

The New Paradigm for Green Buildings and Energy Efficiency

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Improving the energy efficiency of homes, businesses, schools, governments, and industries—which consume more than 70 percent of the natural gas and electricity used in the United States—is one of the most constructive, cost-effective ways to address the challenges of high energy prices, energy security and independence, air pollution, and global climate change in the near future. Energy efficiency can play a significant role in meeting our energy requirements, and it is a critical component of the overall modernization of utility energy systems worthy of the 21st century.¹

Introduction

The paradigm for green buildings is on the verge of cataclysmic change. With the current deep national concerns about energy independence, global warming and job creation we are likely to see dramatic increases in the development of green buildings and energy efficiency measures, which can provide significant contributions towards addressing all of these concerns. 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. Green buildings' cost-effective energy-efficiency and domestic job-creation opportunities present a true win-win opportunity for our nation.

President-Elect Obama's Plan

President-elect Barack Obama, in his campaign agenda,² committed to a series of measures that will drive the growth of green construction and building energy efficiency. His platform outlined the following measures:

- *Deploy the Cheapest, Cleanest, Fastest Energy Source: Energy Efficiency.* Reducing electricity demand by 15 percent from the U.S. Department of Energy's (DOE) projected levels by 2020 in an effort to save consumers a total of \$130 billion, reduce carbon dioxide (CO₂) emissions by more than 5 billion tons through 2030, and create jobs. A portion of this goal would be met by setting annual demand reduction targets that utilities would need to meet; the remainder would come from more stringent building and appliance standards.
- *Set National Building Efficiency Goals.* Establishing a goal of making all new buildings carbon neutral—or produce zero emissions—by 2030. This will include a national goal of improving new building efficiency by 50 percent and existing building efficiency by 25 percent over the next decade to help meet the 2030 goal.
- *Reduce Federal Energy Consumption.* Making the federal government a leader in the green building market, achieving a 40 percent increase in efficiency in all new federal buildings within five years and ensuring that all new federal buildings are zero-emissions buildings by 2025.
- *Flip Incentives to Energy Utilities.* Flipping incentives to utility companies by (1) requiring states to conduct proceedings to implement incentive changes and (2) offering them targeted technical assistance. This “regulatory equity” starts

with the decoupling of profits from increased energy usage, which will incentivize utilities to partner with consumers and the federal and state governments to reduce monthly energy bills for families and businesses.

- *Invest in a Smart Grid.* Pursuing a major investment in our national utility grid using smart metering, distributed storage and other advanced technologies to accommodate 21st century energy requirements, such as (1) greatly improved electric grid reliability and security, (2) a tremendous increase in renewable generation and (3) greater customer choice and energy affordability.
- *Weatherize One Million Homes Annually.* Weatherizing at least 1 million low-income homes each year for the next decade, which can reduce energy usage across the economy and help moderate energy prices for all. By upgrading a home's furnace, sealing leaky ducts, fixing windows, and adding insulation, energy bills can be cut by 20 to 40 percent and substantial savings can accrue on summer air conditioning as well as winter heating costs.
- *Build More Livable and Sustainable Communities.* Because the amount of fuel used is directly related to land use decisions and development patterns, devoting significantly more attention to investments that will make it easier for us to walk, bicycle and access other transportation alternatives. This plan will also include a commitment to reforming federal transportation funding and to leveling employer incentives for commuters who drive and those who use public transit.
- *Invest In A Clean Energy Economy and Help Create 5 Million New Green Jobs.* Making strategic investments of \$150 billion over 10 years to accelerate the commercialization of plug-in hybrids, promote development of commercial scale renewable energy, encourage energy efficiency, invest in low-emissions coal plants, advance the next generation of biofuels and fuel infrastructure, and begin the transition to a new digital electricity grid. All together, these investments will help the private sector create 5 million new green jobs—good jobs that cannot be outsourced.
- *Create New Job Training Programs for Clean Technologies.* Increasing funding for federal workforce training programs and directing these programs to incorporate green technologies training—such as advanced manufacturing and weatherization training—into their efforts to help Americans find and retain stable, high-paying jobs.
- *Implement Cap-and-Trade Program to Reduce Greenhouse Gas (GHG) Emissions.* Supporting implementation of an economy-wide cap-and-trade system to reduce GHG emissions by the amount scientists say is necessary: 80 percent below 1990 levels by 2050.

Green Buildings: Facts and Figures

The historic facts in the United States demonstrate the compelling need to take steps to require and incentivize green building and energy efficiency best practices. Currently, traditional buildings:

- Use 39 percent of all the energy consumed and 72 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 52 percent of sulfur dioxide emissions, 19 percent of nitrous oxide emissions, and 12 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.

Moreover, 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.

The opportunity presented by green building is enormous. There are more than 82 million residential buildings and nearly 75 billion square feet of commercial floor space in the United States. Massive energy savings can be achieved in this existing building stock by implementing cost effective energy efficiency retrofits and directing development towards more mass transit-oriented patterns. By the year 2015, the nation is projected (before the current economic meltdown) to build 15 million new households and over 11 billion square feet of commercial space. How buildings are built and how the renovations of our existing building stock is accomplished is critical.

Green Building and Energy Efficiency Contributions to the Reduction of GHG Emissions

In its seminal 2007 reports, the Intergovernmental Panel on Climate Change (IPCC), warned that evidence of changes in the climate system “is unequivocal,” and reported with “very high confidence” (90 percent probability) that human activity, principally GHG emissions, is causing global warming.³ The IPCC estimated that GHG emissions must be reduced by as much as 80 percent by 2050 to avoid most severe damage. In addressing how these emission reductions can be achieved, the IPCC concluded that substantial reductions in CO₂ emissions from energy use in buildings can be achieved over the coming years using mature technologies for energy efficiency that already exist widely and that have been successfully used.⁴ A significant portion of these savings can be achieved in ways that reduce life-cycle costs, thus providing reductions in CO₂ emissions that have a net benefit rather than cost.

There is a global potential to reduce approximately 29 percent of projected baseline emissions by 2020 in the residential and commercial sectors in a cost-effective manner; indeed green building was found to have the highest potential emissions reductions among all sectors studied. The IPCC recognized, however, the obstacles to realization of these GHG reduction targets as they relate to buildings: (1) high costs of gathering reliable information on energy efficiency measures; (2) lack of proper incentives (e.g., between landlords who would pay for efficiency and tenants who realize the benefits); (3) limitations in access to financing; (4) subsidies on energy prices;

and (5) the fragmentation of the building industry and the design process into many professions, trades, work stages and industries.

The opportunities afforded by green building and energy efficiency have been echoed by other prominent groups. The Business Roundtable, an association of U.S. business executives, concluded that “wise and efficient energy use is one of the best strategies for enhancing energy security, reducing greenhouse gases and strengthening our economy.”⁵ The group identified boosting the efficiency of new and existing commercial and residential buildings as a critical pathway to achieving our national goals.

In addition, the non-profit organization American Solar Energy Society concluded that “[e]nergy efficiency and renewable energy technologies have the potential to provide most, if not all, of the U.S. carbon emissions reductions that will be needed to help limit the atmospheric concentration of carbon dioxide to 450 to 500 ppm.”⁶ These measures can be accomplished cost effectively with significant benefits to worker productivity and health.⁷

Many Measures Have Already Been Taken to Start Down This Path

The threat of global warming has already inspired a broad host of measures at all levels of government to reduce GHG emissions and foster green buildings and energy efficiency.⁸ The following are illustrative of these existing initiatives.

Zero Emission Buildings Goal

The Architecture 2030 Challenge, a non-profit organization whose mission is to make the U.S. building sector a key to the climate change solution, established a goal of making buildings dramatically more energy efficient today, and carbon neutral by 2030.⁹ This initiative has gained wide acceptance, not only as part of the Obama platform, but is also a goal adopted by the American Institute of Architects, the United States Conference of Mayors, the National Association of Counties, as well as a host of other key market participants and municipalities. Efforts to develop, utilize and test technologies to achieve these goals are already underway.

Tax Incentives

The Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (2005), included a new tax incentive to improve the energy efficiency of commercial buildings. The Energy Efficient Commercial Buildings Deduction established a tax deduction for expenses incurred for energy efficient building expenditures made by a building owner. The deduction is limited to \$1.80 per square foot of the property, with allowances for partial deductions for improvements in interior lighting, heating, ventilation, and air conditioning systems (HVAC), hot water systems, and building envelope systems.

In addition, the Energy Improvement and Extension Act of 2008 (EIEA), Pub. L. No. 110-343, Div. B (2008)—which was approved and signed on October 3, 2008 as part of the emergency economic package—extended these benefits as well as the tax credits for energy efficient home improvements (e.g., windows, doors, roofs, insulation, HVAC, and non-solar water heaters) and for solar energy systems and fuel cells. The EIEA also established tax credits for small wind energy systems and plug-in hybrid electric vehicles, and extended tax credits for builders of new energy efficient homes.

Many states also offer green building tax credits, New York having led the way with a green building tax credit enacted in 2000 keyed to performance guidelines. Maryland, Nevada, Oregon and others have followed with similar enactments.

Energy and Building Codes

The most direct and comprehensive way to drive greener building is through changing energy and building codes. These can serve to promote or impede green building development. The development and enforcement of energy codes is a shared responsibility of state and local government. Prior to 1992, states enacted energy codes on a voluntary basis. Subsequently, however, the DOE has required all states to adopt by 2004 commercial energy codes that are at least as stringent as ASHRAE/IES standards, and most states have complied. The actual standards adopted vary from state to state.

As new technologies are always emerging, frequent code upgrades are necessary and the DOE continues to work to develop more stringent model codes. Federal legislation strengthening the development of and adherence to a national energy code was being considered in the 110th Congress as part of the energy agenda and is likely to be reintroduced in the 111th Congress. Furthermore, the US Green Building Council (USGBC) recently committed to developing a national standard for green building codes under ASHRAE's leadership.

Requiring Green Building Construction

Numerous communities around the country have now bound themselves to conforming new construction and major renovations to LEED¹⁰ standards. Many have also included in this requirement construction that utilizes public funding. The individual mandates vary, for instance in the minimum size of the building to which the requirements apply and in what level of LEED certification must be achieved. Typically, a minimum of 5,000 square feet is specified and LEED Silver is the certification level to be achieved. Since LEED is a framework for all aspects of sustainability and its credits are not restricted to energy concerns, to assure that energy improvements that suit local requirements are included, some communities have specified that a certain number of LEED credits be earned from the energy credit category.

In a growing trend, communities have begun to mandate green building for projects in the private sector as well. Boston, Washington D.C, San Francisco and Los Angeles have been leaders in these measures. Some communities are beginning to require LEED or LEED equivalency or Energy Star even for smaller scale projects. In New York State, Babylon, Brookhaven and Greenburgh have all adopted such measures. While not actually requiring the private sector to build green, Arlington, Virginia mandates that all site plan applications include a LEED score card and have a LEED-accredited professional associated with the project whether or not the builder plans to obtain a LEED certification.

Specific Design Requirements

As technologies develop, many specific cost-effective design elements will present increasing opportunities for targeted mandates and an expansion from those now required in some communities. A salient example of such a specific planning tool is a vegetation requirement, as vegetation can both act as a powerful "sink" for the absorption of CO₂ and reduce the "heat island effect," which are warmer temperatures caused by the reradiation of solar heat absorbed by impervious built surfaces, such as roads and buildings. Seattle and Chicago have enacted measures to foster energy-saving vegetation.

In suburban settings, energy smart landscaping can reduce energy demand and costs by as much as 30 percent. Some communities require projects with a landscaping component to incorporate green landscaping measures and tree shading of parking lots' surfaces.

Another tool with tremendous potential is the installation of solar hot water heaters, which can consume 15 to 25 percent of the energy used in a home. A solar hot water heater can reduce annual operating costs for heating water by 50 to 80 percent. Mandates for hot water heaters, such as those recently adopted in Hawaii¹¹ and in several other countries around the world, may be the next step.

Other Incentives for Green Buildings

Incentives for green buildings that have a minimal price tag for government are being developed and implemented. A growing number of communities are granting density bonuses for buildings that achieve a LEED rating. In addition, expedited permitting, reducing permitting fees and public recognition programs have become increasingly popular. Similarly, lower property tax assessments or some exemption from property tax increases for green buildings are being adopted in some locales.

Fostering Energy Efficiency Improvements in Private Existing Buildings

Voluntary action in response to incentives can be a slow process, and measures to mandate energy efficiency upgrades or to force a review of a building's energy efficiency are emerging. Such measures are necessary as our existing building stock is very large, and if we are to meet GHG reduction goals, these must be more energy efficient. Simply addressing new construction will not be enough.

The City of San Francisco has had a residential energy conservation ordinance since 1982 that requires an energy inspection and compliance with a detailed list of energy and water efficiency measures at the time of sale. City officials have found an average energy savings of 15 percent per household since passage of the ordinance. The City of Berkeley not only followed San Francisco's lead, but expanded the requirement to apply to the sale or major renovation of commercial buildings. And Burlington, Vermont, limits its ordinance requiring compliance with certain energy efficiency standards upon sale of a building to those multi-family residences where the tenant pays the monthly utility bills. This limitation is intended to address the problem that a building owner who does not pay the utility bills lacks motivation to invest in energy efficiency.

Energy Audits

Requiring an energy audit and disclosure of the results upon a sale of property can be an effective tool. A simple disclosure of energy efficiency upgrades and a payback analysis may persuade homeowners to implement the audit recommendations. The State of Kansas has implemented such a measure and requires homebuilders or realtors to disclose information about the energy efficiency of new homes to potential homebuyers prior to purchase, whenever the house is shown and at any other time upon request. The European Union also issued a directive in 2002 that requires energy audits not only for new construction, but also upon the sale or rental of existing buildings.

Environmental Quality Review Requirements

States and local governments are beginning to require a review of climate change impacts in submissions pursuant to local Environmental Quality Review acts, so-called "little NEPA's." Massachusetts, California and Kings County, Washington have commenced implementation of such requirements. In addition, New York's Department of Environmental Conservation recently issued a *Guide for Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements*. Such reviews will be instrumental in moving new construction towards more transit-oriented, greener proposals.

Aligning Utility Incentives

Efforts at the state level to review incentives to ensure that the economics do not drive utilities away from energy efficiency towards selling more power are underway, and "decoupling" is being reviewed and implemented in various states.

Conclusion

Grave energy problems confront the new administration in the United States. Fostering the development of green buildings and energy efficiency is consistent with and will promote many of the objectives that must be at the forefront of government action.

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¹ Env'tl. Protection Agency, National Action Plan for Energy Efficiency, *Vision for 2025: A Framework for Change* at ES-1 (Nov. 2008), available at <http://www.epa.gov/cleanenergy/documents/vision.pdf>.

² See Barack Obama Presidential Campaign Website, *Barack Obama and Joe Biden: New Energy for America*, http://www.barackobama.com/pdf/factsheet_energy_speech_080308.pdf (last visited Nov. 26, 2008).

³ See Intergovernmental Panel on Climate Change (IPCC), Working Group III, Fourth Assessment Report, *Climate Change 2007: Synthesis Report* at 2 (2007), available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.

⁴ IPCC, Working Group III, Fourth Assessment Report, *Climate Change 2007: Mitigation* at ch. 6 (2007), available at <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter6.pdf>.

⁵ *Business Roundtable, More Diverse, More Domestic, More Efficient: A Vision for America's Energy Future* (June 2007), available at http://www.businessroundtable.org/sites/default/files/Business_Roundtable_Energy_Report_06062007.pdf.

⁶ American Solar Energy Society, *Tackling Climate Change in the U.S.: Potential Carbon Emissions Reductions from Energy Efficiency and Renewable Energy by 2030* (Jan. 2007), available at http://www.ases.org/images/stories/file/ASES/climate_change.pdf.

⁷ For a discussion of the costs of building green, see Edna Sussman, *Building Stock Offers Opportunities to Foster Sustainability and Provides Tools for Climate Change Mitigation and Adaptation*, 7 *Sustainable Dev. L. & Pol'y J.* 17 (Spring 2007).

⁸ For an overview of actions taken at the local level, see Edna Sussman, *Reshaping Municipal and County Laws to Foster Green Building, Energy Efficiency, and Renewable Energy*, 15 *N.Y.U. Env'tl. L.J.* 1(2008).

⁹ *Architecture 2030, The 2030 Challenge*, http://www.architecture2030.org/2030_challenge/index.html (last visited Nov. 26, 2008).

¹⁰ LEED, which stands for Leadership in Energy and Environmental Design, is a green building certification program. For information about LEED, see the U.S. Green Building Council home page at <http://www.usgbc.org>.

¹¹ See Bloomberg Law Reports—Sustainable Energy, *Hawaii Becomes the First State to Mandate Residential Solar Water Heaters Starting 2010* (June 2008).