

The Benefits of Building Green:

by David Turcotte, Julie Villareal and Christina Bermingham
UMass Lowell's Center for Family, Work & Community



Recommendations for Green Programs and Incentives
for the City of Lowell



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The concept of Green Building (GB) "encompasses ways of designing, constructing and maintaining buildings to decrease energy and water usage and costs, improve the efficiency and longevity of building systems, and decrease the burdens that buildings impose on the environment and public health."¹ Over 20 cities in the U.S. have saved money and gained other important benefits by setting up GB programs and incentives. Lowell can also benefit by joining this innovative group of progressive cities and save thousands of dollars in the process. For instance, the city of San Diego's new, green municipal building used 65% less energy than a conventional building yielding a savings of \$70,000 in utility costs. In addition, UMass Lowell (UML) found that by paying a little for green planning, many dollars in future energy costs were saved. UML recently hired an energy manager at a cost of \$70,000, but this resulted in significant savings of \$300,000 while other UMass campuses saw energy increases during a time of high energy costs.

The City of Lowell has already made a commitment to sustainable green development and has stated in its Comprehensive Master Plan (2003) that "Lowell will be a model for sustainable development practices and environmental sensitivity in an urban setting."² Consequently, as a result of mutual interests between UML, the City of Lowell's Division of Planning and Development, and several community stakeholders, a partnership on sustainable development evolved. Accordingly, UML's Sustainable Urban Redevelopment Program (SURP) began facilitating the Lowell Green Building Initiative (LGBI) at the Center for Family, Work & Community to help research and establish programs and incentives to encourage more sustainable and greener construction and redevelopment practices in the City of Lowell.

INTRODUCTION

Upon funding from the Parker Foundation, SURP began researching other cities across the country and identified 21 programs (See Appendix 1) that have established green building and sustainable development programs³. An internet analysis was initially conducted of sustainable building programs websites of these municipalities. We then conducted follow-up telephone interviews with the managers of these programs to ascertain pertinent information that was missing from the websites but was necessary to our analysis and evaluation. These cities have established successful programs, not only because of their environmental benefits, but because of their financial benefits. Due to dramatic increases in utility prices, these cities have found that the advantage to greening their municipal buildings first results in substantial savings in their budgets. For instance, the City of San Diego, CA has a mandatory Green Building Program for municipal buildings. One of San Diego's buildings, the Ridgehaven Green Office Building, uses 65 percent less energy than its nearly identical neighbor; yielding a savings of more than \$70,000 in annual utility costs.⁴ These aforementioned Green Building (GB) programs, however, do not focus exclusively on municipal buildings, but also have the goal to promote these practices and benefits in the commercial and residential sectors thereby, not only incurring substantial savings in their municipal budgets, but also gaining an identity as environmental leaders.

We recognized that best practices for GB programs and incentives must be compatible and adaptable to the unique characteristics and goals of Lowell. As we conducted our research, our number one criteria to identify best practices was: could this work effectively in Lowell, which is an older, urban, densely populated city with a diverse population, and garner enough support to be enacted? Our overall findings of the 21 programs showed that not one particular city could be a 'model'



for sustainable construction and redevelopment practices for Lowell. Based on the fact that most of these programs were either very new with little history (i.e. Boston), larger in size (i.e. Chicago) or in the western part of the U.S., the SURP staff and advisory committee concluded that we needed to test the best practices we identified in the survey to determine if they would work equally

well in Lowell. As a result, we conducted two surveys with: 1) homeowners, and 2) building and construction professionals – in order to gather more data on what economic incentives (as well as identify current practices and educational needs) would work here in Lowell (see Appendixes 2,3).



BENEFITS OF GREEN BUILDING

In a November 5, 2004 Press Release announcing the findings of Boston's Green Building Task Force Report, Mayor Thomas Menino stated "Green building is good for your wallet. It's good for the environment. And it's good for people..."⁵ One of the most common ways of measuring sustainability in a green building is by registering it with the U.S. Green Building Council, a nationally and internationally recognized coalition of over 6,000 building industry organizations.⁶

Leadership in Energy and Environmental Design (LEED)

The U.S. Green Building Council (USGBC) has introduced the LEED (Leadership in Energy and Environmental Design) Green Building Rating System to designate facilities' respective levels of performance and environmental excellence.⁷ LEED serves as a national standard for developing high performance, sustainable buildings. LEED is a voluntary, consensus-based, market-driven system based on existing, proven technology and evaluates environmental performance from a "whole building" perspective. LEED is a self-certifying system designed for rating new and existing commercial, institutional, and multi-family residential buildings. It contains prerequisites and credits in five categories:

- Sustainable Site Planning
- Improving Energy Efficiency
- Conserving Materials and Resources
- Embracing Indoor Environmental Quality
- Safeguarding Water

Depending on the number of credits a building receives, it is awarded Certified, Silver, Gold or Platinum. There are currently over 4,200 projects registered with LEED, a significant increase from the 630 registered in 2002.⁸ The growing popularity of registering a project with the USGBC's LEED rating system is due to its perceived value and to the increasing awareness of the benefits of green building.

Green Building Benefits		
Economic	Social	Environmental
Create, expand, and shape markets for green products and services	Enhance occupant comfort and health	Enhance and protect biodiversity and ecosystems
Improve occupant productivity	Heighten aesthetic qualities	Reduce waste streams
Optimize life-cycle economic performance	Improve overall quality of life	Conserve and restore natural resources

Economic Benefits. As green building becomes more popular, the financial benefits for developers and homeowners are becoming clearer. One of the most comprehensive reports to examine the costs and benefits of green buildings is a 2003 analysis conducted by Gregory H. Kats for the state of California. According to Kats, the average cost premium over just building to code is less than 2%. The Kats report finds "that minimal increases in upfront costs of about 2% to support green design would, on average, result in life cycle savings of 20% of total construction costs – more than ten times the initial investment."⁹ The majority of savings from green building are in maintenance and utility costs. Below are a few examples of the financial benefits provided by green buildings:

- In Massachusetts, the average annual cost of energy for buildings is \$2.00/ft. A green building will use about 30% less energy. When applied to a 100,000 sq ft state office building there's a reduction of \$60,000, with a 20-year present value expected energy savings at a 5% real discount rate worth about three quarters of a million dollars.¹⁰
- The George Robert White Environmental Conservation Center in Boston, MA uses green materials and green technologies leading to a 40% energy savings in comparison to a traditional building operation. The Center's focus on design and engineering pre-construction led to elimination of an "unnecessary" backup system saving the project approximately \$100,000.¹¹
- One of San Diego's buildings, the Ridgehaven Green Office Building, uses 65 percent less energy than its nearly identical neighbor; yielding a savings of more than \$70,000 in annual utility costs. This equates to \$1/sq.ft. in annual savings. Before its 'green' renovation, a sister building to Ridgehaven paid an average monthly utility bill of \$10,750. The 'green' building with its energy efficient retro-fit pays just \$3,750.
- Adobe Systems has spent about \$1.1 million on 45 green building projects, yielding nearly \$1 million in savings and another \$350,000 in energy rebates.¹²
- Lawrence Berkeley National Laboratory conducted a study and found that US businesses could save as much as \$58 billion in lost sick time and an additional \$200 billion in worker performance if improvements were made to indoor air quality.¹³



- \$300,000 of renovations at the Reno, NV Post Office, resulted in 8% increased productivity in the first 20 weeks, leveling off to 6% after a year. There was approximately \$50,000/year in total energy and maintenance savings – six-year payback and productivity gains of \$400,000 to \$500,000/year (less than one year payback).¹⁴
- Water reduction can decrease the maintenance and life-cycle costs for building operations and decrease consumer costs for municipal supply and treatment facilities: New York City invested \$393 million in a 1.6 gallons per flush (GPF) toilet-rebate program that has reduced water demand and wastewater flow by 90.6 million gallons per day, equal to 7% of the city's total water consumption. The rebate program accomplished a net present value savings of \$605 million from a 20-year deferral of water supply and wastewater treatment expansion projects.¹⁵
- Research indicates that as the market for green products and buildings grows, the costs drop: Seattle has experienced drops in the cost of LEED Silver buildings from 3-4% several years ago to 1-2% in 2003.¹⁶
- The Erie Ellington Homes in Dorchester, MA, a low-income residential rental development, cost about 20% less (\$99 per sq ft) than comparable conventional buildings in the city which were being built for roughly \$120-125 per square foot, an initial capital cost savings of more than \$1.65 million. Several factors contributed to significant construction cost savings, including the integrated "whole building" design process of "EcoDynamic" specifications by the Hickory Consortium, use of panelized construction in which the buildings' frames were constructed off-site in pieces, installation of one high-efficiency boiler for space heat and hot water in each duplex or triplex building rather than one for each unit and other measures. Operating costs are about 35% less than comparable conventional new buildings (\$89,189 versus \$136,999 for an annual savings of \$47,810).¹⁷
- Boston, MA found that job creation and business opportunities were "tangible offshoots of Boston's increasing green building activity" as the city would attract businesses that offer green building services – increasing the number of workers with the design, engineering, construction, and materials manufacturing skills to meet demand.¹⁸

- Utility companies offer incentives for energy efficiency options for homeowners, businesses and local government.

Social Benefits. Green design is linked with increased worker productivity and using green materials increases health benefits. A Herman-Miller study found a 7% increase in worker productivity following a move to a green, daylit facility.¹⁹ Genzyme's Cambridge, MA headquarters includes 18 indoor gardens, adjustable thermostats in every room and mirrors on the roof reflecting light into the atrium. The company reports sick time among employees has decreased 5% in comparison to other facilities in the state and 58% of the staff have reported they are more productive in the building.²⁰ Also, Portland, OR in its 1999 "Green Building Initiative," found that its "biggest potential payoff would be probable improvements in productivity of the building occupants. These would result in better lighting, air flow, indoor air quality etc. which would improve worker comfort and reduce complaints, absenteeism, and health problems."²¹ According to the Kats "Green Building Costs and Financial Benefits" Report, "a 1% increase in productivity (equal to 5 minutes per working day) is equal to \$600 to \$700 per employee per year, or \$3 sq ft per year. A 1.5% increase in productivity – a little over 7 minutes each working day – is equal to about \$1,000 per year, or \$4 to \$5 sq ft per year. Over 20 years and at a 5% real discount rate, the present value of the productivity benefits is about \$35 sq ft for Certified and Silver level buildings."²² The Hickory Consortium, contractors of the Erie Ellington Homes in Dorchester, MA interviewed residents regarding air quality and found that "symptoms were noticeably reduced in 8 out of 18 children with asthma problems."²³

Environmental Benefits. The environmental benefits include conservation of natural resources, waste reduction, improvement of air and water quality, and protection of the ecosystem. According to the Environmental Protection Agency (EPA), U.S. buildings are responsible for 39% of total energy use, 12% of total water consumption, 68% of total electricity consumption and 38% of carbon dioxide emissions.²⁴ The building industry is significantly tied to global warming. According to the High Performance Design Guide to Energy-Efficient Commercial Buildings, "it is responsible for almost 40% of greenhouse gas emissions in the U.S." Greenhouse gases are emitted during product manufacturing, transportation, building construction and operation. Fossil fuel combustion, such as burning coal to make electricity, is the source for 99% of greenhouse gas emission. Carbon dioxide is the most common greenhouse gas (85% of the total).²⁵ On average, green buildings use about 30% less energy than non-green buildings and



by reducing the pollutants from fossil fuels, green building ultimately decreases the impact of global warming.²⁶

According to the EPA, the U.S. generated about 136 million tons of building-related construction and demolition debris in 1996.²⁷ This debris is costly to the environment by increasing landfill volumes and to both the builder and client who pay higher project costs. In San Diego, CA, during the construction of the Ridgehaven Building, the city set out to comply with the state's 50% recycling goal and reduce materials going to the city-owned landfill. They diverted 51% of the renovation materials from disposal and also saved \$92,000.²⁸

Buildings account for 40% of the raw materials used in the U.S. and 40% of non-industrial solid waste.²⁹ Using building materials with fewer chemicals and toxins leads to better air and water quality. The government estimates that people spend 90% of their time indoors and the EPA has ranked indoor air pollution among the top five environmental risks. Carpeting in businesses and homes is one of the most common sources of indoor pollution largely because of high levels of chemical off-gassing that occur during installation. Adhesives, seam sealants and carpet padding all contribute to Volatile Organic Compound (VOC) off-gassing.³⁰ According to Mayor Menino's Green Building Task Force Report (2004), "the lack of off-gassing from traditional carpeting and paints has resulted in an environment in which kids with asthma report significantly improved breathing" and concludes that "indoor air quality benefits have proven better than anticipated" (p. 6).³¹



RECOMMENDATIONS

Accordingly, based on UML's research and surveys, here lies an opportunity for the City of Lowell to join an elite group of over 20 cities. Therefore, it is recommended that in order to reap the environmental and financial benefits of a GB program as achieved by other cities, the City of Lowell should:

1. Lead by example: It is important that the City of Lowell lead by example and promote sustainable construction and redevelopment practices within its municipal buildings, not only to save the city substantial revenue as utility prices will inevitably keep increasing, but to set a good example for builders and homeowners. The city should establish and follow programs for its own municipal buildings and:

- Conduct energy and water consumption monitoring in schools and other city buildings.
- Establish baseline data on present energy and water consumption in all municipal buildings.
- Improve and promote energy and water conservation in existing municipal buildings. The City of Portland, OR Executive Summary Report found that reducing water consumption can be done successfully with "little or no incremental costs."³² Small changes in landscaping techniques can result in large reductions of water usage. Oregon found that use of native vegetation can eliminate the need for irrigation decreasing first and future costs as well as earning LEED credits.³³
- Perform capital planning for energy efficiency and conservation to produce cost savings in buildings. Examples include: 1) the Artists for Humanity building in Boston, MA was designed to reduce energy use by 65% and to include significant daylighting and other green features; and 2) the City of Austin, TX achieved a 41% energy reduction with its EMS Station.
- Establish, at the planning process stage of any new municipal building or major renovation, that the project be built or renovated to the design and construction standard of at least Silver LEED certifiable. The City of Portland, OR, in a 1999 survey of three municipal buildings, found that "for a relatively small increase in first costs, the life cycle costs (costs and benefits over the life of a building) to the City

would have decreased for each building. Taking into account only the 'hard' future costs (such as utilities, maintenance etc.), future savings over 25 years would have more than offset the initial investment costs. The life cycle costs would have decreased primarily due to reductions in energy and potable water consumption and stormwater runoff."³⁴

- Broaden requirements from Energy Star certification to meet a minimum standard of LEED certifiable for all city-supported projects.
- Engage in greener practices in municipal buildings – ventilation system, use less toxic cleaning materials, low VOC in paint, follow green practices, develop a Green Team (an internal committee to do energy and efficiency audits). Boston's Green Team represents 12 city agencies and departments to oversee the implementation of its 10 Point Action Plan.³⁵
- Develop a three-year implementation plan with goals on improving such areas as energy reduction.
- Provide green building training for City of Lowell employees.
- Explore grant funding from Massachusetts Technology Collaborative (MTC). The City of Boston received funding that allowed them to give out 5 grants (\$20,000 each) as well as other funding sources. The Woods Hole Research Center in Cape Cod, MA received a total of \$500,000 to install 26.4 kW of solar photovoltaics and a 100 kW wind turbine at the site of its new headquarters.³⁶
- Access available incentives offered by local utility companies to pay for capital costs involved in making municipal buildings greener and more energy efficient (see section 5 for more details).
- Identify municipal building or project in the city to become a quick "green" success story.

2. Develop economic incentives for private and commercial properties: For Lowell to be a "model for sustainable development practices and environmental sensitivity in an urban setting," it is also important that the City of Lowell promote green construction and redevelopment within the commercial and residential sectors.³⁷ Incentives are a key element to more sustainable redevelopment practices in the City of Lowell. We believe Lowell should offer economic incentives to encourage green construction and redevelopment and the following are the primary incentives that would most likely be accepted:



- Planning and design grants.* One city, Boston, MA, found this to be an effective incentive. They acquired a grant from the Massachusetts Technology Collaborative (MTC) and gave out 5 grants (\$20,000 each) for a mix of residential and commercial properties in different locations. The UML Builders and Professionals Survey mentioned this as an enticing incentive.
- Low-interest financing. This incentive was used by San Diego, CA, Arlington County, VA, San Francisco, CA, Scottsdale, AZ, Seattle, WA and Chicago, IL, all of which are successful programs, and mentioned as an enticing incentive in both the UML Building and Construction Professionals Survey and Homeowners surveys (see Appendix 4 for other cities that had incentives that matched incentives in UML Builders and Home Owners' Surveys).
- Matching grants and other incentives for energy efficiency improvements for historical buildings. For example, Chicago's Green Bungalow Initiative was a pilot program sponsored by the city of Chicago to encourage visible neighborhood revitalization. Various City of Chicago departments and others (U.S. Department of Housing and Urban Development (HUD), the Southwest Home Equity Assurance Program, and the Historic Chicago Bungalow Association) worked together to help provide financial incentives for this initiative
- Initiate residential and commercial recognition awards to recognize best practices (such as used by Memphis, TN and Arlington, VA in its Green Home Choice program and by Scottsdale, AZ with its construction job site signs).
- Fast track permitting (accelerated permitting process for builders who build green). This was the main incentive that worked in developing a GB program in our selected six successful cities: San Diego, CA, Arlington County, VA, San Francisco, CA, Scottsdale, AZ, Seattle, WA and Chicago, IL (see Appendix 5 for more details on these cities).
- Marketing of green homes for sale. Some of the cities that have used this incentive are Chicago, IL, Arlington County, VA, Frisco, TX, and Santa Barbara, CA.
- Reduced permit fees. Both the UML Building and Professionals Survey and the Homeowners Survey mentioned this incentive as enticing. The city of Gaithersburg, MD, for example, offers a building permit fee reduction incentive to developers who design and construct green buildings as outlined by the LEED rating system. Gaithersburg also requires commercial, institutional, and high-rise residential building site plan/building permit applications to include a completed LEED scorecard. This scorecard allows the developer to assess the options for including green components in a project's overall performance and to collect data on the environmental status of buildings in the city.
- Logo certification (trademark symbol recognizing important 'green building' features). The above-mentioned cities found that this was the second biggest incentive.

NOTE: See Appendix 6 for Incentives results from the 21 government entities survey.

The following are **secondary** incentives that should be considered:

- Density bonuses. This was an incentive suggested in the UML Building and Construction Survey. Arlington, VA has a GB Density Incentive Program that allows developers to request a slightly larger building than would normally be allowed by County Code if the project receives official LEED certification from the USGBC at one of the four LEED award levels. Boston, MA is considering adding density bonuses to its incentives.

*NOTE: Whereas the city can only use Community Development Block Grants (CDBG) funds to benefit low to moderate-income households, Lowell should follow Boston's example and seek additional funds to make grants available to a spectrum of green projects.

3. Develop Education and Outreach Strategies: The municipalities in our research believed that an important element to any green building program is continuing education and outreach efforts which are essential to ensure achievements are shared and everyone is aware of process changes, especially in voluntary GB programs (see Appendix 7 for 'lessons learned' from research). To complement a shift toward greener building, on-going education and training, which is addressed from various perspectives within the building profession, is needed for those who create buildings and those who occupy them. Successful municipal GB programs increase their effectiveness by making a concerted effort to reach out through promotion, information transfer, training and the importance of developing relationships and buy-in with key stakeholders in Lowell - residents (homeowners and renters), builders and development professionals, business and financial communities, architectural and design firms, realtors, environmental and historic



preservation groups, Lowell Housing Authority, arts and culture community, non-profit organizations, UML, neighborhood associations, and city departments (see Appendix 8 for education/outreach results from the 21 governmental entities survey).

It is recommended that the City of Lowell promote Education, Awareness and Training to the public regarding the benefits of the GB program. The City of Boston found that “the lack of awareness about the benefits and opportunities of green building may be the single greatest challenge” identified by its Task Force (Mayor Menino’s Green Building Task Force – Executive Summary, p.8). Taking the City of Boston’s Task Force recommendations, it is suggested that the City of Lowell:

- Work with media partners at WCAP, UML’s “Sunrise” program and “Thinking Out Loud’s” ‘Environmental Corner’ section on “How to Green” news stories for homeowners. Also utilize Lowell Telecommunications (LTC), the Sun newspaper, UML “Shuttle” magazine, and neighborhood groups’ newsletters.
- Create a user-friendly website for easy access to information. This was a ‘lesson learned’ from the respondents to our survey of cities.
- Conduct workshops, green building clinics, and seminars. For example, Boston, MA does industry specific conferences and panel meetings. They have also held “Green Building 101” in-house half-day workshops for city staff and “LEED” workshops.
- Use a one-page “Homeowners’ Green Building Check List” similar to one being created by Green Homes Northeast for the City of Boston.
- Develop education brochures/tip sheets for homeowners detailing energy efficiency options.
- Distribute green building information at Inspectional Services Department, the Public Library, and through mailings (information could be put in with sewer, water & tax bills).
- Explore partnership with UMass Lowell and City of Lowell to promote a non-profit Green Building Resource Center which will provide a list of green builders, a list of sources or suppliers of green materials (our Homeowners Survey indicated that these lists should be an incentive and our survey showed that Santa Monica, CA. was the only city to

supply a list of green materials suppliers as an incentive), and technical assistance to homeowners and residential contractors. For example, Chicago, IL has “The Chicago Center for Green Technology” which has resources for builders, developers, architects and homeowners looking to incorporate sustainable design practices and green materials into their next building project.

- Promote local best practice examples and pursue opportunities to share lessons learned via media partners, public meetings, periodic seminars and forums.
- Provide culturally sensitive training and education. Pamphlets, mailings, trainings etc. should be offered in multiple languages.
- Promote greening of historical homes as mentioned in the Incentives Section. For example, Chicago’s Green Bungalow Initiative used creative, environmentally friendly methods of rehabbing early 1900’s bungalows to appeal to contemporary homeowners while preserving the historic character of the homes. Another example is Cambridge, MA City Hall Annex which is one of just a handful of green, historic renovations of an existing building in the U.S. The structure, originally built in 1871, received an extensive renovation in 2004. The architects had to meet the stringent requirements of both LEED and the historic preservation requirements of the Mid-Cambridge Neighborhood District Commission.³⁸
- Model home as educational tool (tours to include school children). This has been done by Chicago, IL, San Diego, CA, Arlington County, VA, New Jersey, Scottsdale, AZ, Austin, TX, Portland, OR, Santa Monica, CA, Santa Barbara, CA, and Boulder, CO.

Other educational aspects to consider:

- Work with Builders Guilds – National Association of Building Remodelers.
- Outreach and information tables at community events.

NOTE: See Appendix 9 for suggested key features from the cities survey.

4. Establish Green Building Commission. To recognize the importance of citizen involvement and community planning groups as formal mechanisms for community input in decision-making processes in the City of Lowell, the City Council and the City Manager should consider establishing the “Green Building



Commission” and appoint members who represent a diversity of stakeholder groups in Lowell (as mentioned on p.7, Section 3) - similar to the already existing “Lowell Green Building Advisory Committee” (LGBAC), formed by UML’s Sustainable Urban Redevelopment Program.

The Commission will:

- Meet on a regular basis.
- Report to the City Manager.
- Play an important role in championing the GB Program.
- Disseminate information throughout the city at the stakeholders’ group meetings.
- Promote the GB goals and monitor program policies.
- Arrange Public Meetings at which time information on the GB program will be presented and there will be opportunity for hearing feedback from the attendees.

5. Enlist support from Utility: From our survey of cities, 8 had their programs financially supported by a utility, 2 with direct funding (Memphis, TN, San Francisco, CA) and 3 with in-kind staffing support. We recommend a partnership with a local utility such as National Grid (NG) and Keyspan regarding education workshops and training classes for city employees, homeowners, business owners and building professionals. NG offers 1-hr ‘lunch and learn’ workshops as well 5-hr Advanced Buildings Seminars for architects, engineers, project managers, building owners and building professionals. NG also offers free audits and various efficiency incentives. They have developed a number of energy efficiency programs and will assist customers in customizing energy solutions to lower operating costs, improve productivity, and build a competitive edge. NG’s nationally recognized Design2000plus program, for example, offers engineering solutions, financial incentives, and quality assurance strategies to customers constructing a new building or renovating an existing building.³⁹

The Mass Technology Collaborative offers initiatives that include 75% up to \$500K for installation of renewable energy and \$50K for feasibility studies. The MTC’s “Matching Grants for Towns” matches customers’ voluntary payments in two ways: (1) matching grants for communities that help towns and cities fund renewable energy projects, and (2) low-income matching grants for clean energy projects through Massachusetts. According to

the MTC’s website, through the matching grants for communities program, towns and cities can receive up to one dollar in funding for each dollar residents spend on clean energy. The MTC points out that towns and cities can use this money to fund clean energy projects within their communities.⁴⁰

6. Partner with UML to access in-kind support that UML might be able to offer: UML has numerous on-going community engagement “vehicles” that might provide opportunities for the city and UML staff, faculty and students to collaborate and learn together. The City of Lowell’s proposed GB program could tap shared interest and expertise by tying into existing student internships, class projects that link students to their academic disciplines, faculty research and community outreach initiatives.

Below is a list of projects that have been identified as a part of this partnership work that could be of interest to specific UML courses, programs, and centers:

- Write grants and access other outside financial resources to support and expand activities of the GB program.
- Create a marketing plan that would raise community awareness to the benefits of green buildings and/or educate homeowners, business owners and construction and development professionals to the benefits of green buildings and to the specifics of the City of Lowell programs.
- Conduct research to evaluate impact of green building programs and activities.
- Develop educational tools such as a one-page “Homeowners’ Green Building Check List” similar to one being created by Green Homes Northeast for the city of Boston.
- Develop education brochures/tip sheets for homeowners and businesses with a variety of green building ideas.
- Identify local best practices and case study examples and pursue opportunities to share lessons learned via media partners, public meetings, periodic seminars and forums.
- Develop culturally sensitive training and education. Pamphlets, mailings, trainings etc. should be offered in multiple languages.
- Conduct feasibility studies and assessments of existing energy conditions, alternative energy approaches and energy efficiency improvements.



- Create educational materials and other content for a user-friendly, GB website for the City of Lowell so homeowners, construction and development professionals, and business owners can easily access information.
- Develop curriculum for workshops, green building clinics, and seminars for homeowners and building professionals.

To make UML faculty, staff, and students aware of these opportunities, the city should:

1. Work with UML's Community Connections Information Clearinghouse (CCIC) whose focus is: 1) to assist outside partners in identifying UML courses that have projects, service learning, practicum, or internship possibilities, and 2) to assist UML students, staff, and faculty in identifying community partners who have projects that provide interesting growth opportunities for our students, staff, and faculty (<http://www.clearinghouse.uml.edu>)
2. Use UML's media and communications departments: "Shuttle" magazine, WUML's Lowell Sunrise program and WUML's "Thinking Out Loud's" 'Environmental Corner' to enable faculty, staff, and students to know of the collaboration opportunities.

The City of Lowell could also use these UML media outlets to raise community awareness to the benefits of green buildings and educate homeowners, business owners and construction and development professionals to the advantages of green buildings and to the specifics of the City's program.

7. Collaborate with others such as Northeast Sustainable Energy Association (NESEA), The Green Roundtable (GRT), Green Homes Northeast (GHNE) and Mass Technology Collaborative (MTC):

- Northeast Sustainable Energy Association (NESEA) encourages the use of sustainable energy and green building by supporting industry professionals and educating consumers. NESEA (www.nesea.org) offers a Building Energy conference and trade show, an advocacy network, high profile public events like the Tour de Sol and the Green Building Open House and maintains a Sustainable Yellow Pages.
- The Green Roundtable (GRT) provides assistance to architects, contractors, building owners, and developers and works with both public sector and private sector clients.

GRT (www.greenroundtable.org) can provide technical assistance and manage the LEED rating system process. The sustainability consulting GRT offers includes green process facilitation, site planning, building systems analysis, natural flows analysis, daylighting analysis and building envelope optimization.

- Green Homes Northeast (GHNE) (www.ghne.org) is a collaborative program offering a variety of resources related to green building. The GHNE has developed a series of trainings, including the "Green Building and Remodeling Training," that are held at locations throughout the Greater Boston Area.
- Mass Technology Collaborative (MTC) (www.mtpc.org), created in 1998 through the electric restructuring law and funded through a monthly surcharge on electric utility bills, is the state's development agency for renewable energy and the innovation economy. MTC provides a variety of resources for green building programs throughout the state including research-oriented tools such as reports and analyses. It also provides a variety of funding resources to assist programs in implementing their green building initiatives.

ACRONYMS

CDBG	Community Development Block Grants
EPA	Environmental Protection Agency
GB	Green Building
GHNE	Green Homes Northeast
GPF	Gallons per flush
GRT	Green Roundtable
HUD	Housing and Urban Development (U.S. Dept of)
LEED	Leadership in Energy and Environmental Design
LGBAC	Lowell Green Building Advisory Committee
LGBI	Lowell Green Building Initiative
LTC	Lowell Telecommunications
MTC	Massachusetts Technology Collaborative
NESEA	Northeast Sustainable Energy Association
NG	National Grid
SURP	Sustainable Urban Redevelopment Program
UML	University of Massachusetts Lowell
USGBC	United States Green Building Council



APPENDIX 1

21 Governmental Entities:

Arlington, MA
Arlington County, VA
Aspen, CO
Austin, TX
Battery Park City Authority, New York City
Berkeley, CA
Boston, MA
Boulder, CO
Calabasas, CA
Chicago, IL
Frisco, TX
Gaithersburg, MD
Memphis, TN
New Jersey
Portland, OR
San Diego, CA
Santa Barbara, CA
San Francisco, CA
Santa Monica, CA
Scottsdale, AZ
Seattle, WA

APPENDIX 2

The following is the results of the **BUILDING AND CONSTRUCTION PROFESSIONALS** survey:

When asked what incentives could be used in the city of Lowell to entice incorporation of Green Building (GB) practices, the building and construction professionals rated (on a scale of 1-5 with 1 being the least enticing and 5 most enticing) tax credits or rebates as the highest incentive (4.22), followed by density bonus for green development, low interest financing, planning and design grants, reduction in permit fees, and reduced parking requirements for green development (3.68)

When asked what policies or programs would make it easier to become more involved in incorporating green building strategies, the building and construction professionals rated education 'delivery' with brochures/fact sheets, website, list of green suppliers, workshops, conferences, and a model home as educational tools. For education 'content,' they preferred energy conservation and efficiency, reduction of oil/gas dependency,

water conservation/landscaping techniques, alternative home heating, indoor air quality, and renewable energy alternatives.

When asked the best way to create community awareness of green buildings and change building practices, they had a myriad of answers such as: through new home buyers receiving tax credit... along with homeowners receiving energy saving information; an energy certificate at time of sale; education/public awareness regarding financial incentives/newspaper articles/radio/TV/cable access (Chronicle, PBS); space in National Park Service film room; tax incentives; offset additional costs by allowing possible density bonus, and/or reduction in amount of impervious surfaces; promote on website with explanation; advertisement and education; mandated conformance; mailings; workshops, conferences with partners (UMass Lowell, City of Lowell); benefits need to be expressed to developers and local boards. Developers will need incentives to create green developments. These would likely be financial incentives. By-laws and permitting process would be key in providing these incentives; education of general public and developers/builders as to the value and need for green building; tax savings; model a GB program in Lowell after a program in another area of the country that is demonstrating success (i.e. Scottsdale, Arizona); low cost; model unit exposing many examples of green features, with tours including school children; Award programs with media involvement, Incentives through entire permitting process; combination of outreach. Build from murmur to roar i.e. through newspaper/model home. Has to be a 'good' website or 'good' resource guide; Work with City of Lowell, The Sun newspaper, trade groups and associations to raise awareness. Provide training opportunities to professionals and homeowners; Direct mail – trade show (major) participation. Permanent display in high visibility area. Multiple seminars in small local environment; Develop a demonstration program by picking one project to employ green practices effectively then use its success to communicate and prove the program.

When asked how they would see a GB program work in Lowell, the building and construction professionals thought that: The city would award a certificate to new homeowners and to the home builder at the time of occupancy permit; Tax incentives; Model home to educate; As part of an open space type of development that would allow flexibility of zoning/building regulations; I could see people being drawn to downtown Lowell being interested in the program. From the developer's point of



view, the cost must be justified (at least partially) by the benefits/saving through reduced costs and incentives; With resistance; Accepted at municipal and public level. Resisted at private and residential level; It needs to be cost effective; Town owned structures should be required to be energy efficient – to set an example for property owners/developers; Implement financial incentives/density or other bonuses for developers. Require green municipal building; Guided by a program that encourages green building on many levels (builder through city approval boards etc.) This program should attract interest on many levels ... possibly through financial incentives, community tax breaks etc.); Combination of incentives and mandates very important; Tie funding into LEED (Leadership in Energy and Environmental Design) source; Partial funding by city would help; UML designate one capital project every year; Coordination between UML and the City of Lowell to develop and offer ongoing programs and incentives. Involve key stakeholders: Home Builders Association, the Northeast Association of Realtors, Lowell Development Finance Corporation; Affiliate/coordinate with a larger state and/or federal initiative; Start with community projects. Involve key community groups in the design process. Monitor and report the results; Start with state owned buildings.

APPENDIX 3

The following is the results of the **HOMEOWNERS** survey:

When asked what incentives could entice homeowners to incorporate GB practices, the homeowners replied (on a sale of 1 to 5, with 1 being the least enticing and 5 being the most enticing): tax credits or rebates (4.03), low interest financing, list of waste recycling places, list of green suppliers, and reduction in permit fees (3.30).

When asked what educational topics would be good for programs to allow people to use GB techniques at home, the homeowners replied: energy conservation (most), recyclable materials, air quality, water conservation, recyclable materials, less toxic materials, renewable energy, landscaping, and waste management (least).

The homeowners thought that educational options for a GB program could be: brochure fact sheets, list of green suppliers, website, workshops, model home, and a hotline.

When asked the best way for the city of Lowell to get information out on GB program, the homeowners suggested: newspaper articles, (most preferred), direct mail, website, cable TV, resource guide, workshops, and info booths at events (least preferred).

APPENDIX 4

The following describes in more detail the programs that match up with our building and construction professionals and homeowners surveys:

Seattle, WA implemented the **City's Sustainable Building Policy** in 2000. This policy is incorporated into the City's Environmental Management Program (EMP) adopted by the Mayor and City Council in 1999. This policy uses the U.S. Green Building Council's LEED Rating System to evaluate city-financed building projects and sets a policy goal of Silver Level performance city-funded projects with over 5,000 square feet of occupied space. The city offers **incentives** and assistance to Seattle businesses and residents to conserve resources (water, energy, and materials), protect habitat, build community and save on utility bills. It also provides guidelines for city facilities with the Facility Standards for Design, Construction and Operations (FSDCO) manual. The city has an **Environmental Action Agenda (EAA)**, adopted in 2002, which builds on the citywide EMP. It presents the city's goals for protecting environmental quality, promoting environmental justice and improving quality-of-life in Seattle for current and future generations with goals, targets and next steps for continuously improving the city's performance in three areas: Lean Green City Government, Healthy Urban Environments, and Smart Mobility. The Agenda creates a framework for integrated City environmental action, robust tracking and reporting, coherent communication on environmental issues and links environmental stewardship, economic development and social equity. The EAA establishes four integrating themes for environmental action: 1) Climate Protection Initiative; 2) Restore Our Waters; 3) Green Seattle Initiative; and 4) Healthy People and Communities.

<http://www.seattle.gov/sustainablebuildings/SBpolicy.htm>

Boston, MA formed a **Green Building Task Force** in 2003 that included highly knowledgeable and experienced professionals in every field related to the financing, design, construction, management, and maintenance of buildings. This broad composition has given the Task Force, which met monthly for one



year, a uniquely comprehensive set of disciplinary expertise and perspectives, allowing the group to consider the myriad of opportunities and challenges of high performance green building through a variety of lenses and from a number of different angles in order that the city become a national leader in green building. The Task Force took a uniquely interdisciplinary and thorough approach to the challenges and opportunities of improving Boston's built environment through green building practices. The Task Force organized its inquiry into seven broad categories. This generated recommendations that will guide Boston's policy for supporting green building. The Task Force began by surveying green building programs nationwide to help establish goals and benchmarks, and then proceeded to engage in seven issue-focused meetings. Those meeting topics were: **Education, Awareness and Training; Building a Green Team; Capital and Operating Finance; Incentives** (such as creating a green building pre-development loan fund, creating a green building revolving loan fund to assist early adopters, filing state and federal legislation for green building tax credits, revise city RFPs and NOFAs to award additional points for development teams with LEED Accredited Professionals (AP) and for proposing LEED certified buildings); Sustainable Planning and Leadership; Economic/Business Development; and Standards, Measurement and Verification. Additionally, members of the Task Force participated in special discussions with experts from around the country and traveled to Chicago and Seattle to learn from green building professionals in those cities. Boston established a goal of LEED Silver rating for all city-owned building projects. Also, the city required that all large projects built in Boston are LEED certifiable. Boston has **Green Building Feasibility study grants** that offset the costs incurred when a development proponent expands its standards feasibility study and incorporates GB technology analyses during the early phases of project planning. Boston also developed **Next Steps for Boston – a 10 point Action Plan**: 1) LEED by example; 2) Require LEED Certifiable for City-supported projects; 3) Amend Article 80 to require LEED Certifiable; 4) Craft a 3-year implementation work plan; 5) Provide training for City employees; 6) Provide technical assistance; 7) Provide predevelopment funding; 8) Residential assistance; 9) Residential recognition; and 10) Distributed generation.

<http://www.cityofboston.gov/bra/gbtf/gbtfhome.asp>

San Diego, CA has a Strategic Framework Element (SFE) which is a new chapter of the City's Progress Guide and General Plan. The SFE's policies, goals and recommended actions were drawn

from citizen-based planning efforts (a 40-person **Strategic Framework Citizen Committee** formed in 1999) and intensive public outreach. The County of San Diego has a **Green Building Incentive Program** designed to promote the use of resource efficient construction materials, water conservation and energy efficiency in new and remodeled residential and commercial buildings. The program offers incentives of reduced plan check turnaround time and a 7.5% reduction in plan check and building permit fees for projects meeting program requirements. To qualify for the incentives, the project must comply with one of these resource conservation measures: 1) natural resource conservation; 2) water conservation; or 3) energy conservation. The County also offers the incentive of no fees for the building permit and plan check of residential photovoltaic systems (Homeowners Relief Act). The County currently has several policies and ordinances that promote green building design and construction and insure that all new development is done in a manner that is considerate of the county's natural resources.

<http://www.sandiego.gov/planning/genplan/pdf/commit.pdf>

Scottsdale, AZ was the first Arizona community to establish a GB program. The program was officially established in 1998. An Environmental Quality Advisory Board (EQAB) created a standing committee - the 14 appointed member **Green Building Advisory Committee** (GBAC) - that champions the program, gives guidance to the program, creates materials (such as the residential checklist with explanations) and assists in creating and managing events (such as the Expo with the City of Phoenix, the Lecture Series, and the Desert Green City Cable series). Scottsdale's program is **voluntary and non-regulatory**. It is also free of charge and does not require a membership. Scottsdale also joined the US Green Building Council. Scottsdale's GB program is consumer driven and has on-going efforts to bring the program to the attention of the general public and the building industry with the following **incentives**: 1) priority plan review; 2) educational programs; 3) green building inspections and certification; 4) homeowner's manual; 5) directory of participating designers and builders; 6) promotional package for builders/developers; and 7) job site signs. Scottsdale's program is designed "**Deep Green**" because of its whole systems approach to building and its regulatory capacity - efficiency, strategic thinking and long-term solutions to cost, quality, health, safety and environmental quality issues.

<http://www.scottsdaleaz.gov/greenbuilding>



Arlington County, VA adopted a pilot **Green Building Incentive Program** in 1999 based on the US Green Building Council's Leadership in Energy and Environmental Design (LEED) system to evaluate special exception site plan requests for bonus density and/or height. Staff from the Department of Environmental Services, the Department of Economic Development, the Department of Community Planning, Housing and Development, the Office of Support Services, the County Manager's Office and the County Attorney's Office was convened to develop the original policy and the Green Building Program which was then implemented in 2000. The Program includes: 1) the Construction Waste Management Plan; 2) Energy Star compliance; and 3) the Green Building Fund that requires all site plan projects that do not receive LEED certification to contribute to the Fund. Arlington County developed the **Green Home Choice Program** as an **incentive** for homeowners to build green. The program provides a listing of building techniques and components that result in a more efficient and healthy homes. Builders who participate are offered front-of-the-line plan review, lawn signs indicating participation in the program, attendance at County-sponsored seminars, and recognition as "green" builders. The **GB Density Incentive Program** allows developers to request a slightly larger building than would normally be allowed by County Code if the project receives official LEED certification from the USGBC at one of the four LEED award levels.

<http://www.arlingtonva.us/Departments/EnvironmentalServices>

New Jersey Affordable Green (NJAG) Program offers technical and financial assistance, as well as advocacy and education programs to encourage the use of green technologies in New Jersey's homes. It also helps with marketing efforts to raise awareness and interest in owning a green home. The NJAG program: 1) offers **technical assistance** to increase the number of green/high performance homes throughout New Jersey; 2) coordinates with DCA's **Balanced Housing Program** to provide additional funds up to \$7,500 per unit to integrate green/high performance features in homes; and 3) requires 'NJ Energy Star' certification, certifying the projects are at least 15 percent more energy efficient than a standard home. Several programs and initiatives were developed to educate people and promote green homes throughout New Jersey: 1) The **Built Green New Jersey Program** which promotes whole-system green building practices to consumers and builders from technical assistance to awards and recognition; 2) the **Home Energy Raters System (HERS)** – a statewide home energy rater's alliance to support and publicize

energy efficient mortgage programs; and 3) **Presentations, workshops and conferences** about the use of green technology in homes and its benefits and costs.

<http://www.nj.gov/dca/dh/gho/index.shtml>

APPENDIX 5

The following green building programs from our survey, even though they used different incentives than the ones mentioned in our Building and Construction Professionals Survey and Homeowner Survey, are worth mentioning as their programs have proved to be very successful (**San Diego, CA, Arlington County, VA, San Francisco, CA, Scottsdale, AZ, Seattle, WA, Chicago, Illinois, Berkeley, CA, Santa Barbara, CA, Frisco, CA, and Portland, OR**). These programs used similar incentives such as fast track permitting, logo certification, marketing of green homes, low interest financing, browning fees, density bonuses, grants programs, cash incentives, and tax credits in accomplishing their goal of successful sustainable green development. **San Diego, CA; Arlington County, VA; San Francisco, CA; Scottsdale, AZ; Seattle, WA; Chicago, IL, and Berkeley, CA.** all used fast track permitting as an incentive. Logo certification was another incentive used by **Arlington County, VA, Scottsdale, AZ, Seattle, WA, Santa Barbara, CA and Frisco, CA.** Marketing of green homes and low-interest financing were used by **Seattle, WA, Chicago, IL, Santa Barbara, CA and Frisco, CA.** "Browning fees" were used by **Arlington County, VA and Scottsdale, AZ.** The only city to use density bonuses was **Arlington County, VA.** **Scottsdale, AZ** was the only city to use grants programs. **Seattle, WA and Portland, OR** were the only cities to use cash incentives and **Chicago, IL** the only city to use tax credits.

A selection of six of these successful green building programs and the incentives they used follows:

San Diego, California used **fast track permitting** (used by other cities researched) and **reduced permit fees** (builders in Lowell rated this an incentive)(also used by other cities researched). The sustainable building strategies used by San Diego had various environmental objectives that were achieved related to energy efficiency, waste reduction, water conservation, improved indoor air quality and lighting. The use of durable environmental materials with minimal chemical emissions and recycled content was encouraged. The 'green' project specifications addressed indoor air quality criteria, construction reuse and recycling, and



healthful building maintenance. Lessons learned – The Ridgehaven Building used 65 percent less total energy than its nearly identical neighbor, yielding a savings of more than \$70,000 in annual utility costs. This equates to \$1/sq.ft. in annual savings. Before its 'green' renovation, a sister building to Ridgehaven paid an average monthly utility bill of \$10,750. The 'green' building with its energy efficient retro-fit pays just \$3,750.

<http://www.sandiego.gov/planning/genplan/pdf/commit.pdf>

Arlington County, VA used fast track permitting, logo certification, density bonuses and browning fees. Arlington's GB Incentive Program was originally adopted in October 1999 when the County adopted a Pilot GB Incentive Program based on the U.S. Green Building Council's LEED Green Building Rating System to evaluate special exception site plan requests for bonus density and/or height. The original **GB density incentive program** was implemented in April 2000 and revised and enhanced in December 2003. The program allows a private developer to apply for additional density if the project achieves a LEED award from the USGBC. The program applies to all types of building projects (office, high rise residential etc.) achieving any one of four LEED awards. The density bonus ranges from a minimum of .15 Floor to Ratio (FAR) for a LEED certified project to a maximum of .35 FAR for a platinum project. In December 2003, the County established a GB Fund and a policy of having site plan developers who do NOT commit to achieving a LEED rating from the USGBC contribute to the fund (i.e. **browning fee**). Arlington's Residential GB Program (called **Green Home Choice (GHC)**) requires every builder and designer who enters a project into the Arlington GHC to attend a County sponsored GB lecture, workshop or seminar. These educational programs provide information on energy resource and efficiency, environmentally responsible buildings and feature experts in all areas of environmental design and construction. Promotional incentives, building strategies and green financing are discussed to help qualify homes under the program. Incentives used include: 1) lecture series, workshops and special events; 2) promotional package for builders and developers; 3) expedited plan review; 4) development process assistance; 5) job site signs indicating: Arlington Green Home Choice; 7) directory of participating builders; 8) certification by green building inspectors; 9) homeowner's manual (explanation of features); 10) press releases and news articles; and 11) recognition of builders on website. This program is based on the Earthcraft House program,

a green home rating system designed by the Southface Institute in Atlanta, GA.

<http://www.co.arlington.va.us/des/epo/green.htm>

San Francisco, CA – The goals for the Green Building Program within San Francisco's Department of the Environment (SF Environment) are set forth in San Francisco's Administrative Code. The Administrative Code also established resource efficiency requirements for City buildings and City leaseholds as well as a Green Building Pilot Project. The **Resource Efficient Building (REB)** Program develops goals, criteria and strategies for maximizing green building design operations and makes policy recommendations for city and private sector green buildings to the Board of Supervisors. The REB Program provides a Green Building Training Program for City design professionals. SF Environment recommended an amendment to the REB ordinance to set a LEED Silver as San Francisco's required standard for all new construction and renovation projects over 5,000 square feet. For **incentives**, San Francisco used **fast track permitting, logo certification** and may develop a **tax incentive**.

<http://www.sfenvironment.com>

Scottsdale, AZ used fast track permitting, grants programs, browning fees, logo certification (all used by other cities researched). Scottsdale's GB program is a whole-systems approach utilizing design and building techniques to minimize environmental impact and reduce the energy consumption of a building while contributing to the health of its occupants. **Incentives** – As a **consumer-driven program**, the city of Scottsdale is engaged in an on-going effort to bring the program to the attention of the general public and building industry by using: 1) development process assistance (expedited plans); 2) construction job site signs; 3) directory of participating builders and designers; 4) certification (green building inspections); 5) lecture series, workshops and special events (green home tours, green building Expo); 6) homeowner's manual (explanation of features); and 7) recognition of builders and designers on city web site. Scottsdale's GB program rates building projects in the following six environmental impact areas: 1) site use; 2) energy; 3) indoor air quality; 4) building materials; 5) solid waste; 6) water.

<http://www.scottsdaleaz.gov/greenbuilding>

Seattle, WA's motto is "A Global City Acting Locally." Through the City's Environmental Action Agenda, they want to promote sustainable building in the private sector by: 1) providing technical



assistance to developers from project design to construction; 2) helping to create a non-profit Sustainable Development Center to offer technical assistance to the building community; 3) encourage sustainable residential housing through financial incentives and outreach; 4) evaluate options for a green building incentive and to facilitate the permit process; and 5) increase the number of green roofs through incentives, demonstration projects and public information. In order to accomplish these goals, they use **fast track permitting, low interest financing and mortgage program, logo certification, marketing of green homes for sale, cash incentive and energy and utility rebates and savings** (all used by other cities researched).

<http://www.seattle.gov/sustainablebuildings/SBpolicy.htm>

Chicago, IL's Green Building program has been in effect 5-10 years and is a voluntary program. The program covers multi-family and single family, light industrial buildings, commercial, retail, institutional and commercial offices and municipal buildings. The program focuses on site selection and planning, water conservation, renewable energy and energy efficiency, reuse and use of GREEN construction materials and indoor environmental quality. They have a recycling requirement since January 1, 2006 for new construction and demolition (C & D). For **incentives**, they used fast track permitting, tax credits (through Planning Dept), and marketing of green homes for sale through "Green Homes for Chicago." There is low interest financing, not with the city, but through banks. For **education**, the program has several model homes as educational tools, does education seminars for builders at the Green Technology Center (GTC) (the first municipal building in the county to be awarded the prestigious LEED Platinum rating), has brochures and fact sheets, a list of green builders, and a list of sources of suppliers of green materials. They do **outreach** through TV and radio, mailings to homes and building department materials. Chicago adopted a new set of environmentally sensitive construction standards for public buildings called the "**Chicago Standard**" that aims to conserve energy, reduce costs, and improve the quality of life and requires that new construction and major renovations achieve LEED certification. The **Green Homes for Chicago** program demonstrates how energy efficient and environmentally friendly practices can be incorporated into affordable housing design and construction. Chicago is also a national leader in **rooftop gardens** with more than 40 constructed or being planned for public and private buildings around the city. The **Green**

Bungalow Initiative started as a pilot program sponsored by the city of Chicago.

<http://www.cityofchicago.org/Environment>

APPENDIX 6

The following is the results on incentives and education/outreach programs from the **21 governmental entities survey**:

Incentives: Incentives are a key ingredient to a green building program because most individuals require a learning curve due to little or no experience with green design. Incentives help cover the additional costs involved in learning to do green building rehab and construction. Our research showed that GB programs used:

- **Logo certification** (trademark symbol recognizing important GB features),
- **Fast track permitting,**
- **Grants programs,**
- **Marketing of green homes for sale,**
- **Browning fees** (add charge for not building green),
- **Low interest financing and mortgage program,**
- **Density bonus,**
- **Cash incentive,**
- **Reduced permit fee,**
- **Rebates,**
- **Bonus point LEED,** and
- **Tax credits** as incentives to build green.

APPENDIX 7

The 21 governmental entities had various advice regarding '**lessons learned**' such as:

- Use existing green building guidelines instead of reinventing the wheel
- Necessity of user-friendly websites for easy access to information
- Peer pressure works to change practices in both the private and public sectors
- Importance of champions with access to decision makers who can promote necessary change and practices



- Importance of developing relationship and buy-in with stakeholders
- Focus on changing to a green building culture
- "Key" element is continuing education/outreach efforts
- Building standards are necessary to define success
- Nurturing building inspector buy-in and support
- Thinking about the effect of individual building components on the whole.

APPENDIX 8

The following is the results on incentives and **education and outreach programs** from the **21 governmental entities survey**:

Education - All the municipalities we researched used model homes as educational tools, education seminars for builders, brochures and fact sheets, resources guides [list of green builders, list of sources or suppliers of green materials, technical assistance] for the educational part of their GB programs.

Outreach – The marketing part of the GB programs conducted outreach through media (TV, radio, newspapers), mailings to homes, websites, dissemination of materials through Building Departments, attendance and presentations at community and stakeholder events) as important avenues to use to spread awareness of the program.

APPENDIX 9

Suggested key features taken from survey of 21 governmental entities:

- Creation of an ordinance which is important in the development of a GB program
- Possible support from a utility
- Voluntary residential and commercial programs
- Mandatory requirements for city buildings (compliance for permit, energy reduction, green construction measures, LEED certification)
- Taking an integrated approach to GB program to include aspects such as water conservation, renewable energy and energy efficiency, reuse and use of green construction materials and indoor environmental air quality
- Using existing GB guidelines instead of reinventing the wheel
- Necessity of user-friendly websites for easy access to information
- Peer pressure works to change practices in both the private and public sectors
- Finding champions with access to decision makers who can promote necessary change and practices such as Chicago's Mayor Daley who wants to turn Chicago into the "greenest city in America"
- Remembering importance of developing relationship and buy-in with stakeholders
- Focusing on changing to a GB culture
- "Key" element is continuing education/outreach efforts
- Building standards are necessary to define success
- Nurturing building inspector buy-in and support
- Thinking about the effect of individual building components on the whole
- Start with a pilot project like San Francisco



References

- ¹ City of Boston, Massachusetts. Mayor Menino's Green Building Task Force Report, "Everyone benefits from green building..." Fall 2004.
- ² City of Lowell, Massachusetts. Comprehensive Master Plan. 2003. p.115
- ³ Turcotte, D., Villareal, J. and Sartelle, H. "Creating Healthy and Green Communities: Research on 21 Municipal Green Building Programs", October 2005. University of Massachusetts, Lowell.
- ⁴ Ridgehaven has an average monthly bill of just \$3,750 compared to a neighboring building which has an average monthly bill of \$10,750. This equates to \$1/sq.ft
- ⁵ City of Boston, Massachusetts, Office of the Mayor, Thomas M. Menino. Press Release, November 5, 2004. Online at: www.cityofboston.gov/bra/gbtf/gbtfhome.asp
- ⁶ U.S. Green Building Council (USGB). Online at: www.usgbc.org
- ⁷ U.S. Green Building Council (USGB). Online at: www.usgbc.org
- ⁸ McManus, C. Company raises green bar. September 29, 2006. Coloradoan News: www.Coloradoan.com
- ⁹ California's Sustainable Building Task Force: "The Costs and Benefits of Green Buildings", A Report to California's Sustainable Building Task Force, October 2003. Principal author Greg Kats. Available at: www.cap-e.com
- ¹⁰ Massachusetts Technology Collaborative: Green Building Costs and Benefits by Gregory Kats. 2003. Available online at: www.mtpc.org/renewableenergy/green_buildings/GreenBuildingspaper.pdf
- ¹¹ City of Boston, Massachusetts. Mayor Menino's Green Building Task Force Report, "Everyone benefits from green building..." Fall 2004 Available online at: www.cityofboston.gov/bra/gbtf/gbtfhome.asp
- ¹² Gregory Zimmerman, "Smooth Operations" Facilities Net, September 23, 2006. Available online at: www.usgbc.org/News/USGBCInTheNewsDetails.aspx?ID=2632
- ¹³ California's Sustainable Building Task Force: "The Costs and Benefits of Green Buildings", A Report to California's Sustainable Building Task Force, October 2003. Principal author Greg Kats. (www.cap-e.com)
- ¹⁴ Joseph J. Romm and William D. Brownin. "Greening the building and the bottom line: Increasing productivity through energy efficient design."
- ¹⁵ Greener Buildings. Backgrounders: Water Use. Available online at: www.greenbiz.com/sites/greenerbuildings/backgrounders_detail.cfm?UseKeyword=Water%20Use
- ¹⁶ Massachusetts Technology Collaborative: Green Building Costs and Benefits by Gregory Kats. 2003. Available online at: www.mtpc.org/renewableenergy/green_buildings/GreenBuildingspaper.pdf
- ¹⁷ Costs and Benefits of Green Affordable Housing, Tellus Institute p. 93,95).
- ¹⁸ City of Boston, Massachusetts. Mayor Menino's Green Building Task Force Report, "Everyone benefits from green building..." Fall 2004. p.5
- ¹⁹ California's Sustainable Building Task Force: "The Costs and Benefits of Green Buildings", A Report to California's Sustainable Building Task Force, October 2003. Principal author Greg Kats. Available at: www.cap-e.com
- ²⁰ Christopher Palmeri, "Green Stamp of Approval," Business Week, September 11, 2006. Available online at: www.businessweek.com/magazine/content/06_37/b4000083.htm
- ²¹ City of Portland, Oregon. Office of Sustainable Development: Green Building Initiative. Available online at: www.portlandonline.com/osd/index.cfm?c=41481
- ²² California's Sustainable Building Task Force: "The Costs and Benefits of Green Buildings", A Report to California's Sustainable Building Task Force, October 2003. Principal author Greg Kats. Available online at: www.cap-e.com
- ²³ Costs and Benefits of Green Affordable Housing, Tellus Institute p. 95.
- ²⁴ U.S. Environmental Protection Agency (E.P.A.). Available online at: www.epa.gov/greenbuilding/pubs/whybuild.htm.
- ²⁵ AIA Vermont. High Performance Design Guide: To Energy-Efficient Commercial Buildings. Available online at: www.encyvermont.com/pages/Business/BuildingEfficiently/DesignResources/HighPerformanceDesignGuide/
- ²⁶ California's Sustainable Building Task Force: "The Costs and Benefits of Green Buildings." A Report to California's Sustainable Building Task Force, October 2003. Principal author Greg Kats. Available online at: www.cap-e.com.
- ²⁷ U.S. Environmental Protection Agency (E.P.A) Available online at: www.epa.gov/epaoswer/non-hw/debris-new/basic.htm.
- ²⁸ Greener Buildings. Waste Management Backgrounder. Available online at: www.greenbiz.com/sites/greenerbuildings/backgrounders_detail.cfm?UseKeyword=Waste%20Management.
- ²⁹ Greener Buildings. Building Materials. Available online at: www.greenbiz.com/sites/greenerbuildings/backgrounders_detail.cfm?UseKeyword=Building%20Materials.
- ³⁰ Green Seal, Choose Green Report: Carpet, December 2001.
- ³¹ City of Boston, Massachusetts. Mayor Menino's Green Building Task Force Report, "Everyone benefits from green building..." Fall 2004.
- ³² City of Portland, Oregon. Portland Online: Executive Summary Report. www.portlandonline.com
- ³³ *Ibid.*
- ³⁴ *Ibid.*
- ³⁵ City of Boston, Massachusetts. Mayor Menino's Green Building Task Force Report, "Everyone benefits from green building..." Fall 2004.
- ³⁶ Massachusetts Technology Collaborative's Clean Energy Choice Program, "Matching Grants for Communities": Available online at: www.cleanenergychoice.com/matching_grants.htm
- ³⁷ City of Lowell, Massachusetts. Comprehensive Master Plan. 2003. p.115.



³⁸ City of Cambridge, Massachusetts. Cambridge City Hall Annex, 2004. Available online at: <http://www.cambridgema.gov/CDD/et/env/greenblgs/annex.pdf>

³⁹ National Grid Massachusetts: Economic Development. Available online at: www.nationalgridus.com/masselectric/business/ecdev/ecdev.asp

⁴⁰ Massachusetts Technology Collaborative's Clean Energy Choice Program, "Matching Grants for Communities." Available online at: www.cleanenergychoice.com/matching_grants.htm.

