nations continue to revitalize local industry by becoming clean energy-generation hubs. The latest of these is Portugal, which this year will produce nearly 45 percent of its electricity from renewable sources, up from 17 percent just five years ago.

Progress in the United States is just as variable. While the Senate failed to act on the House version of the climate bill, the executive branch has rolled out a series of initiatives seeking to regulate greenhouse gas emissions. With Clean Air Act rulings from the Supreme Court blowing wind at its back, the U.S. Environmental Protection Agency (EPA) announced this year that it will commence regulating GHG emissions for “primary emitters” starting in 2011. The U.S. Securities and Exchange Commission (SEC) rolled out regulations that force public companies to

disclose material risks that climate change poses to their business. And the executive branch implemented ARRA funding, together with aggressive executive orders that require the federal government to get its own house in order by reducing energy consumption over the short and intermediate time frame.

Activity at the local, state, and regional levels of government remains at high levels, with more than 1,000 mayors across the country having pledged to pursue carbon emission reductions on par with the 1992 Kyoto Accord.

People are thinking about why they are in real estate in the first place. It's a long-term investment and a long-term value proposition. So let's think about long-term things that make a difference.

Select Actions at the Federal Level

FEDERAL EXECUTIVE ORDERS: EFFECTS ARE BUILDING

At the federal level, historic, if yet unrealized, action has been taken by the Obama administration and by several federal agencies in the past year. The issuance of Executive Order 13514 by President Obama in fall 2009 set sustainability goals for federal agencies to improve environmental, energy, and economic performance. The president followed this in January with a requirement that all federal agencies reduce their carbon footprint by 28 percent by 2020.

The federal government employs more than 1.8 million civilians, and purchases more than \$500 billion per year in goods and services. September 2010 marked a milestone when all federal agencies submitted their individual plans to the White House on how they would achieve this objective. GSA, manager of over 8,000 buildings, submitted a plan that exceeded the 28 percent emissions reduction goal.

For the next few years, agencies will report their GHG emissions on a voluntary basis as reporting processes are systematized. The nearly 600,000 businesses that the federal government does business with will be strongly affected. GSA is working with vendors on a voluntary trial basis to extend carbon reporting to all GSA contracts. Over time, businesses wanting contracts with the federal government will be prioritized by their commitment to supplying low-carbon or energy-efficient services to the federal government to help it achieve its reduction targets.

Special implications for developers delivering new buildings for the GSA include adhering to the 2030 Net-Zero-Energy Building Requirement. This requirement will strongly affect market practices by stipulating that buildings be operationally carbon-neutral by 2030, i.e., produce no net GHG emissions. These targets may be accomplished by implementing innovative sustainable design strategies, generating on-site renewable power, or purchasing up to 20 percent of needed power through renewable energy or certified renewable energy credits.

SUSTAINABLE COMMUNITIES INITIATIVE

Three federal agencies have forged a unique partnership that is likely to have an impact on the real estate investment community. The Sustainable Communities Initiative, a collaborative effort of the Department of Housing and Urban Development (HUD), the Department of Transportation (DOT), and the EPA, aims to stimulate more integrated and sophisticated regional planning to guide state, metropolitan, and local investments in land use, transportation, and housing, as well as to challenge localities to undertake zoning and land use reforms as a component of integrated infrastructure investments.

Governed by six livability principles, the initiative has four main tasks:

- Offer planning grants to catalyze a new generation of integrated metropolitan transportation, housing, land use, and energy planning, using state-of-the-art data and analytic GIS tools;
- Fund challenge grants to provide a local complement to regional planning activities, enabling multi-jurisdictional partnerships to establish policies, codes, tools, and capital investments needed to achieve development outcomes;
- Enhance capacity building to support grant recipients and other communities interested in implementing sustainable community strategies; and,
- Pursue a joint research effort designed to advance transportation and housing linkages.

SEC CLIMATE CHANGE REPORTING REQUIREMENT

Also at the federal level, the SEC issued a climate-risk disclosure requirement in January 2010 requiring publicly traded companies to disclose to investors the “material risk” that climate change trends will have on the company’s assets, as well as the regulatory consequences that are likely to arise for a company as a result of regulations curbing GHG emissions. This action is the world’s first economy-wide climate risk disclosure requirement. What does this mean for publicly traded real estate companies? What are the consequences for banks and insurers that finance and insure coastal development prone to severe weather or sea-level rise? No reporting or disclosure has yet been completed.

DOE’S ENERGY EFFICIENCY COMMUNITY BLOCK GRANT PROGRAM

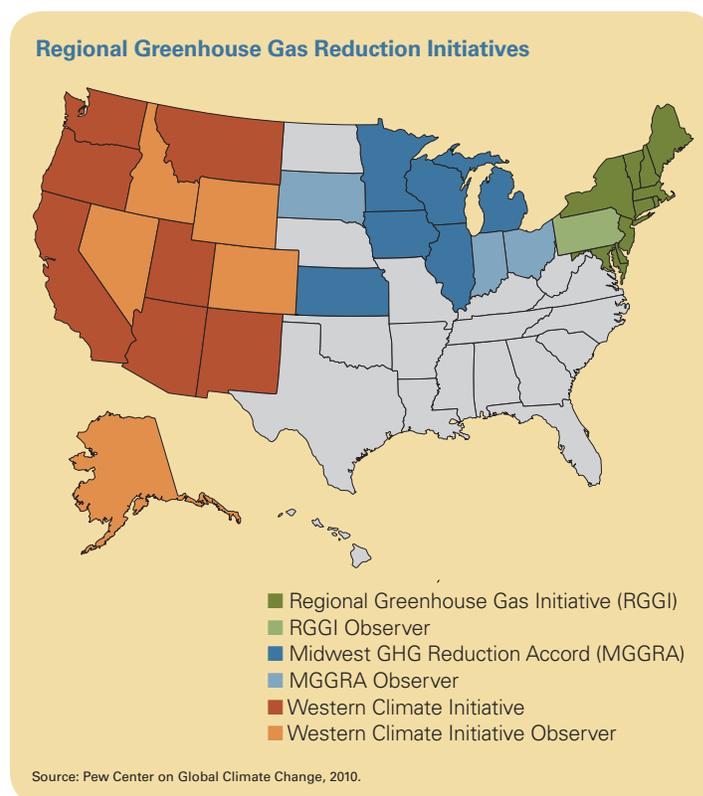
With little fanfare, the DOE has been investing ARRA funding in communities across the country under its Energy Efficiency Community Block Grant Program. This could have the result of positioning the DOE as a local economy change agent. Over \$3.2 billion was allocated for the program, and roughly \$2.7 billion was disbursed on a formula basis directly to municipalities and counties. Overwhelmed by an unprecedented

influx of resources, many municipalities moved forward with energy-saving public works projects, such as updating vehicle fleets with hybrid cars, replacing street lights with LED technologies, and pursuing energy efficiency in their own public buildings. Competitive grants and remaining budgets have commenced a new era of awareness and goals associated with community energy planning. A second round of competitive grants was designed to help stand up PACE lending programs. Many of these funds are now being redirected to create public revolving loan funds which benefit non-creditworthy small businesses seeking to implement energy efficiency.

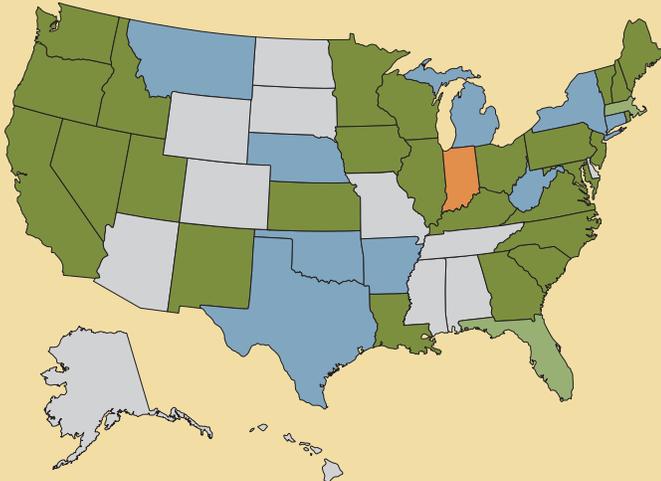
Multistate Regional Initiatives

SHAPING EMISSIONS MARKETS AT THE REGIONAL LEVEL

Several regional-level initiatives have coordinated multistate agreements around GHG emission reduction targets. These represent first steps at exploring how regional emissions trading markets can be formed, as states have begun to adopt climate change policies. Benefits to states of



State-Adopted ASHRAE Energy Codes



- 2009 IECC/ASHRAE 2007 or equivalent
- 2009 IECC/ASHRAE 2004 or equivalent
- 1998–2003 IECC/ASHRAE 1999/2001
- Pre-1998 IECC/Pre-ASHRAE 1999

Note: The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) standards introduced before 1999 do not meet the requirements of the federal Energy Conservation and Production Act (ECPA) of 1998.

Source: Pew Center on Global Climate Change, 2009.

these initiatives include helping reduce their vulnerability to energy price spikes, promoting state economic development, and improving local air quality. With total membership of more than 20 states, three distinct regional greenhouse gas reduction initiatives have formed to develop systems to reduce CO₂ emissions from power plants, increase renewable energy generation, and track renewable energy credits. These regional entities

encompass a majority of the dynamic real estate markets in the United States.

RISE OF STATE CLIMATE CHANGE PLANS

At least 20 U.S. states have adopted GHG reduction targets into law and have prompted officials to craft statewide plans to prepare economy-wide plans in a manner that both mitigates greenhouse gas emissions and, in certain instances, seeks to create strategies to adapt to ongoing impacts of climate change. While each varies in specific planning strategies, one noticeable aspect of many of the plans is an emphasis on shorter-term tactics, many of which establish goals of engaging the real estate community in energy efficiency programs. The comprehensive nature of these plans often recognizes the interrelationship of long-term land use policies and the corresponding impact on vehicle-miles traveled (VMT) in the transportation sector.

CALIFORNIA SETS AN EXAMPLE

Many aspects of California's Senate Bill 375, the groundbreaking state law on climate change, are still being worked out among dozens of regional planning agencies, hundreds of local jurisdictions, and with statewide environmental and social justice advocacy groups and building and transportation industry representatives. SB 375 will be getting top billing for some time to come at city planning conferences and land use law and government seminars, as all stakeholders seek to

REGIONAL INITIATIVES

Regional Greenhouse Gas Initiative (RGGI):

Established in December 2005 as a cooperative effort by ten Northeast states, RGGI is the first mandatory, market-based carbon emissions reduction program in the United States. RGGI states have capped carbon emissions from the power sector and will require a 10 percent reduction by 2018. To date, \$583 million in auction proceeds have been paid out to state energy programs.

Western Climate Initiative (WCI): July 2010 marked the release of the WCI Regional Program,

a comprehensive strategy designed to reduce GHG emissions through increased energy efficiency, diversification of clean-energy fuels, and creation of new energy-related jobs. Regional emissions trading is slated to be made operational in 2012.

Midwestern Greenhouse Gas Reduction Accord (MGGRA):

In November 2007, the governors of six Midwestern states signed an accord to reduce GHG emissions through a regional cap-and-trade program and other complementary policy measures.

learn about how dramatic and deep reductions in greenhouse gas emissions can be managed over time. Expect fierce arguments over just what level to set interim emissions targets at and how to reach them, where to encourage housing and job development, and how to invest transportation dollars.

The reduction of VMT through more transit-oriented land use development is one of 18 specific strategies to achieve long-term emissions reductions. Signed into law September 30, 2008, this bill links land use decisions to transportation funding decisions in a way that is unprecedented in California. The vehicle for this coordination is a new regional land use plan: a sustainable communities strategy (SCS). The result is expected to be more rational and coordinated regulation and public funding, which should accelerate the pace at which development consistent with these plans can proceed.

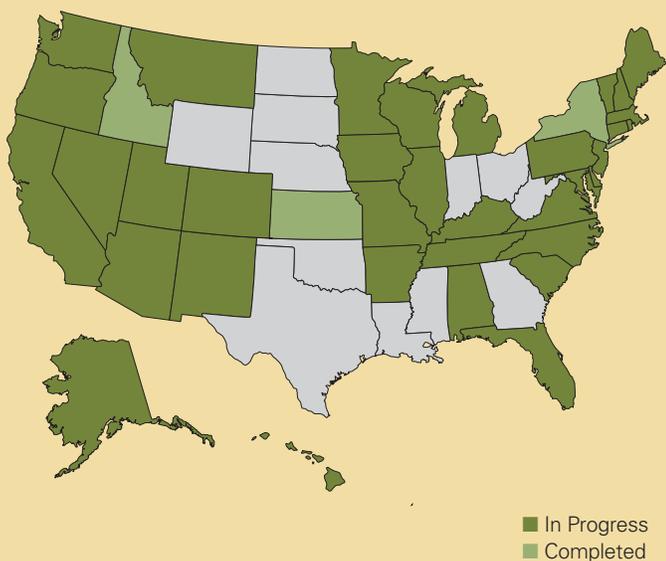
A NEW LANDSCAPE FOR ENVIRONMENTAL REVIEW

State climate plans are having a major impact on how state environmental quality statutes (“mini-NEPAs”) are being implemented. New York, Massachusetts, and other states have issued

detailed guidance on the role of greenhouse gas emissions impact in the environmental impact assessment process. In the case of California, the California Environmental Quality Act (CEQA) was designed to give citizens information on the environmental impact of developments in their communities. Over time, however, it had been used as an anti-development tool by NIMBY advocates to delay or even stop environmentally sound, transit-oriented infill development projects. CEQA’s merits and effectiveness have been debated for years, but SB 375 may make CEQA less useful to anti-infill project opponents.

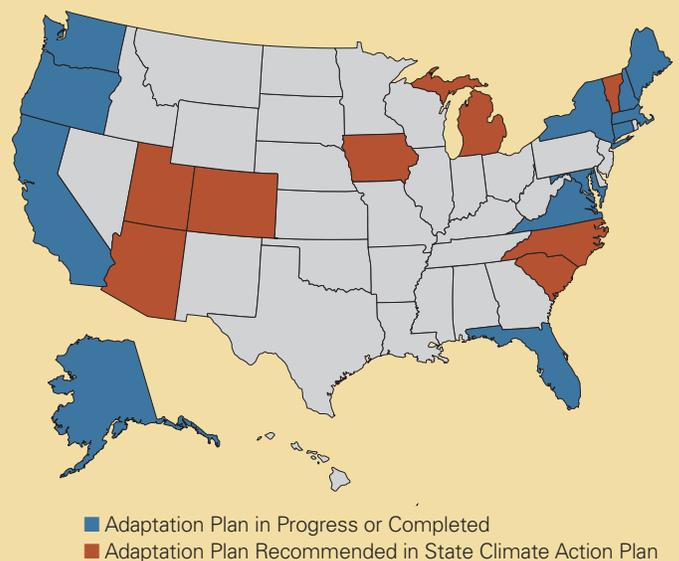
As SB 375 is implemented, exemptions and streamlining provisions will be available for projects consistent with a region’s sustainable communities strategy. That means projects with positive regional environmental impacts—for example, high-density infill projects near transit nodes or corridors—may, in theory, get a fast track to getting approvals and entitlements. SB 375 requires regional transportation plans (RTPs) to include the SCSs and to be internally consistent, thereby better aligning transportation, housing, and land use planning to reduce transportation emissions. Regions have broad freedom to design SCSs.

State Climate Change Action Plans



Source: Pew Center on Global Climate Change, 2010.

State Climate Change Adaptation Plans



Source: Pew Center on Global Climate Change, 2010.

The SCSs are expected to respond to SB 375 by:

- Promoting compact development patterns located near transit;
- Coordinating between the location of employment and housing;
- Supporting transit use;
- Concentrating economic activities into existing communities; and
- Incorporating a mix of housing types.

Local Initiatives: A Taste of NYC

BUILDING REGULATIONS ARE SHAPING CITY INVESTMENT

The most aggressive local legislation to date in any U.S. city to improve energy efficiency in buildings was passed recently by the New York City Council. Among the provisions of the Greener, Greater Buildings plan—a package of four bills passed individually by a large majority—is that energy audits and retro-commissioning must be performed once every ten years for buildings exceeding 50,000 square feet and public buildings over 10,000 square feet. It calls for annual Energy Star performance benchmarking and public disclosure of energy and water use information, as well as lighting upgrades and submetering of tenant spaces. Finally, it calls for creation of a New York City energy code that existing buildings must meet upon renovation.

The legislation also introduced a workforce development initiative that will train workers for new energy efficiency-focused jobs, as well as a financing program using \$16 million in federal stimulus funds to provide loans to property owners for energy efficiency retrofits, such as new lighting, windows, and HVAC systems. These provisions will make existing buildings perform in a more energy efficient manner, and the mandatory disclosure requirements will contribute new energy performance information to the competitive marketplace.

Use of the U.S. Environmental Protection Agency's Energy Star Portfolio Manager rating system (a public online database available through www.epa.gov) aligns the New York City legislation with a similar mandate recently passed in Washington, D.C. As of January 1, 2010, Washington building owners were required to begin measuring the energy use of commercial properties, under a new law aimed at reducing energy demand and costs for building owners and tenants.

The new benchmarking law directs all commercial buildings to use the EPA Energy Star Portfolio Manager, which allows building owners and operators to track and assess energy consumption of one or more properties and rate building performance on a scale of 100 against a national data set. Buildings that earn a rating of 75 or higher qualify for the Energy Star label.

FLORIDA: ANOTHER STATE TO WATCH

FLORIDA EXECUTIVE ORDERS 07-126, 127, and 128 establish greenhouse gas reduction goals of:

- 10 percent by 2012;
- 25 percent by 2017;
- 40 percent by 2025.

Actions include:

- Apply GHG Protocol Corporate Standards as developed by the World Business Council for Sustainable Development;
- Use Energy Star building standards;
- Use state-developed Florida Climate Friendly Preferred Products List ;
- Revise Florida Energy Code for Building Construction—15 percent increase in energy performance requirements of new construction from 2007 standards;
- Initiate rulemaking to increase energy efficiency of consumer products by 15 percent from current standards; and
- Require utilities to produce at least 20 percent of energy from renewable sources (emphasis on wind and solar); initiate rulemaking to reduce cost of solar and renewable energy; initiate rulemaking to authorize net-metering.

NEW YORK'S GREENER, GREATER BUILDINGS PLAN

THE GREENER, GREATER BUILDINGS plan uses a six-point strategy to improve energy efficiency in existing buildings:

- **NYC energy code:** Close loophole that allows for replacing inefficient equipment with other inefficient equipment;

- **Lighting upgrades and submetering:** Requires all large buildings to upgrade lighting over the next 15 years (lighting accounts for one-fifth of all energy used in the city). Submetering requires building owners to provide monthly statement of electricity consumption in certain large tenant spaces;

- **Benchmarking:** Requires large buildings to conduct annual analysis of energy consumption using free, online EPA tool. (Does not require residential tenants to release information to landlord);

- **Audits and retro-commissioning:** Requires large buildings to conduct energy audit every ten years and to undertake energy-efficient maintenance practices as part of retro-commissioning. Large buildings with simple systems will be able to opt out, instead choosing other efficiency upgrades;

- **Green workforce development training:** City and federal agencies will work with private business to create 17,800 skilled construction-related jobs; and

- **Green building financing:** Federal stimulus funds are being used to establish a pilot revolving loan fund for the city. Energy savings data will be collected to encourage private sector lending in the long run.

Currently, Washington, D.C., ranks fourth in the nation in the number of Energy Star-labeled buildings, with 136.

In 2012, building owners will be required to disclose energy ratings, giving prospective tenants and buyers an easy-to-understand way of comparing the energy consumption and operating costs of buildings. By 2015, all private buildings larger than 50,000 square feet will be benchmarked annually and the ratings made public.

Making energy use in buildings transparent to the marketplace means enabling energy effi-

ciency to become a part of the decision-making process by investors considering acquisition or tenants trying to locate property. As such, solid, accurate energy use data become critical.

Regulatory initiatives in New York City are moving toward creating mandated lighting improvements, energy audits, and the continuous improvement in energy performance—and particular targets are those that have the highest energy consumption levels. Creating a regulatory framework takes the market out of the realm of voluntary processes and standardizes practices.

Lighting is the foremost energy use in commercial buildings.



ADDITIONAL RESOURCES

WHAT FOLLOWS IS A REFERENCE reading list of recent studies and resources, including industry research, academic research, industry reports, and market studies.

Ehrhardt-Martinez, Karen, and John Laitner.

The Size of the U.S. Energy Efficiency Market: Generating a More Complete Picture.

Washington, D.C.: American Council for an Energy-Efficient Economy, 2008.

A unique assessment of the size and scale of current investments in the U.S. energy efficiency market, this report reveals the scope of potential benefits that future investments might yield. The goal of this publication is threefold: to increase the visibility of the contributions that efficiency currently makes to our economy; to illustrate the potential contributions that efficiency can make in terms of energy security, economic productivity, and climate change mitigation; and to recommend specific means of accelerating our transition to a more energy-productive, low-carbon economy.

White House Council on Environmental Quality.

Recovery Through Retrofit.

Washington, D.C.: White House Council on Environmental Quality, 2009.

The Recovery Through Retrofit report builds on investments made in the American Recovery and Reinvestment Act of 2009 to expand the residential energy efficiency and retrofit market in American communities. This report provides a roadmap of how the federal government can use existing authorities and funds to unlock private capital and mobilize retrofit programs nationwide.

Urban Land Institute.

Climate Change, Land Use, and Energy 2009: Investment Niche or Necessity?

Washington, D.C.: Urban Land Institute, 2009.

This publication concentrates on the real estate investment community's outlook, preferences, and business practices associated with climate change, land use, and energy. The report was researched through a ULI member survey focusing on due diligence practices in real estate investment and lending, a dedicated ULI conference, and a review of existing literature.

World Business Council for Sustainable Development (WBCSD).

Energy Efficiency in Buildings: Transforming the Market.

Washington, D.C.: WBCSD, April 2009.

In this study and analysis, the WBCSD models three scenarios for global response to the climate challenge in buildings: complacency and inaction leading to a failure to tackle climate change; inadequate action resulting in only incremental improvements in energy efficiency, and a substantial failure to curb climate effects; and 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, D.C.: McKinsey and Company, 2009.

This report offers a detailed analysis 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, 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.

The Corporate Library.

Climate Risk Disclosure in SEC Filings: An Analysis of 10-K Reporting by Oil, Gas, Insurance, Coal, Transportation, and Electric Power Companies.

Boston: CERES, June 2009.

Investors have traditionally relied on SEC filings to learn how publicly traded companies are evaluating and managing risks material to their operations and performance. This report uses the Global Framework for Climate Risk Disclosure to evaluate the disclosure of 100 companies. It assesses company filings in three main categories: emissions and climate change position, risk assessment, and actions to address climate risks and opportunities. The report also includes case studies, providing deeper analysis of current climate disclosure practices.

Barbose, Galen, Charles Goldman, and Jeff Schlegel.

The Shifting Landscape of Ratepayer-Funded Energy Efficiency in the U.S.

Berkeley, California: Lawrence Berkeley National Laboratory, 2009.

This paper addresses recent trends in state policies pertaining to ratepayer-funded energy efficiency programs in the United States. It follows with projections of future spending and savings from such

programs, highlighting key themes. A discussion of major obstacles states and program administrators may face over the coming decade as they seek to ramp up ratepayer-funded energy efficiency program activity, as projected, concludes the study.

United Nations Environment Program (UNEP), Sustainable Buildings and Climate Initiative.
Common Carbon Metric for Measuring Energy Use & Reporting Greenhouse Gas Emissions from Building Operations.

Nairobi, Kenya: UNEP, December 2009.

This paper offers globally applicable common metrics for accurately measuring and reporting the energy use in and GHG emissions from existing building operations to support international, regional, national, and local policy development and industry initiatives.

Urban Land Institute.

Land Use and Driving: The Role Compact Development Can Play in Reducing Greenhouse Gas Emissions.

Washington, D.C.: Urban Land Institute, 2010.

The findings of three recent studies that document and attempt to quantify the effectiveness of compact development as a tool to reduce greenhouse gas emissions are highlighted in this timely report.

Urban Land Institute.

SB 375 Impact Analysis Report.

Washington, D.C.: Urban Land Institute, 2010.

Passed in 2008, California's Senate Bill 375 connects regional transportation funding to new land use "sustainable communities strategies," thereby reducing driving and emissions. This report examines the potential effects of the bill on the economic future for the state and the quality of life for its residents.

Navigant Consulting.

The 21st Century Electric Utility: Positioning for a Low-Carbon Future.

Boston: CERES, 2010.

This report identifies five key elements of a 21st-century electric utility business model and makes specific recommendations to utilities as they transition to a low-carbon future. It is a starting point for utilities, policy makers, regulators, investors, ana-

lysts, and advocates to consider the utility decisions and behaviors best suited to helping realize an energy future that “minimizes cost, risk, and environmental impact and maximizes opportunity, options, and societal benefit.” Drawing 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.

Muldavin, Scott.

Value Beyond Cost Savings: How to Underwrite Sustainable Properties.

San Rafael, CA: The Muldavin Company/Green Building Finance Consortium, 2010.

Three years of independent research by the Green Building Finance Consortium inform this book’s presentation of key findings and conclusions regarding the valuation and underwriting of sustainable properties.

Hinkle, Bob, and David Kenny.

Energy Efficiency Paying the Way: New Financing Strategies Remove First-Cost Hurdles.

San Francisco: CalCEF, 2010.

This white paper provides policy makers, regulators, and private sector firms engaged in the design and implementation of energy efficiency programs a series of innovative financing options that can be used across a broad spectrum of residential, commercial, and industrial market segments. This includes options to augment existing efficiency initiatives at the utility, state, and federal levels by offering energy end users a set of specific financing solutions customized for energy efficiency. Further, a detailed description of how efficiency projects are developed in each financing option provides property owners and decision makers at commercial and industrial facilities a blueprint to implement energy efficiency retrofit projects.

Bloomberg New Energy Finance and Forest Trends.

Building Bridges: State of the Voluntary Carbon Markets 2010.

New York City: Bloomberg New Energy Finance, 2010.

The fourth annual “State of the Voluntary Carbon Markets” offers a marketwide perspective on trading volumes, credit prices, project types, locations, and buyer motivations of buyers. Findings are based on data voluntarily reported by 200 offset suppliers, as well as exchanges and registries.

Prindle, William R. (ICF International).

From Shop Floor to Top Floor: Best Practices in Energy Efficiency.

Washington, D.C.: Pew Center on Global Climate Change, 2010.

Leading-edge energy efficiency strategies of six companies are presented, distilling best practices and providing guidance and resources for other businesses. In-depth case studies cover efficiency strategies encompassing internal operations, supply chains, products and services, and other cross-cutting issues. The report also describes common barriers companies face in developing and implementing energy efficiency strategies, as well as provides examples of successful approaches.

CERES.

Energy Efficiency and Real Estate: Opportunities for Investors.

Boston: CERES, 2010.

Geared toward direct and indirect real estate investors with the background information, and academic and industry research, this report provides case studies, key steps, and best practices for integrating energy efficiency across their portfolios. Fiduciaries responsible for these portfolios may assume unnecessary risk and overlook substantial opportunities to enhance returns if they fail to factor energy efficiency into their real estate investment decisions.

National Research Council of the National Academies.

America's Climate Choices series: Advancing the Science of Climate Change, Limiting the Magnitude of Climate Change, Adapting to the Impacts of Climate Change, Informing an Effective Response to Climate Change.

Washington, D.C.: National Academies, 2009–2010.

As part of its most comprehensive study of climate change to date, the National Research Council has issued four reports emphasizing why the United States should act now to reduce greenhouse gas emissions and develop a national strategy to adapt to the inevitable impacts of climate change. The reports are part of a congressionally requested suite of five studies—the fifth to be released in late 2010—known as America's Climate Choices.

DB Climate Change Advisors.

Investing in Climate Change 2010: A Strategic Asset Allocation Perspective.

New York City: Deutsche Bank Group, 2010.

This paper describes how investors can pursue climate change investment opportunity through evaluating how they have performed in the past and looking ahead to what is forecast. It presents ways investors can use strategic asset allocation to capture alpha opportunities from these markets while maintaining their investment goals—liability driven, such as pension funds or insurance companies or wealth accumulation for families; or mission driven, for the endowment or foundation investor.

Berridge, Rob, and Jackie Cook.

Mutual Funds and Climate Change: Growing Support for Shareholder Resolutions.

Boston: CERES, 2010.

This study analyzes 74 mutual fund families' proxy votes on shareholder-sponsored climate change resolutions over the past five proxy seasons (2004–2008). The shareholder resolutions analyzed typically request corporate disclosure of risks and opportunities from climate change and strategies to respond to those risks and opportunities. The report also evaluates votes on 20 resolutions sponsored by climate skeptics over the three proxy seasons in which these resolutions have been filed (2006–2008).

Spalding, Kristen Snow.

Investors Analyze Climate Risks and Opportunities: A Survey of Asset Managers' Practices.

Boston: CERES, 2010.

Learn what specific best practices asset managers are using to incorporate climate risks into their due diligence, corporate governance, and portfolio valuation. The report also outlines questions institutional investors can ask asset managers, in requests for proposals (RFPs) and in annual performance reviews, to ensure managers are giving climate change risks and opportunities the attention they deserve.

Pew Center on Global Climate Change.

In Brief: The Business Case for Climate Legislation.

Arlington, Virginia: Pew Center on Global Climate Change, 2010.

This brief lays out the business case for national climate and energy policy and explains why leading companies have decided that legislation that limits GHG emissions is good for their industries. While the details of individual companies' policy positions will vary based on specific circumstances, broadly speaking, businesses support legislation that addresses climate change for three reasons: the need for regulatory certainty, the economic opportunity arising from climate solutions, and the reputational benefits of supporting public policies that combat climate change.

Johns Hopkins University.

Impacts of Comprehensive Climate and Energy Policy Options on the U.S. Economy.

Baltimore: Johns Hopkins University 2010.

The national debate over federal climate policy and its impact on the broader economy should be informed by the experience of the states and their stakeholders, which have been engaged in broad-scale comprehensive climate policy planning, analysis, and implementation since 2005. This study compiles and updates the findings of 16 comprehensive state climate action plans and extrapolates the results to the nation. The document then takes those results and, using a widely accepted economic model, projects the national impact of these policies on employment, incomes, gross domestic product (GDP), and consumer energy prices.

Satchwell, Andrew, Charles Goldman, Peter Larsen, Donald Gilligan, and Terry Singer. ***A Survey of the U.S. ESCO Industry: Market Growth and Development from 2008 to 2011.*** Berkeley, California: Lawrence Berkeley National Laboratory, 2010.

In this study, LBNL analyzes the current size of the ESCO industry, industry growth projections to 2011, and market trends in order to provide policy makers with a more in-depth understanding of energy efficiency activity among private sector firms. It draws heavily on information from interviews with ESCOs conducted from October 2009 to February 2010 and from a review of publicly available financial information regarding individual ESCOs.

Pike Research.

Energy Efficiency Retrofits for Commercial and Public Buildings: Energy Savings Potential, Retrofit Business Cases, Financing Structures, Policy and Regulatory Factors, Demand Drivers by Segment, and Market Forecasts.

Boulder, Colorado: Pike Research, 2010.

This report analyzes the market opportunity for energy efficiency retrofits of commercial and public buildings in the United States. It provides a detailed examination of the drivers, barriers, and industry dynamics in today's market, along with several scenarios for future growth. The report includes an in-depth assessment of policy and regulatory factors, financing structures, demand drivers by segment, retrofit business cases, key industry players, and market forecasts.

U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy.

Energy Efficiency Trends in Residential and Commercial Buildings

Washington, D.C.: U.S. Department of Energy, 2010.

This report provides an overview of trends in the construction industry, including profiles of buildings and the resulting impacts on energy consumption. It also provides a specific profile of the construction industry and patterns of energy use followed by sections providing product and market insights and information on policy efforts, such as taxes and regulations, which are intended to influence building energy use. Information on voluntary programs is also offered.

U.S. General Services Administration.

Strategic Sustainability Performance Plan.

Washington, D.C.: U.S. General Services Administration, 2010.

The U.S. General Services Administration (GSA) has formulated a Strategic Sustainability Performance Plan. With a long-term goal of a 30 percent reduction in annual greenhouse gas emissions by the year 2020, the agency will aggressively pursue reaching a zero environmental impact through numerous measures aimed at "greening" its supply chain and improving energy efficiency across its property portfolio.

Johnson Controls, Inc.

2010 Energy Efficiency Indicator Global Survey.

Milwaukee: Johnson Controls, Inc., 2010.

The global Energy Efficiency Indicator (EEI) study is conducted annually to track the priorities, practices, investment plans, and return on investment criteria among those on the front lines of energy management in commercial buildings. While the EEI has been conducted and published in North America for the past four years, 2010 marks the first time a survey on this topic has been conducted across Canada, China, France, Germany, India, Italy, Poland, Spain, the United Kingdom, and the United States.

Pike Research.

The U.S. Energy Service Company Market: Energy Performance Contracts, Energy Savings Guarantees, and Energy Efficiency Measures for Commercial Buildings.

Boulder, Colorado: Pike Research, 2010.

This report examines the commercial buildings market by end use, identifying the solution opportunities for ESCOs and highlighting key industry drivers. It analyzes the framework for rapid growth in this market, reviewing federal programs, laws, regulations, and pending legislation, while revealing key barriers for the privately owned commercial building market. Market forecasts include base case and aggressive growth scenarios through 2020.

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ULI ENERGY FINANCE FOR REAL ESTATE FORUM PANELISTS

Drew Ades

Director, Housing and Community Development Risk Management, Fannie Mae

Trenton Allen

Director, Citigroup

Richard H. Bradley

Executive Director, Downtown DC Business Improvement District (BID) Corporation

Daniel M. Cashdan

Head of Investment Banking, HFF Securities LP

John Christmas

Senior Vice President, Hannon Armstrong Capital

Cisco DeVries

President, Renewable Funding LLC

Luke Falk

Project Manager, New York City Office, New York State Energy Research and Development Authority (NYSERDA)

Frederick R. Fucci

Partner, Arnold & Porter LLP

Steve Gossett, Jr.

Vice President, Transcend Equity Development Corporation

Scott D. Henderson

Director of Finance, Clinton Climate Initiative

Bob Hinkle

President and Chief Executive Officer, Metrus Energy

Kenneth W. Hubbard

Executive Vice President, Hines

John L. Knott, Jr.

President and Chief Executive Officer, The Noisette Company, LLC

William G. Lashbrook III

Senior Vice President, PNC Real Estate Finance, The PNC Financial Services Group

Susan Leeds

Director of Capital Markets, Equilibrium Resource Management

Charles B. Leitner III

Global Head, RREEF

Anthony E. Malkin

President, Malkin Holdings

Scott Muldavin

President, The Muldavin Company, Inc. Executive Director, Green Building Finance Consortium

Clay Nesler

Vice President, Global Energy and Sustainability, Johnson Controls

Scott Nordheimer

Senior Adviser, Urban Atlantic

Neal J. Parikh

Senior Policy Adviser, Mayor's Office of Long-Term Planning and Sustainability, City of New York

John Petze

Global Director, Sales Operations, Cisco Systems, Smart and Connected Buildings

Patrick L. Phillips

Chief Executive Officer, Urban Land Institute

Jonathan F.P. Rose

President, Jonathan Rose Companies LLC

Gregory B. Saunders

Chief Financial Officer, Coddling Enterprises

Peter Scarpelli

Vice President, Global Leader of Energy Services, CB Richard Ellis

Wayne Seaton

Managing Director and Head of Sustainable Public Infrastructure, Wells Fargo Securities

William M. Sisson

Director, Sustainability, United Technologies Corporation Research Center

Scott Wisdom

Associate Relationship Manager, U.S. Bank

ULI EXECUTIVE STAFF

Patrick L. Phillips

Chief Executive Officer

Richard M. Rosan

President, ULI Foundation

Cheryl Cummins

Executive Officer

Michael Terseck

Chief Financial Officer/Chief Administrative Officer

David Howard

Executive Vice President, Development and ULI Foundation

Maureen McAvey

Executive Vice President, ULI Initiatives

ULI PROJECT STAFF

Uwe S. Brandes

Vice President, ULI Initiatives

Matthew F. Johnston

Research Manager, ULI Initiatives

Maria Fiore

Director, Program Development

Rose Kim

Director, Special Events

James A. Mulligan

Managing Editor

Betsy VanBuskirk

Creative Director

Craig Chapman

Senior Director, Publishing Operations

SPECIAL ADVISERS

Edward McMahon

Senior Resident Fellow, ULI/Charles Fraser
Chair for Sustainable Development and
Environmental Policy

John McIwain

Senior Resident Fellow, ULI/J. Ronald
Terwilliger Chair for Housing

Tom Murphy

Senior Resident Fellow, ULI/Klingbeil Family
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Jess Zimbabwe

Director, ULI Rose Center for Public
Leadership

Scott D. Henderson

Director of Finance, Clinton Climate Initiative

Bracken Hendricks

Center for American Progress

Kate Q. Knight

AIG Global Real Estate Investment

David Wood

Director, Initiative for Responsible Investing

PRODUCTION TEAM

Report Adviser and Editor

Garfinkel + Associates, LLC

Book Design and Production

John Hall Design Group
Beverly, Massachusetts
www.johnhalldesign.com

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Wells Fargo & Company (NYSE: WFC) is a nationwide, diversified, community-based financial services company with \$1.2 trillion in assets. Founded in 1852 and headquartered in San Francisco, Wells Fargo provides banking, insurance, investments, mortgage, and consumer and commercial finance through more than 10,000 banking stores, 12,000 ATMs, the internet (wellsfargo.com and wachovia.com), and other distribution channels across North America and internationally. The company promotes economic growth and self-sufficiency, education, social services, the arts, and the environment in thousands of communities. In 2009, the company gave \$202 million in grants to 18,000 nonprofits, and team members contributed more than 1.23 million volunteer hours around the country. For more about Wells Fargo's achievements in social responsibility: www.wellsfargo.com/about/csr. Wells Fargo ranked number one among banks and insurance companies—and No. 13 overall—in *Newsweek* magazine's inaugural "Green Rankings" of the country's 500 largest companies. The Wells Fargo Environmental Affairs website is <https://www.wellsfargo.com/about/csr/ea/>.

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ULI New York District Council
ULI Daniel Rose Center for Public Leadership in Land Use
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Climate Change, Land Use, and Energy 2010: New Tools. New Rules.

New regulations and finance tools are emerging in the effort to make buildings energy efficient and reduce end-use carbon emissions in commercial buildings. This report includes stories from the retrofitting trenches, prevailing attitudes, and case studies that provide a benchmark for how energy efficiency is valued in real estate transactions today.



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