



U.S. GREEN BUILDING COUNCIL  ILLINOIS CHAPTER

Basics of Green/Sustainable Buildings

State and Local Government Committee



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What is a green building?

- It is not just a green roof!
- A structure and site that is designed, constructed and operated to meet specified standards, enabling an environmentally and socially responsible, healthy and prosperous environment that improves the quality of life of the occupants and lessens the building's impact on the environment.



What is a sustainable building?

- The definitions of sustainable buildings AND green buildings are constantly changing - but they share six common tenants:
 1. Optimize site potential
 2. Optimize energy use
 3. Protect & conserve water
 4. Use environmentally preferred products
 5. Enhance indoor environmental quality
 6. Optimize operations and maintenance practices

What is a LEED certified building?

- A voluntary rating system created by The U. S. Green Building Council (USGBC) to set a standard of green building design
- The LEED rating system consists of a maximum 110 point-based rating scale for buildings; points are awarded for achievements in 7 categories:
 - Sustainable Sites
 - Energy and Atmosphere
 - Indoor Environmental Quality
 - Water Efficiency
 - Materials and Resources
 - Innovation in Design
 - Regional Priority

What is a LEED certified building?

LEED address the complete lifecycle of buildings:



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Tenent 1: Optimize Site Potential

- Use a whole system approach:
 - Minimize development of open space and habitat disturbance
 - Control erosion
 - Reduce heat islands
 - Minimize impact of commuting to site
 - If possible, minimize development of untouched open space (green field) or rehabilitate an existing building



Tenent 2: Optimize Energy Use

- Reduce load through integrated enclosure design and building orientation
- Optimize control of entire facility through an automated system
- Utilize building systems that are highly efficient and practical for your area
- Reduce lighting and plug loads
- Produce energy onsite or purchase renewable energy offsite
- Commission your building's vital systems



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Tenent 3: Protect and Conserve Water

- Design landscaping to minimize need for irrigation
- Collect and reuse storm water
- Install low-flow plumbing fixtures appropriate for occupant usage
- Reduce, control and treat surface and building roof runoffs



Tenent 4: Use Environmentally Preferred Products

- Give preference to local products
- Eliminate all materials that pollute or are toxic during their manufacture, use or reuse
- Encourage recycling and use of recycled products
- Specify materials harvested on a sustained yield basis (i.e. - lumber from certified forest)



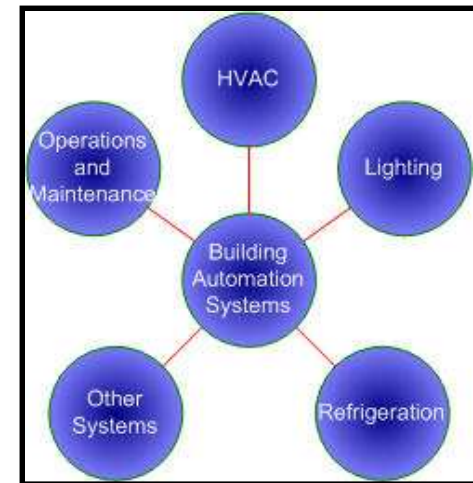
Tenent 5: Enhance Indoor Environmental Quality

- Provide thermal comfort while also providing personal control
- Supply clean air free of contaminants
- Control odors and pollutants with careful selection of cleaning products and building materials
- Integrate natural and artificial light sources
- Carefully design moisture barriers and envelope to prevent mold and airborne pollutants



Tenant 6: Optimize Operations and Maintenance

- Have a comprehensive and preventative maintenance program
- Select systems that are easily maintained and are integrated into a building wide Building Automation System
- Have separately metered systems so inefficiencies can be easily identified
- Implement ongoing commissioning of systems (lighting, envelope, HVAC, domestic water, etc) to keep them running as designed and at peak performance



Examples of LEED buildings in Illinois



HSBC Headquarters
Mettawa, IL



Evelyn Pease Tyner Center
Glenview, IL



Bolingbrook High School
Bolingbrook, IL



Naperville Public Works Facility
Naperville, IL

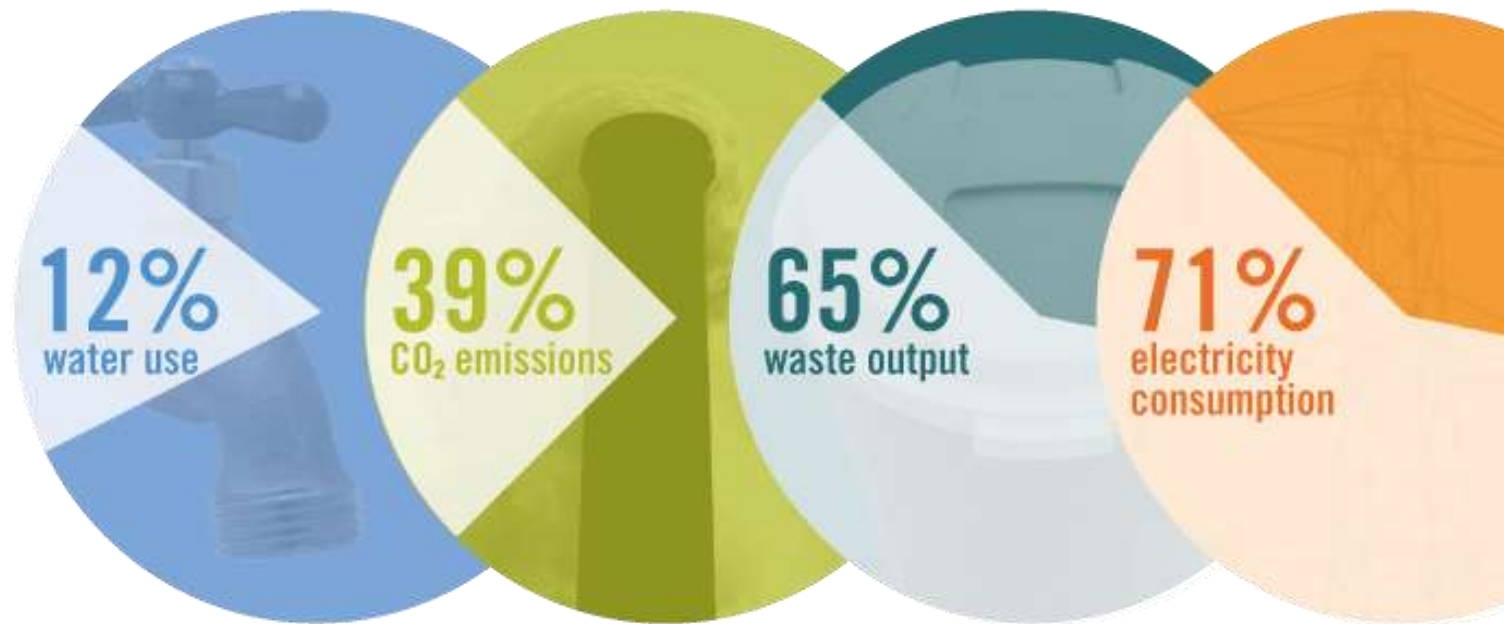
Benefits of sustainable buildings

- Better for the Environment
- Better for Building Occupants
- Improved Bottom Line
- Lower Operating Costs



Better For The Environment

- U.S. Buildings are responsible for:



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Better For The Environment

- Global CO₂ Emissions by Sector:

#1. Buildings

#2. Transportation

#3. Industry

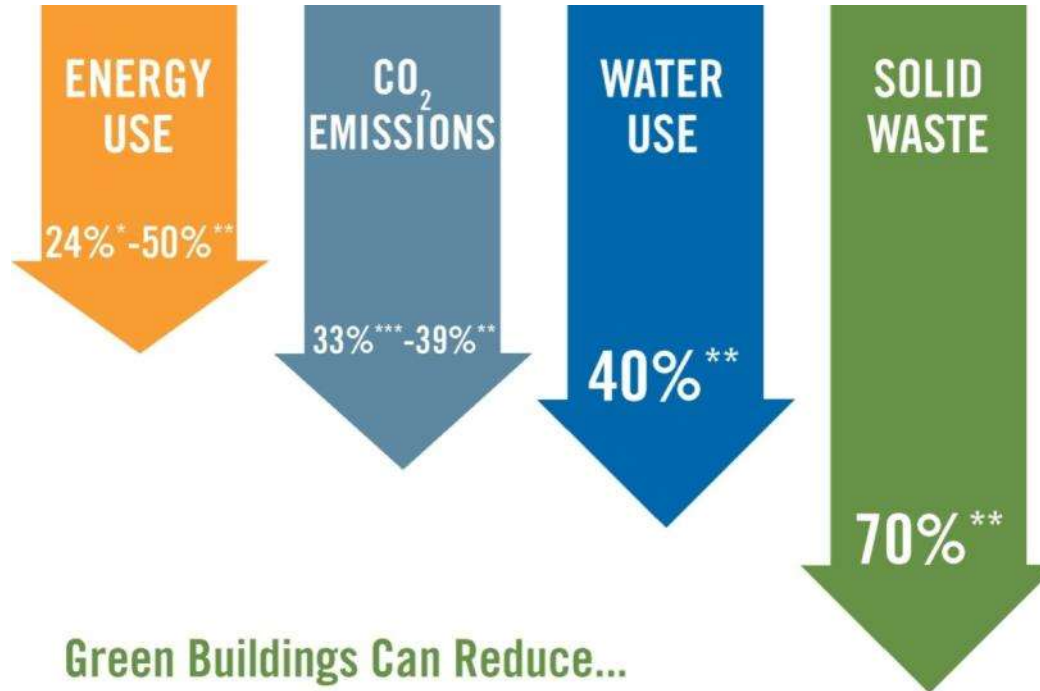
Source: Energy Information Administration (2006), Emissions of Greenhouse Gases in the United States.



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Better For The Environment

- The average green/sustainable building saves:

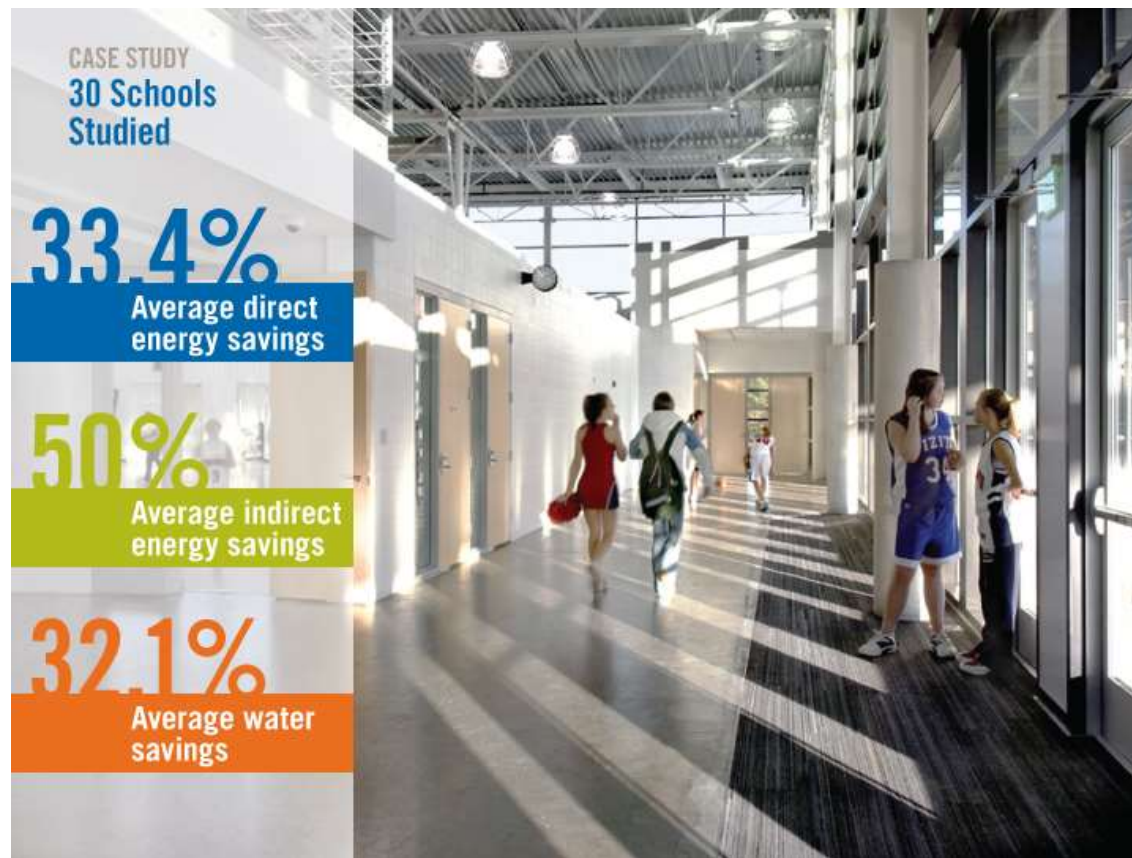


* Turner, C. & Frankel, M. (2008). Energy performance of LEED for New Construction buildings: Final report.
** Kats, G. (2003). The Costs and Financial Benefits of Green Building: A Report to California's Sustainable Building Task Force.
*** GSA Public Buildings Service (2008). Assessing green building performance: A post occupancy evaluation of 12 GSA buildings.



Better For The Environment

- Sustainable schools save:



Better For Building Occupants

- Green building occupants are healthier and more productive:
 - In the U.S., people spend, on average, 90% or more of their time indoors*
 - Green buildings typically have better indoor air quality and lighting

* Source: The Total Exposure Assessment Methodology (TEAM) Study, EPA 600/S6-87/002, U.S. Environmental Protection Agency, 1987.



Improved Bottom Line

- Business benefits to going green:

8-9%* operating cost decreases

7.5%* building value increases

6.6%* return on investment improves

3.5%* occupancy ratio increases

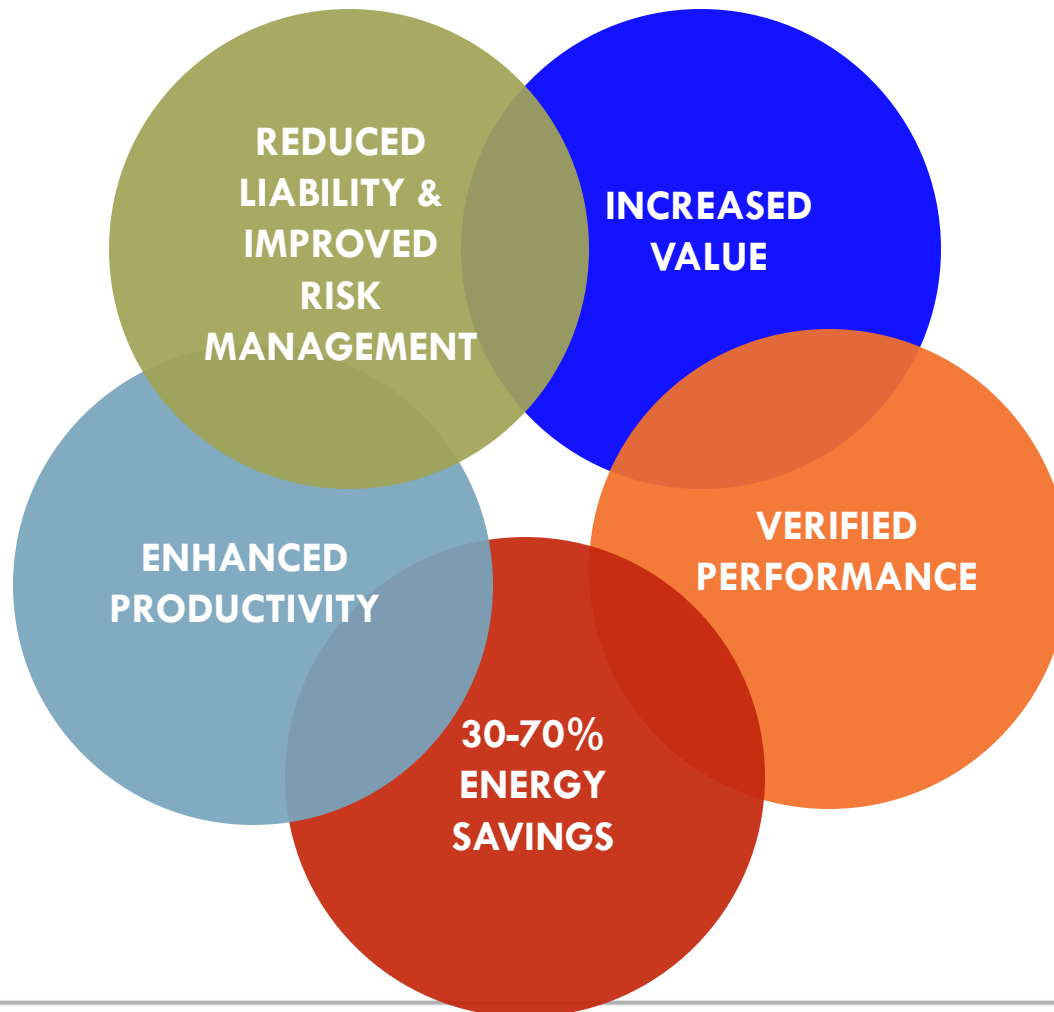
3%** rent ratio increases

* Source: McGraw-Hill Construction, Key Trends in the European and U.S. Construction Marketplace SmartMarket Report, 2008

** Source: McGraw-Hill Construction, Greening of Corporate America SmartMarket Report, 2007



Improved Bottom Line



Improved Bottom Line

- Case Study: Bolingbrook, IL High School
 - 360,000 gallons in water savings
 - 25-30% reduction in operating costs through enhanced lighting controls
 - 62% waste diverted from landfill
 - LEED Certified



Lower Operating Costs

- Study of 12 sustainably designed GSA buildings (7 were LEED rated), compared to average performance of US commercial buildings:
- 26 % less energy use (65 kBtu/sqft/yr vs. 88 kBtu/sqft/yr)
- 13 % lower maintenance costs (\$2.88/sqft vs. \$3.30/sqft)
- 27 % higher occupant satisfaction
- 33 % fewer CO2 emissions (19lbs/sqft/yr vs. 29/lbs/sqft/yr)



Lower Operating Costs

- Case Study: Aurora Police HQ and Branch Courts Facility
 - The Police Headquarters and Branch Courts Building, Parking Deck and Training and Support Building were developed to create a Public Safety Campus.
 - Building automation system (BAS) used to monitor and operate the buildings' mechanical systems allowing for greater occupant comfort and control of energy use.
 - The facility is designed to use 30% less water and 27% less energy.
 - Power monitoring is incorporated for tracking and monitoring of the campus power usage.
 - Excess energy collected by photovoltaic panels on the Training and Support Building roof puts energy back into the grid.



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What is Green Infrastructure?

- The goal of green infrastructure:
 - To recreate the natural cycle of infiltration to capture and slow the release of stormwater naturally keeping as much out of the sewers as possible
 - To “overtime” rebuild municipal stormwater infrastructure recreating naturalized stormwater infiltration that manages the stormwater closer to where it falls
 - Due to hundred of years of impervious surfaces being built over the natural watersheds, stormwater is no longer infiltrating naturally
 - Water is not collecting on impervious surfaces and concentrating into strong discharges that overwhelm sewer systems causing flooding in homes and combined sewer overflows (CSO)
 - Green and naturalized space is expanded in the community

Green Infrastructure- Stormwater Management

- Four primary ways to manage stormwater:
 - Buildings and structures – green roofs and green walls
 - Hardscape – pervious pavements and overflow inlets
 - Landscape – bio-swales, rain gardens and green streets
 - Water capture and reuse – rainwater harvesting, greywater harvesting, passive irrigation

Green Infrastructure- Stormwater Management

- Why manage stormwater utilizing a combination of green and conventional infrastructure?
 - To protect our source of drinking water
 - Stormwater flows over polluted land which then pollutes the rivers/lakes that ultimately provide our drinking water
 - Excessive stormwater flow causes combined sewer overflows (CSO) that release raw sewage into rivers and streams to prevent backups in homes
 - In areas with wells, this stormwater no longer infiltrates back into the water table causing wells to be dug much deeper



Green Infrastructure- Stormwater Management

- Why manage stormwater utilizing a combination of green and conventional infrastructure?
 - To Reduce the amount of stormwater entering rivers and streams
 - Excessive stormwater runoff volume erodes river banks
 - Excessive stormwater runoff volume causes the destruction of habitat for animals, plants, and insects resulting in a stream that is unstable

Green Infrastructure Grants

- What are the current grants available?
 - IEPA Illinois Green Infrastructure Grant Program (proposals due by December 13t, 2013)
 - Section 319 Grant Program- Nonpoint Source Pollution Control (applications due by August 1, 2013)

Questions?

