

Green Buildings

In the United States alone, buildings use approximately one-third of the nation's total energy, two-thirds of its electricity, one-half of its chlorinated hydrocarbons, and are responsible for more than one-third of all carbon emissions. And, because the majority of people spend most of their time indoors, our social well-being and personal health are also significantly effected. Accounting for one-quarter of the world's wood harvest and two-fifths of its material and energy flow, buildings – how they are built and maintained – largely determine our world's environment and our ability to live sustainably in it. The impacts that buildings have on their surrounding environments, whether homes, schools, or office space, reach far beyond just their walls and effects the communities, cities, and world around them.

Because of growing awareness regarding the environmental impacts buildings have, and the desire to lessen those impacts, green building has recently become a more significant part of building architecture, construction, and maintenance. Learning how to become involved and relevant in the growing green building trend has become easier given the wealth of available information about sustainable development. This article provides a broad discussion regarding the elements and benefits of green buildings.

What is Green Building?

A green or sustainable building aims to increase the benefits to people, the environment, and the economy by using resources efficiently, reducing demolition and construction waste, and creating healthy indoor environments – in ways that supersede those of conventional buildings. Green buildings are distinguishable from their traditional counterparts largely because they are designed with energy efficiency, low environmental impact, easy reconfiguration, occupant health, and use of natural, low-tech solutions as their objectives.

The following is a sampling of key elements considered in green building. For more detailed information on green buildings please visit these helpful sites.

<http://www.epa.gov/greenbuilding/>
<http://www.ciwmb.ca.gov/GreenBuilding/Basics.htm>
<http://www.nesea.org/buildings/>
<http://www.usgbc.org>

Site Assessment

Site selection for a green building project takes a holistic perspective that integrates the following:

- Community Effects
- Plant/Animal Habitats
- Existing Infrastructure
- Building Orientation
- Conservation and Recycling of Existing Buildings
- Brownfield Redevelopment

For more on site assessment, please visit

<http://www.buildinggreen.com/menus/entries.cfm?HeadingID=104.>

Building Materials

Choosing building materials for a green building project involves the consideration of environmental impacts throughout the lifecycle of the building. This objective includes, in addition to standard cost, aesthetic, performance, and regulation requirements, the following goals:

- Minimize the Use of Natural Resources
- Provide a Healthy Work or Living Environment

Visit <http://www.epa.gov/greenbuilding/> for more on green building materials and guidelines.

Energy Efficiency

Energy consumption represents about 25% of a building's total operating cost, making its conservation not only an environmental concern, but also an economic one; integrating energy efficient components from a building's design is the best way to achieve optimal savings in both regards. Energy-efficient features may include:

- Thermal Zoning
- Day-lighting
- Raised Floor Systems
- Solar Access
- Site Landscaping
- High-Performance Lighting
- Control for Individual Occupants
- Renewable Energy Sources
- Water Efficiency
- Occupant Health and Safety
- Building Operation and Maintenance

Massachusetts Technology Collaborative offers more information on energy efficiency and the green building at http://www.mtpc.org/RenewableEnergy/Green_Buildings.htm

Air Quality

Occupant productivity and health are directly related to a building's Indoor Air Quality (IAQ). Energy use, building materials, and HVAC design all determine whether IAQ levels are acceptable for occupation. Key to maintaining acceptable IAQ levels are:

- Reducing Anthropogenic Pollution
- Eliminating Onsite Pollution
- Reducing Building Emissions

Please visit <http://www.sustainable.doe.gov/buildings/indrainr.shtml> for more information on green buildings and air quality.

Water

Water conservation, storm water management, and, when possible, the reuse of treated water is the hallmark of a green building approach and includes at least the following elements:

- Reducing Water Consumption through Low-Flow Appliances
- Storm water Capture for Cooling, Irrigation, and Groundwater Recharge
- Xeriscape
- Smart Irrigation Tools
- Green Roofs

If you want tips on how to conserve water and manage storm water, visit Seattle's Resource Venture at <http://www.resourceventure.org/rv/index.php>

Solid Waste

Buildings can generate solid or hazardous waste at any point during its lifecycle, whether during construction, operation, or demolition. Sustainable buildings are designed to eliminate waste all together by turning it into a useful or recyclable product. Steps toward this end include:

- Collecting and Properly Managing All Waste
- Recycling Materials Into Organic Nutrients
- Eliminating Volatile Organic Compounds
- Close Management of Site Preparation to Reduce Construction Waste
- Overseeing Landscape Design to Prevent Loss of Vegetation
- Designing Internal Waste Collection, Separation, Storage, and Recycling for Hazardous and Non-Hazardous Materials

Greener Buildings has more on waste management at http://www.greenerbuildings.com/topics.cfm?topic=waste_management

Operations and Maintenance (O&M)

Although O&M activities happen after a facility is built, attention to O&M considerations during design and construction are essential in order to ensure that green building objectives are met, maintained, and can be upgraded throughout a building's life. Sustainability within O&M requires diligence in the following areas:

- HVAC and Lighting Operation
- Water Efficiency
- Landscaping Practices
- Pollution Prevention Practices
- Routine Maintenance

Visit http://www.wbdg.org/design/optimize_om.php to learn more about O&M practices for green buildings.

By integrating these elements during the construction and on through the maintenance of a facility, the environment, occupant health, and the economy are vastly improved. And, such integration can often be accomplished at a minimum additional cost above that of more traditional buildings.

Benefits to Green Building

Green buildings are high-quality buildings that offer measurable benefits which make them easy to validate from both an environmental and economic standpoint. With longer life spans, lower operation and maintenance costs, and greater occupant satisfaction, higher initial costs in design translate into huge savings in overall costs during the life of a building. Benefits include:

O&M Costs

- Reduced Water Consumption
- Site-Related Tax Benefits
- Insurance and Liability Savings
- Energy Consumption Reduction

Productivity

- Reduction in Absenteeism Due to Illness and Increase in Employee Productivity
- Increase in Production Due to Design Features Such as Day lighting

And perhaps most importantly . . .

Image and Reputation

- Social Justice
- Community Goodwill
- Brand Recognition

Whatever the motivation to go green, the end results are the same – far-reaching and tangible benefits to the environment, building occupants, and overall cost savings in operations and maintenance.

Leading the Way in Sustainability with LEED®

Green Buildings and LEED®

So, how do you know if a green building is a green building? By having it evaluated through LEED®. In the 1990s, a group of design and construction professions formed the U.S. Green Building Council (USGBC) and established a 69-point certification process defining the elements of a true “green” building. The rating system, Leadership in Energy and Environmental Design® (LEED®), is now the leading standard to measure green building projects and ensure sustainability goals are met.

To learn more about LEED®, please visit the USGBC website at <http://www.usgbc.org>.

The environmental challenges facing our world specific to the pollution generated by traditional buildings are indisputable; so are the benefits of sustainable development. Learn more about how to actively contribute to the health of the global environment, the economy, and your local neighborhood.

GLOSSARY:

- Brownfield Redevelopment – the redevelopment of a previously built urban site that is not in use.
- Anthropogenic Pollution – pollution relating to or resulting from the influence humans have on the natural world.
- Xeriscape – a trademark for a method of landscaping that emphasizes water conservation, used especially in areas with an arid climate.