



Compendium of Model Sustainability Practices **green buildings**

ECO-CITY ALEXANDRIA
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GREEN BUILDINGS

INTRODUCTION

Within the last three years green buildings have emerged as the major strategy of local governments to combat rising carbon emissions and the threat of global warming. Addressing the emissions and energy patterns of the built environment has a profound impact on our natural environment – as well as on our economy, health, and productivity. For example, the United States Green Building Council (USGBC) notes that in the United States, buildings account for:

- 65% of electricity consumption
- 36% of energy use
- 30% of greenhouse gas emissions
- 30% of raw materials use
- 30% of waste output (136 million tons annually), and
- 12% of potable water consumption.

Citizens and government can design more energy efficient buildings and retrofit existing homes, offices, and civic buildings that can save millions of dollars in energy expenditures.⁸⁰ Today, “breakthroughs in building science, technology, and operations are available to designers, builders, and owners who want to build green and maximize both economic and environmental performance.”⁸¹ It is important that builders take advantage of these technologies, as building greener can help protect water quality, improve air quality, protect ecosystems and biodiversity habitat, and conserve renewable and non-renewable sources of energy, which in turn affects climate change. In light of these benefits and their importance for public health and well-being, many local governments now actively promote or require developers and homeowners to build green through incentive programs or local regulation.

As the statistics above illustrate, reduction in energy consumption is one of the most important reasons for building green. Construction, maintenance, and demolition of buildings consumes an enormous amount of energy, which in many cases comes from non-renewable and polluting sources.

We have organized this section of the compendium into two subsections. Section one contains model green building programs and section two presents supplemental programs, plans, and policies that complement the model practices; it concludes with a survey of city ordinances from several cities throughout the nation. At the end of this section we provide a list of useful green building resources and references.

⁸⁰ Roseland (ibid).

⁸¹ USGBC web site. Accessed December 2007 on:
<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1718>

GREEN BUILDINGS

1. Green Building Incentive Program

Location: Arlington, Virginia

Department: The Department of Environmental Services, Administration and Environmental Planning Bureau staff manages the County's Sustainability and Green Building Services including the Green Building Incentive Program for commercial and multi-family development projects. Staff also review and monitor all site plan projects to ensure compliance with the green building requirements. The Environmental Planning Office serves as a technical environmental resource for County agencies, the County Board, and residents. In addition, Arlington has an Environment and Energy Conservation Commission (E2C2), whose members are appointed by the County Board, review and provide advice on a broad range of environmental and energy conservation issues.

Start Date: 1999, expanded in 2003

Budget and Staffing: Staff includes one Energy Manager and several supporting staff from the departments referenced above. The E2C2 includes 12 members.

Description: In 1999, Arlington County adopted a Green Building Incentive program, which allowed private commercial developers to apply for additional density if the project achieves a Leadership in Energy and Environmental Design (LEED™) rating from the U.S. Green Building Council. The program was expanded in 2003 to include all types of development that are eligible for any one of the four LEED™ awards, not just for commercial office projects. The incentive is a density bonus ranging from .15 FAR for a LEED Certified project to .35 FAR for a platinum project and/or bonus height.⁸²

In addition to offering green building incentives, the County requires private developers to evaluate the environmental impacts of *all* site plan projects. Conditions of approval for those development applications typically include:⁸³

⁸² See Arlington's incentive program at <http://www.arlingtonva.us/Departments/EnvironmentalServices/epo/EnvironmentalServicesEpoIncentiveProgram.aspx?lnsLinkID=1075>

⁸³ See Arlington's Green Building Programs at <http://www.arlingtonva.us/Departments/EnvironmentalServices/epo/EnvironmentalServicesEpoGreenBuildings.aspx?lnsLinkID=1075>

- LEED™ Accredited Professional: The program requires that all site plan projects have a LEED™ accredited professional on the development team;
- LEED™ Scorecard: All site plan applications in Arlington County must complete the LEED™ scorecard with an explanation of each LEED™ credit, describing how they intend to achieve the credit or why they are unable to incorporate the component into the project. A short explanation as to how the seven LEED™ prerequisites will be achieved should be included as well. This process allows the County to measure a project's overall performance and to collect data on the environmental status of all site plan buildings in the County;
- LEED™ Tracking: During project negotiation, a final number of LEED™ credits is identified and the commitment to incorporate them into the project is formalized in a condition of site plan approval which requires that reports be submitted with specific building permit applications. These reports track the progress of LEED™ prerequisites and components throughout the demolition and construction process. Permits will not be issued if LEED™ reports are incomplete;
- Construction Waste Management: The developer agrees to provide a plan for diverting from landfill disposal the demolition, construction, and land clearing debris generated by the project. The plan outlines recycling and/or reuse of waste generated during demolition and/or construction. The plan also outlines specific waste streams and identify the means by which waste will be managed (reused, reprocessed on site, removed by licensed haulers for reuse/recycling, disposal, etc.). The plan must include letters from contracted haulers, reprocessors, and recyclers indicating that they are able to manage waste from the project;
- Energy Star Appliances: For multi-family residential projects, the developer agrees that all of the following types of appliances, fixtures, and/or building components used in the project shall have earned the U.S. EPA's Energy Star label: clothes washers, dishwashers, refrigerators, ceiling fans, ventilation fans (including kitchen and bathroom fans), light fixtures (halls and common areas), and exit signs. To further enhance energy efficiency, the developer shall also choose two of the following types Energy Star-qualified components: programmable thermostats (in residential units); residential light fixtures; windows and doors; and HVAC systems.

In 2003, Arlington County established a Green Building Fund for site plan developers who do not want to achieve a LEED™ rating; instead, those developers may contribute to the Fund. Each contribution is calculated at a rate of \$0.03 per square foot. The green building fund is used to provide education and outreach to developers and the community on green building issues. If a project achieves 26 or more points and the developer receives LEED™ certification from the USGBC, the Fund contribution is refunded upon receipt of the LEED™ certification.

**Alexandria
Match:**

Most local-government green building programs in Virginia are implemented through comprehensive plans or incentive programs. Providing public outreach and education for these programs will be key in assuring their success. To further develop Alexandria green building program, the City will need to address the following questions:

What obstacles can the City remove?
What can the City require?
What can the City do to encourage green building?⁸⁶

At this time, without changes in state legislation, local governments do not have the authority to *require* structures to incorporate green building components. Therefore, many Virginia jurisdictions find themselves implementing ‘encouragement programs’. These focus on promoting the benefits of green buildings—such as addressing the high cost of utilities, concern over global warming, and the increasing expenses of maintaining and operating inefficient County facilities.

It may be encouraging that on April 9, 2007, Governor Timothy M. Kaine issued Executive Order 48, setting a goal for executive branch agencies and institutions to reduce the annual cost of non-renewable energy purchases by at least 20% by fiscal year 2010.⁸⁴ The Executive Order directs state organizations to “construct new and renovate existing state facilities consistent with U.S. Green Building Council or U.S. EPA/DOE Energy Star ratings; to lease office space that is convenient to public transportation, energy efficient and pedestrian and bicycle accessible; to purchase fuel-efficient, low-emission state-owned vehicles and maximize use of alternative transportation fuels, minimize travel, implement transit and ridesharing incentive programs and telecommuting; and to purchase or lease Energy Star rated appliances and equipment, where possible,

⁸⁴ See executive order 48 at http://www.governor.virginia.gov/Initiatives/ExecutiveOrders/2007/EO_48.cfm

and use recycled paper-compatible office equipment”. It may be that in the near future, Virginia jurisdictions may feel they have more flexibility to implement mandated ordinances such as those implemented in other states.

Alexandria is already doing a lot to promote green buildings. The City now requires all City facilities to meet green building standards and has a mandatory green building checklist that all developments or redevelopments requiring approval must submit with applications. Alexandria is also ramping up to implement its own comprehensive energy management program, which started by hiring an Energy Manger earlier this year. As a signatory of the U.S. Mayors' Climate Protection Agreement, Alexandria has committed itself to “strive to meet or beat the Kyoto Protocol targets in its community, through actions ranging from anti-sprawl land-use policies to urban forest restoration projects to public information campaigns.” To meet this goal, in addition to what the City is already doing, Alexandria could focus on providing more community outreach in the area of green building and energy education. The City could implement a program similar to Arlington’s “Green Living Challenge” or “Hands on Green” workshop series. Furthermore, the City could offer more incentives to developers of green buildings, such as building densities, waivers of height requirements, or expedited application review. Alexandria could also find and alleviate any impediments to private green building construction.

References: Virginia Sustainable Building Network: <http://www.vsb.org/>

Arlington Fresh AIRE – Arlington Initiative to Reduce Emissions: <http://www.arlingtonva.us/portals/topics/Climate.aspx>

Arlington promotes green building through a detailed information brochure, which can be seen at: http://www.arlingtonva.us/Departments/EnvironmentalServices/Documents/9755Green_Building.pdf.

2. Green Building Code Checklist

- Location:** Telluride, Colorado
- Department:** Building Department
- Start Date:** March 2005
- Description:** The Town of Telluride recently adopted an ordinance requiring all residential new construction, additions and remodels to comply with green building regulations. The code is broken down into four

categories: energy efficiency, indoor air quality, materials, and resource conservation. Developers choose from the lists to achieve a required number of points (500 points are possible, with 100 needed). Documentation must be provided to prove compliance with the mandatory checklist, and the Town either inspects the built product or allows self-certification from the developer (a signed legal document guaranteeing compliance in the future). The checklist is thorough from an interior building perspective, and it touches on responsible land use and siting of projects. In addition, a Green Building Resource Guide was developed to provide background on the rationale behind each of the points listed in our Green Building Code, and offer local and regional resources to obtain green building products and services. Sam Samuelson, the Telluride Building Official, feels that this program has been very successful; he says that “[Telluride] tried not to do too much at once. The fact that every permit applicant has to fill out the forms really has helped with AWARENESS of Green and sustainable issues.”

Budget and Staffing:

4 staff and no direct budget. The Town charges a 10% Building Permit fee to administer the checklist.

Alexandria Match:

Alexandria has a voluntary green checklist that is around one page in length. Alexandria could take Telluride’s checklist and use it to improve upon or add to the one the City currently uses. While developers cannot be required to integrate green building components into development in Virginia, the City can still use the tools available to it, such as incentive programs and education and outreach. A more comprehensive building checklist and a resource guide such as Telluride’s could help to educate developers on the possibilities and potential costs and savings associated with green building components.

Points of Contact:

Sam Samuelson, the Town of Telluride Building Official
(970) 728-2143
ssamuelson@telluride-co.gov

References:

Telluride Town Ordinance
<http://www.town.telluride.co.us/home/index.asp?page=342>

Green Building Code website:
<http://www.town.telluride.co.us/home/index.asp?page=311>

Telluride Green Building Check-list:
http://www.town.telluride.co.us/docs/gbc_checklist.pdf

Green Building Resource Guide
http://www.town.telluride.co.us/docs/final_gb_resource_guide.pdf

3. Green Building Act

Location: Washington D.C.

Department: City Council / Office of Consumer and Regulatory Affairs

Start Date: December 6, 2006

Description: On December 6, 2006 the Washington, D.C. City Council passed the Green Building Act of 2006.⁸⁵ The legislation articulated a number of new sustainable building regulations for various building types with one common denominator – these projects must be approved by the United States Green Building Council (USGBC) in accordance with the certification level of USGBC’s Leadership in Energy and Environmental Design (LEED). All City-owned projects funded in 2008 or later must LEED certified. In 2010, school construction and City-owned housing projects must also attain LEED certification. The most progressive provision of the bill states that all commercial development of 50,000 square feet or more must be LEED certified if the building permit is issued after January 1, 2012.

The District is not the first jurisdiction to pass such legislation. Another large city that passed green building legislation in late 2006/early 2007 is Boston, Massachusetts. Boston’s “Green Buildings,” Article 37 was inserted into Boston’s building code on January 10, 2007. The Boston Interagency Green Building Committee (BIGBC) is the approving authority for any green buildings, not the USGBC. The BIGBC is a committee that composed representatives of city agencies such as the Boston Redevelopment Authority, the Boston Environment Department, the Boston Transportation Department, the Inspectional Services Department and the Mayor’s Office. This committee will advise the Boston Redevelopment Authority on the regulation.

Boston also adopted “Boston Green Building Credits”. These can be used for the application towards certification within Boston’s system. These credits are adapted into the LEED-based system to include four city-specific requirements, which count toward the 26-credit certification, in the areas of groundwater recharging, historic preservation, modern mobility (transportation) and modern grid (energy). Again, LEED is a model for Boston’s Article 37 but the city does not rely on the USGBC for verification if the building is green or not.

Budget and

⁸⁵ *Green Building Act of 2006*. A BILL 1, 16-515 2 IN THE COUNCIL OF THE DISTRICT OF COLUMBIA

Staffing: Unavailable

Alexandria

Match: As green building regulation gains momentum in places like Washington D.C., Boston, and others, more objections are being raised. Gary Baum, the city attorney of Palo Alto, has publicly stated to the city’s architectural review board, “...attorneys for cities with environmentally-friendly building mandates admit there is ‘no legal basis’ for their policies on private construction. Cities can only require green measures for public projects.” However, progressive cities such as these are testing the boundaries of what can be done – and are having positive results. Alexandria already has mandated that all new City facilities be green and provides developers with a green building checklist, but could the City go one step further and require all new development of a certain size have green components or be LEED certified, as Washington D.C. and Boston have?

Points of Contact: Washington D.C. Department of Consumer and Regulatory Affairs
(202) 442-4400

Chris Busch – Boston Environment Department
(617) 635-4452
Chris.Busch@cityofboston.gov

References: Washington D.C., Office of Consumer and Regulatory Affairs

City of Boston Redevelopment Authority, Green Buildings web site:
<http://www.cityofboston.gov/bra/gbtf/GBTfhome.asp>

SUPPLEMENTAL GREEN BUILDING PRACTICES

1. Green Transit Maintenance Facility

Location: Santa Clarita

Description: Through an unconventional use of materials, the new City of Santa Clarita Transit Maintenance Facility has been certified a LEED Gold building by the U.S. Green Building Council. The project has become one of the first LEED-certified straw-bale buildings in the world.

In an effort to improve air quality in the Santa Clarita Valley, the city’s municipal transit system converted its entire bus fleet from diesel to Compressed Natural Gas (CNG), a conversion that required a modern maintenance headquarters. Completed in May 2006, the new facility includes a 22,000-square-foot administration building,

25,000-square-foot maintenance building, bus wash facility, CNG fueling island for city buses, and publicly accessible CNG fueling station. The \$20-million project is designed to accommodate more than 150 buses and nearly 160 staff, with room for future expansion.

Its rice straw bale construction has a high insulative value and sequesters greenhouse gas emissions. The project features 174, 506 KWh of solar panels, which can eliminate 140,000 lbs. of GHG annually, and 240,000 lbs. of GHG emissions are eliminated by other energy and water conservation systems.

Points of Contact:

Travis Lange, Environmental Services Division Manager
(661) 286-4098
tlange@santa-clarita.com

References: <http://www.santa-clarita.com/cityhall/pw/cip/tmf/>

2. Sustainable Building Policy

Location: Seattle, Washington

Description: The City of Seattle encourages sustainable building both in City projects through the Sustainable Building Policy and Facility Design Standards, and in the private sector by offering technical assistance, financial incentives, and resources. To encourage sustainable building in the private sector, Seattle Public Utilities and City Light (local utility) offers a LEED™ Incentive Program to assist a few projects to reach a level of sustainable building construction acknowledged by a national standard. Seattle Public Utilities and the Department of Planning and Design offer resources through the Sustainable Building Library, and City Light's Sustainable Resource Guide. The City has also partnered with Seattle Central Community College to offer the Sustainable Building Advisor Certification course.

The Seattle Office of Sustainability & Environment coordinates implementation of the policy and reports annually to the Environmental Management Oversight Panel, Legislative and the Executive on how well the City's construction projects meet the goal of sustainability. The City's interdepartmental Green Building Team reviews and updates the "Seattle Supplements to the LEED™ Rating System for City CIP Managers" annually, provides technical expertise on specific sustainable building issues, and coordinates LEED™ training programs.

Points of Contact:

Seattle City Light Program
700 5th Avenue, Suite 3200

Seattle, WA 98104-5031
(206) 684-3000

References: Seattle City Light Conservation / Sustainable Building
<http://www.cityofseattle.net/light/conservation/sustainability/>

3. Sustainable Building Policy

Location: Charlottesville, Virginia and Albemarle County, Virginia

Description: The City of Charlottesville is beginning to implement a sustainable building policy that began with a demonstration project at the City's transit center which was designed to meet LEEDTM certification.

Charlottesville also formed a Green Building Committee to develop guidelines and objectives to reach the following goals:

- Promote the achievement of a 30% reduction from current energy use by businesses and residences through a citywide education, assistance and incentive program;
- Encourage green building and resource and energy conservation practices in new and existing buildings through financial incentives;
- Ensure a consistent citywide policy that promotes green building by ensuring that other city regulations, practices and guidelines actively allow for and encourage green building practices;
- Prevent excessive resource use through capturing the embodied energy of existing buildings through adaptive re-use of existing structures to minimize use of resources.⁸⁶

Albemarle County, which surrounds the City of Charlottesville, also has a comprehensive green building program. Accomplishments include the construction of the Monticello High School and associated storm water management facilities; the construction of the green roof on the County Office Building; tax credits for energy efficiency measures – as permitted by law – and the adoption of the “Neighborhood Model” which guides a more sustainable form of development.

Points of

⁸⁶ See September 13, 2006 Green Building and Sustainability Meeting Minutes of the County of Albemarle Board of Supervisors Work Session
http://www.albemarle.org/upload/images/Forms_Center/Departments/Board_of_Supervisors/Forms/Agenda/2007Files/20070207/GreenBuildingattach.htm

Contact: Charlottesville
Environmental Administration
(434) 970-3631
environment@charlottesville.org

Albemarle County
Community Development
(434) 296-5832
FMacCall@albemarle.org

References: Charlottesville's Sustainable Buildings
<http://www.charlottesville.org/Index.aspx?page=567>

Albemarle County Neighborhood Model
<http://www.albemarle.org/department.asp?department=planning&relpage=2457>

Albemarle County Code, Chapter 18 – Zoning Ordinance
http://www.albemarle.org/upload/images/forms_center/departments/county_attorney/forms/Albemarle_County_Code_Ch18_Zoning20a_Neighborhood_Model.pdf

4. Green Building Ordinances and Building Code Examples

Location: Boulder, Colorado

Boulder's Green Points Ordinance created the first mandatory residential green building program in the United States. Building permit applicants are required to earn Green Points according to a schedule based on house size.

Location: King County, Washington

King County adopted the LEED™ rating system as a standard for all buildings that the County constructs, remodels or renovates. A supplement for the County outlines the LEED™ Green Building rating system within the context of current King County building codes and is designed to help owners, architects, designers, contractors and project managers develop green buildings in King County.

Location: Aspen, Colorado

In 2000, the City of Aspen and Pitkin County started the Renewable Energy Mitigation Program. This program promotes renewable energy and energy efficiency by requiring new homes to mitigate their environmental impacts through building codes. The codes

require new homes to meet a strict energy ‘budget’. Homeowners who want to consume additional energy for snowmelt or outdoor pools and spas have the option of installing a renewable energy system or paying a renewable energy mitigation fee instead.

Location: Frisco, Texas

The City of Frisco adopted an ordinance on May 18, 2004, which established a Commercial Green Building evaluation period. The ordinance requires all non-single family developments $\geq 10,000$ square feet to complete LEED™ Checklist and provide documentation for estimated costs for points selected, estimated timeframe for cost recovery, and detailed explanation for points not selected.

Location: Montgomery County, Maryland

On November 28, 2006, Montgomery County, Maryland drafted Bill 17-06, which would require public buildings and private buildings over 10,000 square feet to achieve a U.S. Green Building Council LEED NC 2.2 Silver rating.

Location: Albuquerque, New Mexico

The Albuquerque City Council adopted an ordinance (FSO-02-70) that reserves capital funds targeted for energy conservation projects. As a direct result of the ordinance, the powers and duties of the Energy Conservation Council (ECC), under the direction of the Facility, Energy & Security Management Division Manager, were expanded to establish criteria to select projects for funding. The ordinance was written in 2002, and states that 1% of the Capital Implementation Project for the general fund in the 2003, 2005 and 2007 bond elections will be reserved to fund the purchase of energy conservation equipment and building materials used to reduce energy costs for General Fund Programs that will reduce energy consumption. This fund is known as the “1% for Energy Conservation Set-A-Side for Capital Improvements”. Departmental applications for the 1% for Energy Conservation Set-A-Side for Capital Improvements are submitted to the Facility, Energy & Security Management Division. The Division Manager appoints a committee of technical experts who approves the savings.

References: ICLEI USA (local governments for sustainability): database of case studies for North America.
<http://www.iclei.org/index.php?id=391>

DSIRE (Database for State Incentives for Renewables and Efficiency): a comprehensive source of information on state, local, utility, and federal incentives that promote renewable energy and energy efficiency.

<http://www.dsireusa.org/>

USEFUL LINKS

- Rocky Mountain Institute: Buildings
<http://www.rmi.org/sitepages/pid124.php>
- U.S. Green Building Council
<http://www.usgbc.org/>
- Natural Resources Defense Council (NRDC): Building Green
<http://www.nrdc.org/buildinggreen/>
- U.S. EPA/Green Buildings
<http://www.epa.gov/greenbuilding/>
- Virginia Sustainable Building Network
<http://www.vsbnet.org/>

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