

BUILDING STOCK OFFERS OPPORTUNITIES TO FOSTER SUSTAINABILITY AND PROVIDES TOOLS FOR CLIMATE CHANGE MITIGATION AND ADAPTATION

by Edna Sussman*

INTRODUCTION

The overwhelming consensus of the scientific community is that climate change is upon us. The most recent reports issued by the Intergovernmental Panel on Climate Change confirmed with an even greater degree of certainty that the earth is warming and that greenhouse gas (“GHG”) emissions generated by humans and land use practices are causing a warming trend and are poised to cause monumental damage.¹ Our building stock presents enormous opportunities to address the climate change challenge. Adopting green building practices will further the goal of sustainability by providing effective tools to mitigate the increase in GHGs and adapt to the irreversible impacts of climate change.

While climate change is a crucial driver, there are other significant factors that are moving the green building movement forward. The cost of energy fuels has risen, making the goal of efficiently supplying energy even more important. Such cost increases seem likely to continue, particularly if the worldwide demand for energy continues to increase. International geopolitical concerns have led to a national call for increased energy independence. The constantly increasing demand for energy, projected to continue with the growth in population and energy-intensive activities, has created serious concerns about energy reliability. As siting and constructing new generation facilities, transmission infrastructure, and pipelines are difficult in our settled society, other means to deal with energy demand are also required. Recent reports by military advisers have added concerns about U.S. national security to the list of reasons climate change should be addressed now.

As these compelling drivers gain recognition, green buildings have moved into the ascendancy. Green building is being employed as a major tool by government and the private sector to address climate change.² The Architecture 2030 Challenge,³ with its goal of making buildings dramatically more energy efficient today and carbon neutral by 2030, is gaining acceptance and was recently adopted as a goal by the U.S. Conference of Mayors, the official nonpartisan organization of U.S. cities. Many believe that the tipping point on green buildings has been

reached. The trade industry considers that soon Class A buildings that are not green will become Class B buildings, commanding lower prices and occupancy rates, as occurred with the advent of air conditioning in an earlier generation.

GOVERNMENT ACTION TO ADDRESS CLIMATE CHANGE INCLUDES GREEN BUILDING INITIATIVES

In the absence of climate change legislation at the federal level, the states have moved ahead with aggressive initiatives. Twenty nine states, representing a population of over 180 million, have developed some form of a climate action plan; fourteen of those states have set GHG reduction targets. The Northeastern and Mid-Atlantic states have entered into the

Regional Greenhouse Gas Initiative (“RGGI”) that sets caps on carbon dioxide emissions from electricity generation establishing the first mandatory GHG regime in the United States and requiring emissions to be reduced by ten percent by 2019.⁴ In February 2007, the Governors of Arizona, California, New Mexico, Oregon, and Washington signed an agreement establishing the Western Regional Climate Action Initiative, a joint effort to reduce GHG emissions

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and address climate change.⁵

Several other regional efforts have been launched. The Western Governors Association covers seventeen states and aims to increase clean energy generation and energy efficiency.⁶ “Powering the Plains” was initiated by a group of five states in the Midwestern United States: Iowa, Minnesota, Wisconsin, North Dakota, and South Dakota. This group is working with industry and clean energy advocacy groups to address energy and agricultural issues.⁷ Similarly, the Southwest Climate Change Initiative is a collaborative effort by Arizona and New

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Mexico to identify measures to reduce GHG emissions and promote clean energy and energy efficiency.⁸

Many states have taken steps individually to address climate change. California, often a leader on environmental matters in the United States, passed legislation in the fall of 2006 mandating statewide reductions in GHG emissions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050.⁹ Numerous other states have established various targets for GHG reductions, and have adopted a suite of initiatives to increase energy efficiency, promote green building, and foster the development of renewable energy.¹⁰

In the face of the failure of the federal government to ratify the Kyoto Protocol, local governmental entities in the United States became a vigorous force in moving the country towards compliance with the Protocol's requirements. On February 16, 2005, the day the Kyoto Protocol went into effect, Mayor Neckles of Seattle, Washington launched the U.S. Mayors' Climate Protection Agreement.¹¹ The goal was to have 141 mayors, the number of countries that had ratified the Kyoto Protocol at that time, sign on and commit to meet or beat the Kyoto Protocol targets in their own communities, a seven percent reduction from 1990 levels by 2012. As of April 2007, over 442 U.S. mayors representing over 61 million people from every state in the union and governed by leaders from every political party have joined the U.S. Mayors' Climate Protection Agreement.¹² The initiative was endorsed by the U.S. Conference of Mayors. Joining in another important program, over 240 local governments in the U.S. collaborate with International Council on Local Environmental Initiatives in its Cities for Climate Protection program.¹³

Through these and other mechanisms municipalities are embarking on developing full fledged sustainability or climate change action plans and setting their own GHG reduction goals. For example, New York City recently launched an office of Long Term Planning and Sustainability which has set as one of its goals to reduce global warming emissions in New York City a full thirty percent by 2030.¹⁴ San Francisco has set its goal at achieving a twenty percent reduction from 1990 levels by 2012.¹⁵ Austin, Texas and Woodstock, New York have announced that they are seeking to be essentially carbon neutral by 2020.

Local governments are addressing climate change with a host of green building approaches. Such actions include changing land use regulations to discourage sprawl and increase density in urban centers, fostering green building construction, promoting mass transit, biking, and pedestrian traffic, purchasing cleaner vehicles and fuels, increasing energy efficiency, reducing waste, planting trees, purchasing renewable energy, and carbon offsets. Government is also engaging the citizenry and businesses in the effort, recognizing that a sustainable future and the required emission reductions can only be achieved with the participation of the entire community.

GREEN BUILDINGS FACTS AND FIGURES

Green buildings, as they are commonly known, are high performance buildings that: (1) increase the efficiency with which buildings use energy, water, and materials; and (2) reduce

building impacts on human health and the environment through better siting, design, construction, operation, maintenance, and removal. While climate change has been an impetus for action, the historic facts in the United States demonstrate the compelling need to use green building practices to foster sustainability. Currently, traditional buildings:

- Use 39 percent of all the energy consumed and 79 percent of all the electricity;
- Are responsible for about 40 percent of the country's emissions of carbon dioxide, the principal cause of global warming;
- Account for 49 percent of sulfur dioxide emissions, 25 percent of nitrous oxide emissions, and ten percent of particulate emissions, all of which degrade air quality;
- Produce 136 million tons of construction and demolition waste annually, as compared to 210 million tons of municipal solid waste; and
- Use 40 percent of the raw materials consumed globally.¹⁶

The trend to date has been away from sustainability:

- Developed land in the United States has increased 34 percent from 1982 to 1997;
- An American household uses on average 146,000 gallons of water per year, 42 percent indoors and 56 percent outdoors, a tenfold increase over the last 100 years;
- Mass transit ridership is down from a peak in 1946 of 23.4 billion to 9.4 billion in 2001;
- Annual number of person miles traveled per capita increased by 38 percent from 1969 to 1990, mostly because of lengthened distances from home to work; and
- House sizes have more than doubled from 1950 to 1999.¹⁷

The green building movement seeks to reverse these trends and diminish the impact buildings have on the environment. Green buildings provide an easy, cost effective opportunity for climate change mitigation by reducing GHG emissions and adopting more sustainable land use practices. Green buildings provide the co-benefit of providing a means to adapt to the inevitable warming caused by climate change and consequent increase in demand for energy by curbing that increased demand through design features.

The opportunity presented by green building is enormous. There are more than 76 million residential buildings and nearly five million commercial buildings in the United States. Massive energy savings can be achieved in this existing building stock by implementing cost effective energy efficiency retrofits. By the year 2015 the nation is projected to build fifteen million new buildings; how these are built is critical to the future.

GREEN BUILDING FEATURES AND LEED

Green building design addresses all aspects of a building, including siting, energy conservation, water conservation, landscaping, materials used, and indoor air quality. Founded just over a decade ago, the United States Green Building Council ("USGBC") emerged as the leader of the green building movement in the United States.¹⁸ Using a membership consensus process, the USGBC developed a green rating system for new

commercial construction and major renovation that is increasingly utilized as the national standard for green buildings.

The Leadership in Energy and Environmental Design (“LEED”) Green Building Rating System,¹⁹ first version 2.0 released in 2000, established a system that ranks buildings as Certified, Silver, Gold, or Platinum based on the level of sustainability achieved by construction and renovation projects. In late 2004, the USGBC issued a LEED Green Building Rating System for Existing Buildings, which creates a system for measuring upgrades, operations, and maintenance. Following these initial LEED programs, the USGBC added programs for commercial interiors and core & shell, is piloting a program for homes, is developing programs for neighborhood development, schools, on campus projects, multiple buildings, and health care. The LEED criteria serve the critical purposes of promoting sustainable design features and creating a standard that can be applied universally and credibly.

The LEED system has gained wide acceptance. The LEED training programs are widely attended and there are now over 35,000 accredited LEED professionals who have completed the rigorous training and demonstrated proficiency in green building strategies. There are 735 LEED certified projects to date but over 5,500 additional buildings are registered for certification.

LEED is being followed for construction and renovation at every level of government. Several federal government agencies, including the Department of Agriculture, Department of State, NASA, U.S. General Services Administration (“GSA”), Army, Navy, and Air Force, have adopted LEED standards for construction. Over twenty states have issued executive orders or laws that require construction to LEED standards or otherwise mandate green building practices consistent with LEED. These states cover all regions of the country. As municipalities and counties all over the country strive to reduce their carbon footprint, many are mandating LEED certification for construction that they fund or require green building practices consistent with LEED. These encompass virtually every major city. Smaller communities are also legion in the ranks of those that have adopted LEED as a standard for construction. Some communities have taken the next step and have also mandated green building standards for private residential construction.²⁰

COSTS OF GREEN BUILDINGS

One of the major disincentives to the construction of green buildings has been the view that they are more expensive. Comprehensive studies have demonstrated that this is not the case. A report issued in October of 2004 by Davis Langdon Adamson studied the actual construction cost of 45 LEED and 93 non-LEED buildings and concluded that there was no statistical dif-

ference in construction costs for LEED versus non-LEED buildings.²¹ Similarly, a comprehensive study published in October of 2004 conducted for the U.S. GSA by Steven Winter Associates Inc. concluded that a “LEED rating could potentially be achieved within a standard GSA project budget without a green building budget allowance.”²² A report released in October 2003 by Greg Kats, commissioned by the State of California’s Sustainable Building Task Force (“California Study”), found a minimal average cost increase of about two percent. However, when the many ancillary benefits of green buildings are added to the analysis, the case for building green is compelling.²³

BENEFITS OF GREEN BUILDINGS

The California Study addresses not only construction costs but also benefits, using a life cycle costing perspective. Life cycle costing is a much more accurate way to measure true cost

and is being increasingly applied, not only in the private sector but also by governmental entities concerned about sustainability. This approach often enables public institutions to make more sustainable and healthier choices without being faulted for sacrificing a seemingly cheaper alternative that might otherwise be politically or even legally compelled. Applying life cycle cost, the California Study concluded that while energy savings alone, which are

typically in the order of 30 percent for green buildings, would more than pay for any additional construction cost, when the value of water conservation, emission reduction, waste reduction, commissioning operations and management, and health and productivity gains is added, the additional costs to support green design would on average result in life cycle savings of more than ten times the initial investment in the green features.

What may prove to be most compelling to the marketplace are the conclusions in the California Study relating the impact of green buildings to human health and productivity. Based on a thorough review of the numerous studies conducted on this question, the California Report concludes that a conservative value to attribute to the benefits in human health and productivity is a one percent overall increase. This attribute of green buildings is not only supported by numerous studies, but also makes sense intuitively: people work harder and more efficiently in work environments with more comfortable thermal, light, and ventilation levels. In the case of the California analysis, the conservative one percent increase in human productivity resulted in a per square foot benefit of \$36.89 to \$53.33 depending on the LEED level achieved over a twenty year life of the building, a number many multiples higher than the additional cost of \$3-\$5 per square foot for the green building features.

With the many benefits of green buildings, incentives to promote green building have already been initiated in many

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jurisdictions. These incentives can often be utilized to drive down the costs of building green even more.

GREEN BUILDING INCENTIVES

The Energy Policy Act of 2005 established a host of incentives to promote green building and energy efficiency. It is likely that the 110th Congress, which is vigorously examining issues related to global warming and energy independence, will pass additional applicable legislation. Many local jurisdictions offer design and consultation assistance, and a variety of incentives for specific technologies to encourage green buildings. Direct subsidies are offered for green features such as low flush toilets, solar hot water heaters and other solar installations, and energy smart appliances. These incentives change over time and each jurisdiction must be consulted for its current offerings. Some examples of additional innovative incentives include:


- *Tax Credits*—New York led the way with a green building tax credit enacted in 2000 keyed to performance guidelines. Maryland, Nevada, Oregon followed with similar enactments.
- *Expedited Permitting*—Scottsdale, Arizona has implemented a highly successful green building program by offering a fast track plan review service that cuts building permit time in half. The program is so successful that about 21 percent of the residential permits in 2004 were for green buildings. Similar programs are in place in several other locales including Gainesville, San Diego, San Francisco, and Sarasota County.
- *Density or Height Bonus*—Arlington, Virginia offered bonus density of between 0.15 and 0.35 FAR (floor-area ratio) and/or an additional three stories in exchange for a LEED Silver rating or higher. Portland, Oregon offers three additional square feet for every square foot of vegetated roof in the project.
- *Waiver or Reduction of Fees*—San Antonio authorizes an administrative waiver or reduction in certain development fees for green buildings that meet specified standards.
- *Home Financing Incentives*—Energy-efficient mortgages are available through Fannie Mae, the Federal Housing

Authority, Freddie Mac, and the Veterans Administration. Further, many private mortgage lenders have signed up to become Energy Star Mortgage Partners; these enable homeowners to qualify for a larger mortgage as a result of projected energy savings.

CONCLUSION

Spreading the word about the attributes of green buildings is the key to expediting their growth. The many benefits of green buildings and the contribution they can make to the climate change challenge are leading to increasing market demand. Building appraisers and lenders are beginning to equate higher performing buildings with greater occupancy rates, rents, and resale values. Insurance companies are beginning to talk about premium credits and building code enforcers are beginning to understand green building features and are able to process permit applications more quickly.

The success of green buildings is illustrated by buildings all over the country and is exemplified by the Durst buildings in New York City. The Durst's renowned Conde Nast building at 4 Times Square was such a success that the Durst Organization is now in the process of completing the development of an adjacent 2.1 million square foot building with the Bank of America, which seeks a LEED Platinum designation. Its features will include construction largely of recycled or recyclable materials, a state-of-the-art cogeneration plant, a gray water system to recapture and reuse all rain and waste water, a green vegetated roof that will reduce the heat island effect, carbon monoxide detectors to add fresh air when necessary, maximum daylighting and daylight dimming for greater occupant productivity, and energy use reduction.

Growing sensitivity to sustainable development and climate change by government and corporate America, increasing interest by homeowners in energy efficient and healthy homes, and increasing knowledge of the low costs and many benefits of green buildings are setting the stage for the burst in green building activity essential to reducing America's ecological footprint, reducing GHG emissions, and enabling the United States to move towards living within its ecological means. 

Endnotes: Building Stock Offers Opportunities

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