Submitted by: Chair of the Assembly at the Request of the Mayor; Assemblymember Selkregg
Prepared by: Department of Economic & Community Development
For reading: July 29, 2008

CLERK'S OFFICE
AMENDED AND APPROVED
Date: 8/12/08

ANCHORAGE, ALASKA
AO No. 2008-93

**AN ORDINANCE AMENDING ANCHORAGE MUNICIPAL CODE CHAPTER 23.05 TO REQUIRE CONSTRUCTION AND RENOVATION OF MUNICIPAL PUBLIC FACILITIES TO MEET A SUSTAINABLE BUILDING STANDARD AND TO PROVIDE INCENTIVES FOR PUBLIC AND PRIVATELY DEVELOPED FACILITIES.**

**WHEREAS**, the Municipality of Anchorage is facing unprecedented increases in fuel and electricity rates; and

**WHEREAS,** in the United States, buildings account for 12.2% of freshwater use, 38% of CO2 emissions, 40% of material use, and 39% of energy use; and

**WHEREAS**, the Municipality desires to reduce building operating and maintenance costs, provide a healthier and more productive indoor work environment for its employees and residents, promote the community's ongoing economic vitality, and support energy efficiency; and

**WHEREAS**, the Municipality recognizes the practice of sustainability, as it relates to buildings, is the use of key resources like energy, water, materials, and land in a more efficient manner than simply constructing buildings to code, plus building sustainability creates healthier work, learning, and living environments with more natural light and cleaner air, contributing to improved employee and student health, comfort, and productivity; and

**WHEREAS**, the LEED (Leadership in Energy and Environmental Design) Rating System is a third party certification system developed by the United States Green Building Council. This system quantifies sustainable design (including residential) and awards rankings based on achievement; and

**WHEREAS**, the ICC (International Code Council)/NAHB (National Association of Home Builders) National Green Building Standard (NGBS) is a third party certification system developed by the ICC/NAHB. This system quantifies residential sustainable design and awards rankings based on achievement; and

**WHEREAS**, these third party certification systems are not expected to significantly impact MOA staffing; and

**WHEREAS**, Anchorage School District (ASD) facility plans and designs are subject to ASD Design Guidelines and Standards; these mandated standards include elements of sustainable design, and recognize and support principles of the U.S. Green Building Council's LEED certification system, the Council of Educational Facility Planners International (CEFPI) High Performing School standards, and the U.S. Department of Energy and U.S. Environmental Protection Agency ENERGYSTAR label; and

**WHEREAS**, government is ultimately responsible for leading by example and setting a community standard for the sustainable planning, design, construction, renovation and operation of buildings to support economic, social, and environmental sustainability; now, therefore,

**THE ANCHORAGE ASSEMBLY ORDAINS:**

**Section 1.** Anchorage Municipal Code chapter 23.05 is amended to add a new section to read as follows:

**23.05.050 Sustainable building standards for construction and renovation of buildings.**

A. *New construction.* The Municipality **including the Anchorage School District** shall construct its public facilities and buildings to sustainable building standards through the use of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system, and shall be responsible for ensuring public facilities and buildings meet the requirements as set out in this section and are operated accordingly.

1. LEED shall be the quantitative measurement for how well standards are met.

2. All public facilities and buildings utilizing municipal funds (either general or bonded), including new private construction for Municipal leasing or renting, shall be constructed in such a fashion as to achieve a minimum level of LEED Certified.

   a. Beginning July 1, 2012, the minimum level is increased from LEED Certified to LEED Silver.

B. *Renovation.* The Municipality **including the Anchorage School District** shall renovate public facilities and buildings **larger than 5,000 square feet**, including private construction for Municipal leasing or renting, to sustainable building standards where technically and economically feasible.

a. The U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system shall be used as a reference guide for all renovation projects.

**C.** [b.] For all projects where sustainable building standards are appropriate, evaluation criteria for procurement of design services shall include experience with sustainable design.

~~C. *Anchorage School District new construction or renovation.* The construction or renovation of Anchorage School District facilities shall meet the following criteria:~~

~~1. The U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system shall be used as a reference guide for all Anchorage School District capital improvement construction projects;~~

~~2. For all projects where sustainable building standards are appropriate, evaluation criteria for procurement of design services shall include experience with sustainable design; and~~

~~3. For projects over 20,000 square feet in size, LEED certification shall be required unless determined by the ASD to not be technically or economically feasible.~~

D. *Application.* The sustainable building standards for municipal buildings and facilities, including Anchorage School District, shall apply to facilities and buildings where the principal use is regularly occupied space including, but not limited to, buildings occupied for office, retail, classroom or assembly purposes.

1. As used in this section, occupied means a facility or building whose primary purpose is for people to work, assemble, or intended to remain within to perform functions (other than routine maintenance) of the principal use of the building. Industrial facilities, such as maintenance, warehouse, and vehicle storage, are excluded from this section.

E. **Exception Procedure. If the Municipality determines that it would not be economically feasible to satisfy the prerequisites for LEED certification in the case of a specific project, it may apply to the building board of appeals for an exemption to the requirement. The board shall act on an exemption application within 30 days, following its regular procedures to the full extent possible.**

**F.** [E.] The Department of Development Services shall refund 100% of the expedited portion of building permitting fees for public and private projects designed to meet a minimum rating of LEED Certified (all development including residential), or NGBS Bronze (residential).

1. The regular portion of building permitting fees for public and private development shall be refunded according to the following schedule:

| | | |
|---|---|---|
| a. | LEED Certified/NGBS Bronze: | 10% refund |
| b. | LEED/ NGBS Silver: | 15% refund |
| c. | LEED/ NGBS Gold: | 22.5% refund |
| d. | LEED Platinum/ NGBS Emerald: | 35% refund |

**G.** [F.] For projects where refund of permit fees is accepted in return for minimum LEED certification, refunds for the project shall be based upon the final LEED certification level achieved.

1. Refunds shall be issued upon receipt of proof, satisfactory to the Municipality, of LEED certification.

2. A project without sufficient proof of certification, or failing to meet the minimum requirements for LEED certification shall receive no refund.

**Section 2.** The Department of Development Services shall review the fee structure biannually and submit an informational memorandum to the Assembly.

**Section 3.** This ordinance shall become effective on July 1, 2009. Existing projects with contracts for design services on the effective date shall be exempt from this ordinance.

PASSED AND APPROVED by the Anchorage Assembly this 12th day of August, 2008.

Chair of the Assembly

ATTEST:

Municipal Clerk

# MUNICIPALITY OF ANCHORAGE
## Summary of Economic Effects -- General Government

AO Number: 2008-93

Title: AN ORDINANCE AMENDING ANCHORAGE MUNICIPAL CODE CHAPTER 21.01 TO REQUIRE NEW AND RETROFITTED MUNICIPAL PUBLIC FACILITIES TO MEET A SUSTAINABLE BUILDING STANDARD, AND AMENDING CHAPTER 23.05 TO PROVIDE INCENTIVES TO MEET A SUSTAINABLE BUILDING STANDARD.

Sponsor: Mayor
Preparing Agency: Department of Economic and Community Development
Others Impacted: Development Services

***CHANGES IN EXPENDITURES AND REVENUES:*** **(In Thousands of Dollars)**

| | FY08 | FY09 | FY10 | FY011 | FY12 |
|---|---|---|---|---|---|
| **Operating Expenditures** | | | | | |
| 1000 Personal Services | | | | | |
| 2000 Non-Labor | | | | | |
| 3900 Contributions | | | | | |
| 4000 Debt Service | | | | | |
| **TOTAL DIRECT COSTS:** | **$ -** | **$ -** | **$ 150** | **$ 165** | **$ 182** |
| Add: 6000 Charges from Others | | | | | |
| Less: 7000 Charges to Others | | | | | |
| **FUNCTION COST:** | **$ -** | **$ -** | **$ 150** | **$ 165** | **$ 182** |
| **REVENUES:** | | | | | |
| **CAPITAL:** | | | | | |
| **POSITIONS: FT/PT and Temp** | | | | | |

**PUBLIC SECTOR ECONOMIC EFFECTS:**

Development Services is fee-supported, therefore permit fee reimbursements made under this ordinance will be a revenue reduction for the Department. The Department's fee revenue is highly variable and dependent on many factors. Additionally, it takes several years for a new building to reach a point of seeking fee reimbursement, further complicating reliable predictions of impact. Hence the ordinance prescribes a biannual budget impact review by the Director of Development Services, which can guide any future adjustments needed to maintain the Department's capacity.

Development Services staff have forecast a probable fee reimbursement total of approaximately $150,000 in 2010. Assuming sustainable building practices are adopted more widely over time, we can expect that number to grow in future years. The chart above uses a 10% adoption rate per year.

Additionally, new public buildings may experience higher design and construction costs which will be more than offset by permit fee reductions and lower operating costs over the life of the building, resulting in a net economic gain for public buildings.

**PRIVATE SECTOR ECONOMIC EFFECTS:**

The ordinance does not make any requirement of the private sector. The ordinance encourages use of sustainable building practices for the private sector by providing a permit reduction incentive for meeting a high-performance building standard.

The net effect of fee reductions and enhanced efficiency buildings is a net economic benefit to the citizens of Anchorage.

Prepared by: Randy Virgin Telephone: 343-4774

# MUNICIPALITY OF ANCHORAGE

# ASSEMBLY MEMORANDUM

No. AM 497-2008

Meeting Date: July 29, 2008

**From:** **MAYOR**

**Subject:** **AN ORDINANCE AMENDING ANCHORAGE MUNICIPAL CODE CHAPTER 23.05 TO REQUIRE CONSTRUCTION AND RENOVATION OF MUNICIPAL PUBLIC FACILITIES TO MEET A SUSTAINABLE BUILDING STANDARD AND TO PROVIDE INCENTIVES FOR PUBLIC AND PRIVATELY DEVELOPED FACILITIES.**

This ordinance implements the United States Green Building Council's LEED rating tool, or the International Code Council (ICC)/National Association of Home Builders (NAHB) Nation Green Building Standard (NGBS) as measurements of sustainability for new building construction and major renovation projects using municipal funds. LEED (Leadership in Energy and Environmental Design) and NGBS have been adopted by scores of government agencies around the U.S. as a means to achieve energy efficient, resource conserving construction of government funded buildings. Under the ordinance, municipal buildings are required to meet a minimum of LEED certified as of the effective date and LEED silver three years from the effective date, homes are encouraged to use LEED for Homes or NGBS, and commercial buildings are encouraged to use LEED.

Additional information about the U.S. Green Building Council and the LEED rating tool is available at www.usgbc.org or by writing to:

**U.S. Green Building Council**
1800 Massachusetts Avenue NW, Suite 300
Washington, DC 20036
Phone 1-800-795-1747

Additional information about ICC/NAHB's NGBS is available at www.nahb.org and http://www.nahbrc.org/technical/standards/greenbuilding.aspx or by writing to:

**National Association of Home Builders**
1201 15th Street, NW
Washington, DC 20005
Phone 1-800-368-5242

A link to USGBC and NAHB web sites will also be accessible from the municipality's web site.

In the U.S., buildings account for 12.2% of freshwater use, 38% of CO2 emissions, 40% of material use, and 39% of energy use. As the public and private sectors are facing unprecedented fuel and electricity costs, this policy seeks to improve efficiency and reduce operating costs for buildings in the Municipality.

In 2007, American Institute of Architects (AIA) conducted a study of U.S. cities to determine the extent of sustainable building policies. Of 606 U.S. Cities with a population of more than 50,000, 92 cities have green building programs in place, and another 36 cities have programs in the works. Forty-two (42) million people live in cities with sustainable building policies. Of the 92 city sustainable building programs, 73 apply to municipal development.

Programs include tax credits, loans, and subsidies, as well as expedited permitting and other non-financial incentives. Communities with sustainable building programs include Salt Lake City, Utah; Chicago, Illinois; Cincinnati, OH; San Diego, California; Seattle, Washington; and the Matanuska-Susitna Borough, Alaska. The value of green building construction starts exceeds $12 billion in 2008 and is projected to increase to $60 billion by 2010. There are currently 9867 buildings registered for LEED certification on the USGBC web-site, and 1283 buildings achieved some level of certification.

A 2006 study of LEED certified schools found green schools, on average, cost about 2% more than conventional schools, but provide financial benefits 20 times larger than conventional construction. Green schools use an average of 33% less energy than conventionally designed schools. Productivity is affected by quality of lighting, amount of daylight, views to the outdoors, temperature control, efficiency of space, and ventilation rates. Productivity gains from improved temperature controls alone equal an average of 3.6% in LEED schools. Another recent review of five separate studies found an average asthma reduction of 38.5% in buildings with improved air-quality.

The U.S. Green Building Council conducted a study of 168 existing LEED-certified office buildings, and found projected savings of:

| LEED Rating | No. of Buildings | Water % | Energy % |
|---|---|---|---|
| Certified | 64 | 30.1 | 29.4 |
| Silver | 49 | 30.4 | 33.3 |
| Gold | 46 | 32.5 | 40.0 |
| Platinum | 9 | 34.4 | 55.0 |

NAHB is a federation of more than 800 state and local associations. About one-third of NAHB's 235,000 members are home builders and/or remodelers. NAHB's builder members construct about 80 percent of the new homes constructed each year in the United States.

The sustainable design process holistically and creatively connects land use and design at the regional level and addresses community design and mobility; site ecology and water use; place-based energy generation, performance, and security; materials and construction; light and air; bioclimatic design; and issues of long life and loose fit. True sustainable design is aesthetic, humane, socially appropriate, and restorative.

Local and national groups have endorsed this ordinance; letters are attached. Additional information is attached as appendices, including:

Examples of Government LEED Policies, July 2007
Alaska LEED Buildings Case Studies- Homer, Barrow, Anchorage, March 2007
The Case for Building Green, September 2007
The Cost of Green Revisited, July 2007

**THE ADMINISTRATION RECOMMENDS APPROVAL OF AN ORDINANCE AMENDING ANCHORAGE MUNICIPAL CODE CHAPTER 23.05 TO REQUIRE CONSTRUCTION AND RENOVATION OF MUNICIPAL PUBLIC FACILITIES TO MEET A SUSTAINABLE BUILDING STANDARD AND TO PROVIDE INCENTIVES FOR PUBLIC AND PRIVATELY DEVELOPED FACILITIES.**

| | |
|---|---|
| Prepared by: | Office of Economic & Community Development |
| Approved by: | Mary Jane Michael, Executive Director<br>Office of Economic & Community Development |
| Concur: | Ron J. Thompson, Development Services Director |
| Concur: | James N. Reeves, Municipal Attorney |
| Concur: | Michael K. Abbott, Municipal Manager |
| Respectfully submitted: | Mark Begich, Mayor |

# FEDERAL, STATE & LOCAL GOVERNMENT LEED GREEN BUILDING POLICIES

## Federal Policies:

Department of Agriculture
Department of Agriculture – Forest Service
Department of Energy
Department of Health and Human Services
Department of Interior
Department of State
Environmental Protection Agency
General Services Administration
National Aeronautics and Space Administration
Smithsonian Institution
U.S. Air Force
U.S. Army
U.S. Navy

## State Policies:

Arizona
Arkansas
California
Colorado
Connecticut
Florida
Hawaii
Illinois
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Nevada
New Jersey
New Mexico
New York
North Carolina
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Carolina
Virginia
Washington
Wisconsin

## Municipal/City/County Policies:

Acton, MA
Alameda County, CA
Albany, CA
Albuquerque, NM
Alexandria, VA
Annapolis, MD
Arlington County, VA
Arlington, MA
Asheville, NC
Athens-Clarke County, GA
Atlanta, GA
Austin, TX
Babylon, NY
Baltimore, MD
Baltimore County, MD
Bangor, ME
Bar Harbor, ME
Bellingham, WA
Berkeley, CA
Boulder, CO
Boston, MA
Bowie, MD
Brookhaven, NY
Burbank, CA
Calabasas, CA
Cambridge, MA
Chamblee, GA
Chapel Hill, NC
Chatham County, GA
Chicago, IL
Cincinnati, OH
Clayton, MO
Cook County, IL
Costa Mesa, CA
Cranford, NJ
Dallas, TX
Denver, CO
Derry, NH
Dublin, CA
Eagle County, CO
El Paso, TX
Erie County, NY
Eugene, OR
Everett, WA
Fairfax County, VA
Fairfax, TX
Fayetteville, AR
Fort Collins, CO
Gainesville, FL
Grand Rapids, MI
Greensburg, KS
Harris County, TX
Hillsborough County, FL
Honolulu, HI
Houston, TX
Howard County, MD
Irvine, CA
Issaquah, WA
Kansas City, MO
King County, WA
La Plata, MD
Lakewood, OH
Livermore, CA
Logan, UT
Long Beach, CA
Los Altos, CA
Los Angeles County, CA
Los Angeles, CA
Madison, WI
Mansfield, CT
Mecklenburg County, NC
Miami-Dade County, FL
Miami Lakes, FL
Minneapolis, MN
Monroe County, NY
Montgomery County, MD
Morgantown, WV
Mountian Village, CO
Multnomah County, OR
Nashville, TN
Nassau County, NY
New York, NY
Niagara County, NY
Normal, IL
Oakland, CA
Omaha, NE
Orange County, NY
Oro Valley, AZ
Palo Alto, CA
Pasadena, CA
Philadelphia, PA
Phoenix, AZ
Pittsburgh, PA
Plano, TX
Pleasanton, CA
Portland, OR
Portsmouth, NH
Princeton, NJ
Queen Creek, AZ
Rochester Hills, MI
Rohnert Park, CA
Sacramento, CA
Salt Lake City, UT
San Antonio, TX
San Francisco, CA
San Diego, CA
San Bernardino County, CA
San José, CA
San Mateo County, CA
San Rafael, CA
Santa Clara, CA
Santa Cruz, CA
Santa Monica, CA
Sarasota County, FL
Scottsdale, AZ
Seattle, WA
Springfield, MO
Starkville, MS
St. Louis, MO
Suffolk County, NY
Sullivan County, NY
Sunnyvale, CA
Syracuse, NY
Tampa, FL
Telluride, CO
Tucson, AZ
Tybee Island, GA
Ventura, CA
Washington, DC
West Hollywood, CA
West Linn, OR
Whatcom County, WA

These programs include legislation and executive orders; tax credits; density bonuses; fast-track permitting; grants and rebates; and other incentives requiring or promoting LEED as of July 1, 2008.

# Examples of LEED® Initiatives in Governments

**Source: US Green Building Council**

**As of July 1, 2008**, Various LEED initiatives including legislation, executive orders, resolutions, ordinances, policies, and incentives are found in **90** cities, **29** counties, **20** towns, **30** states, **12** federal agencies or departments, **15** public school jurisdictions and **37** institutions of higher education across the United States.

**Nevada**

On June 17, 2005, Governor Guinn signed AB3 requiring all state funded buildings be **LEED Certified or higher** in accordance with LEED or an equivalent standard. During each biennium, at least two occupied public buildings whose construction will be sponsored or financed by the State of Nevada must be designated as a demonstration project and be equivalent to a **LEED Silver** or higher certification, or an equivalent standard. The bill also provides tax abatements for property which has an eligible LEED Silver building and tax exemptions for products or materials used in the construction of a LEED Silver building.

**Greensburg, KS**

On December 17, 2007, the Greensburg City Council adopted a resolution certify all new city-owned buildings greater than 4,000 square feet at **LEED Platinum**. The resolution further requires that qualifying city buildings earn all 10 points in EAc1, Optimize Energy Performance.

**Minneapolis, MN**

On July 21, 2006, the City of Minneapolis passed Resolution 2006R-381 requiring that all city-financed municipal projects achieve LEED certification. All new construction or major renovations of municipal projects over 5,000 square feet will achieve **LEED Silver** certification.

**Santa Monica, CA**

The City Council adopted an ordinance in 2000 requiring all new city projects to achieve **LEED Silver** certification. In April 2004, the city launched the Santa Monica Green Building LEED Grant Program that provides a financial incentive for private developers who achieve LEED certification. In August 2005, the city passed an ordinance allowing LEED registered projects to receive expedited permitting. This includes all LEED for New Construction, Homes, Core and Shell.

**Seattle, WA**

In February, 2002, the City of Seattle passed a policy requiring **LEED Silver** certification of all city-owned projects and renovations over 5,000 gsf. The city is encouraging the private construction sector to incorporate LEED design standards into new and existing buildings by providing economic incentives.

**Salt Lake City, UT**
On January 19, 2006, Mayor Anderson amended an executive order requiring all new city constructed buildings and major renovations over 10,000 sq ft to be LEED Silver. On January 19, 2006, he amended the order to require LEED Silver certification for these buildings. http://www.slcgreen.com/pdf/execorderLEED.pdf On November 7, 2006, the City Council passed Ordinance #78 endorsing Mayor Anderson's executive order. The ordinance also requires commercial, condo, or apartments buildings funded by the city through grants, loans, or tax breaks to adhere to LEED standards.

**Cincinnati, OH**
On September 20, 2006, the City of Cincinnati passed an ordinance requiring new municipal buildings to be **LEED certified**. Renovated municipal buildings should incorporate LEED elements during construction.

**Vancouver, BC**
On July 8, 2004, the City of Vancouver officially announced the adoption green building standards – LEED for British Columbia (LEED-BC) for all civic buildings greater than 500 square meters. New public buildings must achieve the **LEED Gold** certification. The City also mandated specific energy points in the LEED Rating System to ensure a 30% energy reduction in civic buildings.
http://www.city.vancouver.bc.ca/ctyclerk/cclerk/20040708/pedec.htm

**Gainesville, FL**
2002: The City of Gainesville passed Ordinance # 1835 requiring all government county buildings be **LEED certified**. Additionally, the county is providing a fast-track building permit incentive and a 50% reduction in the cost of building permit fees for private contractors who use LEED.

**San Diego, CA**
The city adopted LEED for all public projects over 5,000 sq ft in April, 2002. The city has also developed a sustainable building expedite program that uses LEED criteria and provides significant plan review and construction incentives.

**Maryland**
October 2001: Maryland's governor issued an Executive Order calling for all capital projects greater than 5,000 gsf to earn **LEED certification.**
April 2005: The House and Senate passed legislation in requiring a green building standard, such as **LEED (Silver),** be used for state capital projects. The state also approved a green building tax credit for commercial developers.
http://business.marylandtaxes.com/taxinfo/taxcredit/greenbldg/default.asp

# Barrow Global Climate Change Research Center

ALASKA

THE STATE OF GREEN BUILDING IN ALASKA

## Project Information

Status: LEED Registered
Client: Ukpeagvik Inupiat Corporation
Design Team: LCMF Engineers, RSA Engineering
Contractor: UICC
Construction Cost: $16 Million (Phase 1)
Green Premium: to be determined

Bathroom with low/no water use fixtures

## Building Summary

The BGCCR is a research & education facility that includes laboratories, administrative offices, and building support. In order to achieve its mandate, it is integrated into the worldwide flow of information for the assessment and anticipation of global environmental change. It houses a variety of experts who have the flexibility to be responsive by adjusting their research activities to feedback from new results. Its mandate and design also seek the integration of societal aspects to contribute to the sustainable future of human populations in the Arctic regions.

## LEED Lessons Learned

- The building's type and location mandated that the building be designed for high performance in a harsh climate.
- With a remote location, many LEED credits weren't appripriate, however, the design team had the flexibility to achieve other credits.
- Location did not cause an increase in project costs related to sustainable design, as the location was a factor for all project costs. Many of the design features were required due to climate, and fit well into LEED guidelines.
- Items such as low VOC paints and carpets, water saving fixtures and recycled content materials were easily obtained and incorporated.

## Green Building Features

- Design for thermal comfort in a harsh climate (roof and wall systems with R60 to R70)
- Reduced site disturbance to minimize permafrost change and surface erosion.
- Exterior lighting design to mimimize light pollution
- Use of existing landscape to reduce water runoff and increase natural filtration
- Water use reduction through the use of low flush toilets, waterless urinals and water saving fixtures
- Construction using materials with recycled content, such as steel and recycled-tire floor mats
- Commissioning to ensure optimized energy performance
- Advanced air filtration and mechanical system for building, including fume hoods and lab spaces
- Use of low VOC emitting materials (paints and carpets)

# Homer Public Library

ALASKA

THE STATE OF GREEN BUILDING IN ALASKA

## Project Information

Status: LEED-NC® Silver Certified
Client: Homer Public Library/City of Homer
Design Team: ECI/Hyer Architecture & Interiors, Land Design North, LibrariesByDesign, Wm. J. Nelson & Associates, Shannon & Wilson, Ken Castner, and Support Services of Alaska
Contractor: Jay-Brant General Contractors
Construction Cost: $6.5 Million

Compass rose made from recycled gym flooring.

## Building Summary

The people of Homer desired a modern new library that met the needs of their vibrant community. Through extensive community involvement and design team input, a library that expresses a deep connection to the local landscape was developed. The overall design is enhanced through integration of local artistic expression as building design elements. The building was designed as an integrated whole in which each component works efficiently with all other parts of the building. Reading areas throughout the library are flexible to meet each individual's needs; these areas are enhanced by the feeling of openness due to the clerestory windows.

## LEED Lessons Learned

- Review waste management plan at intervals during construction.
- Look at submittal requirements and point interpretations for each targeted point so you know what documentation to collect.
- During construction, schedule an interim review of point progression so the architect, subconsultants, and the contractor know what additional information (drawings and calculations) they will need.
- Keep copies of all documentation of point achievement in a separate folder to review and compare with submittals during construction administration.
- Flag LEED point-related items in the specifications and drawings so the Construction Administrator is aware during substitution requests or changes.
- Work with a good contractor—they have to do a lot of the work that ultimately translates into LEED points.

## Green Building Features

- Bioretention swales that minimize impact on storm sewer system
- Introduction of native plant species reduces need for irrigation system
- Site remains in a relatively natural state & restored to native vegetation
- Recycled materials such as recycled-content plastic decking, reclaimed wood flooring
- Water fixtures that reduce water consumption
- Efficient, easily maintained electrical systems
- Automatic lighting systems
- Solar techniques that minimize heat gain while maximizing daylighting
- Motor controlled clerestory windows that create good airflow
- Variable air volume system that only operates as needed
- 20% of building materials were locally manufactured
- 10% of building materials were harvested locally
- Low-emitting interior finishes, including paints and sealers

# JL Tower

ALASKA

THE STATE OF GREEN BUILDING IN ALASKA

## Project Information

Status: LEED-CS® Registered
Developer: JL Properties
Design Team: RIM Architects, BBFM Engineers, DOWL Engineers, RIM Design and Hay, Zietlow & Associates, LLC
Contractor: Davis Constructors & Engineers
Green Premium: to be determined

Night scene of the entry to the building

## Building Summary

The design of this 14-story office building embraces sustainable design technologies that are energy efficient and environmentally responsible. These features work together to create a high performance work environment. JL Tower will be the first LEED certified building in the Municipality of Anchorage, and the first LEED for Core and Shell certified building in the state of Alaska. Tenants within the JL Tower will have the option of extending sustainable design to their spaces by applying the "LEED for Commercial Interiors" rating system.

## LEED Lessons Learned

- Redevelopment of an existing site supports the LEED goal of increasing community density.
- Due to its midtown Anchorage location, the JL Tower is well-located for community connectivity, convenience for public transportation.
- Since a number of LEED strategies are challenging to implement in Alaska, it is necessary to focus on building systems performance with the savings of long-term operational benefits.
- Since Anchorage's residents spend much of the winter months indoors, the benefits of high indoor air quality is especially relevant for Alaska.
- Construction waste reduction is more attainable in Anchorage than in other areas of Alaska, because of the close proximity to waste recycling centers.

## Green Building Features

- In addition to being within ¼ mile of five bus routes, JL Tower will provide racks for forty bicycles.
- "Tenant Design & Construction Guidelines" are available to guide prospective tenants in implementing "LEED for Commercial Interiors" within their spaces.
- Water use will be reduced through dual-flush toilets, low-flow urinals and faucets, and water-saving showers.
- Building commissioning will ensure systems meet designed expectations.
- A centralized storage area will facilitate a building-wide waste recycling program.
- Exterior heated plazas and vestibule entry-grate systems will minimize the amount of chemicals and dirt tracked into the building.
- Low-VOC emitting materials (carpet, adhesives, paint, and sealants) are incorporated.
- High performance glass is used on the exterior of the building to reduce solar heat gain.

# The Case for Building Green

ALASKA

THE CASE FOR BUILDING GREEN IN ALASKA

## Why Sustainability?

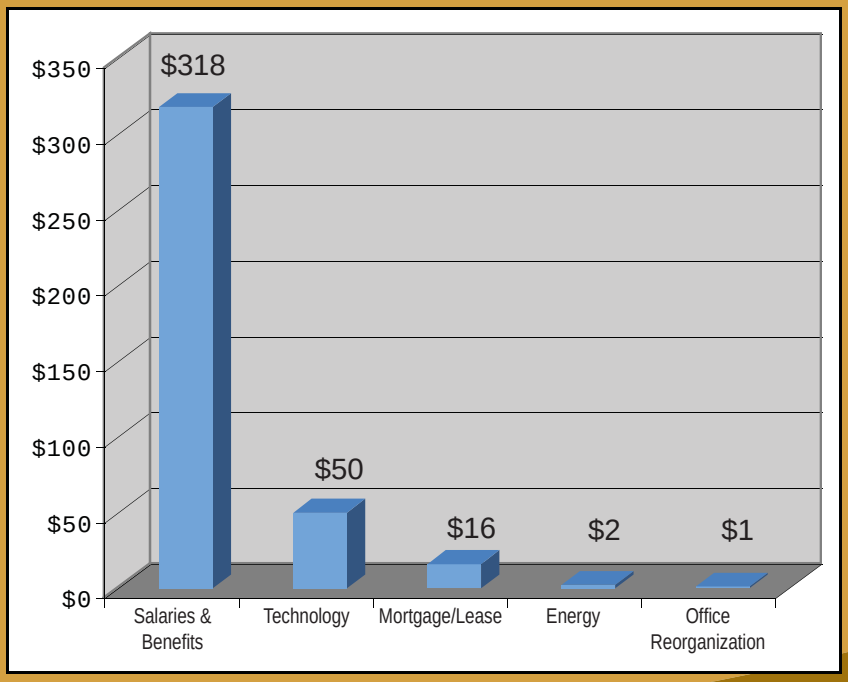
Sustainability as it applies to buildings means that green buildings use key resources such as energy, water, materials and land much more efficiently than buildings that are built strictly to code. They create healthier work, living and learning environments, with more natural light and cleaner air, and contribute to improved employee and student health, comfort and productivity. Sustainable buildings are cost-effective, saving dollars by reducing operations and maintenance costs, as well as by lowering utility bills.

## Green Building and Stewardship

The construction and operation of buildings use a large portion of global resources. Sustainable construction not only provides benefits to owners, users and community, but also to our environment as a whole.

## A Quick Economic Scenario

Projects are dependent upon funding, so it's important to present the argument that green design can make economic sense for you now and into the future. A quick discussion is that depending on your business type, your building is likely only a fraction of your total operation costs. Look at the graph below that breaks down business costs per sq.ft. This graph shows one scenario where building costs are a tiny fraction (4%) of business cost. This clearly shows that if you choose green, any increase in your mortgage/lease required for sustainability will likely be outweighed by the proportional gains that result from increased health and productivity. How would even a 2% gain in productivity affect your bottom line?




Cold Climate Housing Research Center (LEED registered)

## Trends for Building Green

As the building market continues to evolve, we are seeing trends that support, encourage and demand a move towards more sustainable buildings:

- There are definite established links between building quality and the health of inhabitants
- There is an increasingly positive response from the American public to the sustainability message
- The public is beginning to demand green building for themselves and their community
- Local governments are pursuing green building in the interests of their citizens
- Fuel prices and energy will continue to rise and efficiency will become more and more important
- The marketing advantages of green building are becoming obvious for office developments and beyond
- The business benefits of green building are continuing to develop
- Incentives are being developed to encourage private green development
- Organizations such as the American Institute of Architects are developing the expertise to implement increasing benefits, and setting goals for their profession

# Green Building Standards: LEED

ALASKA

THE CASE FOR BUILDING GREEN IN ALASKA

## Why Do We Need a Standard?

Standards are in place to protect the public, and to ensure that you are getting what you pay for. Green building is a developing market force, and there is a spectrum of people involved. This spectrum includes those with true expertise and a desire for sustainable development, but also those that do not have the expertise or whose interest is superficial. In order to ensure that your development is truly green, the use of a third-party standardized system is highly encouraged. When all is said and done, this proof is what will establish your commitment above and beyond those who don't seek it. An identifiable and meaningful label is important to the public, your customers and your peers.

## Why Use LEED?

The Leadership in Energy and Environmental Design (LEED) rating system is currently the strongest and most accepted method of quantifying sustainable construction. The Government Services Administration recently conducted an analysis of various standards, and found the USGBC LEED system to be superior to the others. As an owner, this system provides you with certainty that your development meets a set of national standards. As a tenant, it shows you that your building offers advantages that will benefit your staff and business. As the Alaskan building market continues in the direction of sustainability, LEED certification is a way to differentiate your product and illustrate a proven commitment to conserving resources and creating healthy spaces.

## LEED Buildings Produce Results

A standardized system is only as good as what it produces. LEED has already established a legacy of buildings that have created quantifiable results for their owners, and will continue to offer savings and health benefits into the future.

| LEED Rating | # of Bldgs | Water % | Energy % |
|---|---|---|---|
| Certified | 64 | 30.1% | 29.4% |
| Silver | 49 | 30.4% | 33.3% |
| Gold | 46 | 32.5% | 40.0% |
| Platinum | 9 | 34.4% | 55.0% |

Average savings projected for 168 LEED-certified office buildings. (Source: USGBC)

Homer Library (LEED Silver)

## Count the Benefits of LEED

- By making the step to LEED certification, you will be at the forefront of a nationwide initiative. That kind of leadership gets noticed. LEED certification will help you rise to the top, no matter what type of development you are in.
- LEED certification will make your development stronger, both technically and economically. Durability and long term sustainability will drive every decision, ensuring that essential corners don't get cut in the immediate frenzy of today's needs. This protects tomorrow's pocketbook from expensive repairs and fixes.
- LEED certification means future marketing benefits. With a LEED building, you can prove that your community/company is committed to long-term investment and planning. It's a statement to Alaska and beyond that you are making a legacy that you are proud to leave to your children.
- Ultimately, this approach to design will create benefits far beyond reduction in operating and maintenance costs. Sustainable building leads to a more sustainable community, state and country.

ALASKA

# What is LEED?

THE CASE FOR BUILDING GREEN IN ALASKA

## United States Green Building Council

The U.S. Green Building Council (USGBC) is a non-profit composed of leaders from every sector of the building industry working to promote buildings that are environmentally responsible, profitable and healthy places to live and work. Our more than 11,000 member organizations and our network of 75 regional chapters are united to advance our mission of transforming the building industry to sustainability.

The U.S. Green Building Council's core purpose is to transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life.

## Leadership in Energy and Environmental Design

LEED is a voluntary, consensus-based national rating system for developing high-performance, sustainable buildings. USGBC's members, representing every sector of the building industry, developed and continue to refine LEED. LEED addresses all building types including new construction, commercial interiors, core & shell, operations & maintenance, homes, neighborhoods, and specific applications such as retail, multiple buildings/campuses, schools, healthcare, laboratories and lodging.

Based on well-founded scientific standards, LEED emphasizes state of the art strategies for sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. LEED promotes expertise in green building through a comprehensive system offering project certification, professional accreditation, training and practical resources.

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

Denali Visitor Center (LEED Silver)

## USGBC In Alaska

- 27 Member Firms
- 48 Chapter members
- 80 LEED Accredited Professionals
- 3 Certified Projects
- 13 Registered Projects

## Certified in Alaska

- West Coast/Alaska Tsunami Warning Center - Certifies
- Homer Public Library - Silver
- Denali National Park Entrance Area Visitor Center- Silver

## Registered in Alaska

- Anchorage Museum of History and Art
- Annette Island Weather Service
- Barrow Global Climate Change Research Center
- Bears of Alaska Discovery Center
- Clark Middle School Renewal
- Cold Climate Housing Research Center
- Evergreen Building
- Glacier Valley Elementary Renovation
- Harborview Elementary Renovation
- JL Tower
- St Vincent de Paul Society NP Center
- USCG Ketchikan Clinic

# The Costs of LEED

ALASKA

THE CASE FOR BUILDING GREEN IN ALASKA

## Budgets Matter, Costs Often Don't

Every project is different and has inherent opportunities or constraints that will affect the types of sustainability that you can apply. In Alaska, we're already familiar with the efficiencies required for cold climate design, and this can make LEED a possibility without too much additional work. While there are inherent costs to becoming LEED certified, much of the physical work to build a green building can be done within your existing budget. If it fits into your budget, does the cost matter?

## What will it cost?

The definitive answer is… it depends. While it's true that the cost generally increases with each level of LEED certification, there are also projects that defy the norm. LEED Platinum has been achieved on some projects with only a 1% premium. Mechanical and electircal systems have come in 11 to 15% below original budget. The final cost depends upon the experience and efficiency of your team, the type of project you have, and your local climate for green building (available resources, infrastructure and possible incentives).

## What level of Certification for You?

While we encourage you to aim high, it's more appropriate for you to analyze your project and figure out your own cost/benefit analysis. There will be a LEED level that best fits your project, and beyond that you may see costs jump. When costs start to jump, that's when you need to give closer attention to the benefits you will reap. Green design is best when it's honest.

An approximate rule of thumb is to expect a cost premium of +2% for each LEED level relative to current local costs. This is a place to start the discussion. With each efficiency found and with successful coordination, it's possible to push this premium lower. The size of your project will also affect your premium. Economy of scale benefits larger projects by making it easier to achieve a lower premium. Smaller projects are more sensitive to the costs associated with specialized techniques and equipment that may be part of your green project. When calculating your premium, remember to look at the cost savings from green features, not just their added costs. For example, daylighting can reduce a building's energy requirements, resulting in a smaller transformer at a lower cost.

LEED Silver Medallion

## Cost Factors:

- Design costs may be higher because of more rigorous design processes and LEED documentation, but experience drives costs down.
- The higher the certification level, the higher the LEED documentation cost.
- Design and documentation costs are reported to be 5% to 10% higher for LEED projects, but this is coming down.
- Construction documentation costs are reported to range from $10,000 to $30,000 per project.
- $50,000 to $100,000 may be a reasonable rule-of-thumb estimate for LEED documentation, depending on complexity of project
- Commissioning costs are reported to range from 0.5% to 2% of construction costs. ($0.30 to $0.75/sf for larger projects)
- Small project cost percentages move to the higher end of the scale.
- Integrated design vs. "hand off"
- Costs will depend upon: Experience of design/construction team with green, your own internal capabilities and experience, the specific green measures and programelements used.

# Healthy Schools, Healthy Children

ALASKA

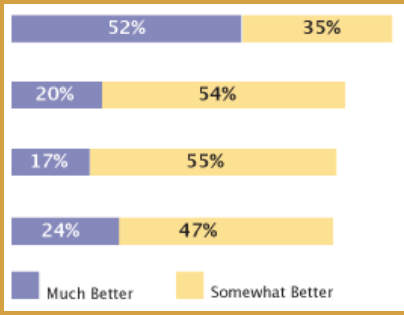
THE CASE FOR BUILDING GREEN IN ALASKA

## Why Demand Green for Schools ?

For the health and education of our children. Over the course of your child's education, how many hours will they spend inside their schools? Children educated in green facilities show a significant reduction in health problems and do better in their classes. Better air quality, better lighting and better design also produce the same benefits for teachers and staff, resulting in a higher rate of teacher retention and lower health costs.

## Industry Perceptions of Green Schools

The figure below summarizes a survey of 665 executives in the construction industry on the benefits of green schools. Of those who have built green schools, 70% felt that green schools reduced absenteeism and increased student performance.




(Source: Turner Construction 2005)

## Financial Benefits of Green Schools

Recent research reveals the financial benefits of greening our schools. The information below is based on a review of 30 green schools, and shows that the additional costs for building green are about 2% (or $3/sq.ft.) compared to the national average cost of $150/sq.ft. Of the $71 of financial benefits shown below, $12/sq.ft. accrues directly to the school for water and energy efficiency, lower health costs and teacher retention. The rest of the benefits spread out into our communities, now and into the future.

| | |
|---|---|
| Energy | $9 |
| Emissions | $1 |
| Water & Wastewater | $1 |
| Increased Earnings | $49 |
| Asthma Reduction | $3 |
| Cold & Flu Reduction | $5 |
| Teacher Retentiaon | $4 |
| Employment Impact | $2 |
| Total | $74 |
| Cost of Greening | ($3) |
| Net Financial Benefits | $71 |

(Source: Greening America's Schools Costs and Benefits 2006)

Clearview High School (not Alaska)

## Greening Education Works!

- Based on a study of 21,000 school records in 3 geographic locations, daylighting schools resulted in 15-25% faster progress on math and reading tests, and an overall increase of 7-18% on test scores
- Greener facilities provide opportunities for curriculum enrichment through using the building as a learning tool.
- In a study of 39 schools in Sweden, researchers identified a 69% reduction in the 2-year incidence of asthma among students in schools that received a new ventilation system with increased fresh air supply rates, as compared to non-upgraded schools.
- Green schools attract students, and help to retain quality teachers and staff. Reduced teacher sick days has a real value: approximately $2/sq.ft.
- Education budgets are tight. While capital expenditures can be bonded, operations and maintenance is a yearly expense. Any reduction in future bills stretches our tax dollars.
- Building green shows a commitment to slowing global climate change and educating children about a sustainable future

# Healthcare Facilities

ALASKA

THE CASE FOR BUILDING GREEN IN ALASKA

## Greening Hospitals Benefits All of Us

There are two aspects to how sustainable building can benefit healthcare facilities: reduction in resource use and an increase in the quality of the facility as it relates to health and recovery. The former relates to profitability in the near and far future, and the latter relates to the primary mission of healthcare: the health of our citizens.

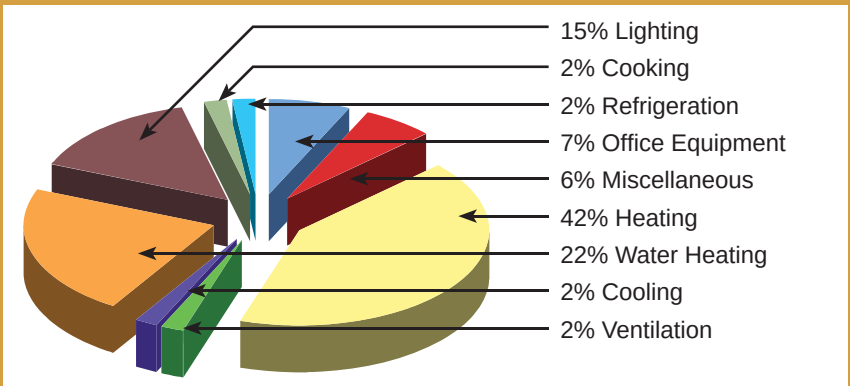
## Healthy Citizens are Happy Citizens

As long as you have your health you have everything, right? Perhaps the most beneficial aspect of building sustainable hospitals and healthcare facilities is the effect that it will have on your patients and staff. Natural light, fresher air and design with therapeutic elements in mind complements the healing process. If you look at this in marketing terms, you are treating your patients in such a manner that when needed, they will return to your facility and recommend others to do the same. From a staffing point of view, you will gain a higher rate of staff retention and be able to attract the quality professionals that you need.

## A Hospital is a Small City

Our healthcare facilities have a very high level of energy use. They require light and heat 24 hours a day, and require more ventilation than most facilities. All of the equipment in a hospital requires electricity, and produces heat that requires ventilation. There are also laundry demands and the resources needed for food preparation. The graph below shows statistics for climates similar to ours in Alaska. Any ability to reduce these energy loads can result in significant savings. Perhaps an even more important aspect for our health networks is that green buildings result in better health. Natural light, fresher air and design with therapeutic elements in mind complements the healing process.

## Cold Climate Hospital Energy Use




(Source: US Energy Information Administration)

Schwab Rehabilitation Hospital, Chicago, Illinois

## Reasons for LEED

- Improvements in indoor climate control (ventilation, humidity, and temperature) can significantly improve the health and recovery rate of patients. Hospitals rely on good reputation for patronage. They profit if their public image is of a responsible and progressive community citizen.
- Hospitals spend on average $1.67/ sq.ft. on electricity, and $0.48 on natural gas. Commissioning and green tune-ups have been shown to reduce lighting and HVAC costs by 10 to 15 percent
- If hospitals reduce energy use by 5%, it is the equivalent of increasing the earnings per share (EPS) by 1 cent. Similarly, each dollar of energy savings is equivalent to a $20 increase in revenue
- Technological advances make energy-efficiency retrofits easier and more cost-effective than before
- People over the age of 65 require six times as much hospitalization as younger people, and this segment of the population is increasing. As you target this market, incorporate sustainability to save money and differentiate your facility from others

# Cost of Green Revisited

## Reexamining the Feasibility and Cost Impact of Sustainable Design in the Light of Increased Market Adoption

DAVIS LANGDON

# Contents

## Introduction

The purpose of this paper is to revisit the question of the cost of incorporating sustainable design features into projects. It builds on the work undertaken in the earlier paper "Costing Green: A Comprehensive Cost Database and Budget Methodology," released in 2004, and looks at the developments that have occurred over the past three years, as sustainable design has become more widely accepted and used.

In the earlier paper we examined the cost of green from three perspectives: the cost of incorporating individual sustainable elements, the cost of green buildings compared to a population of buildings with a similar program, and the cost of green buildings compared to their original budget. This paper provides an updated look at the cost of green by examining a larger sampling of buildings and looking at additional building types. In both this and the earlier paper, the USGBC's LEED rating system is used as a parameter for determining level of sustainable design.

## Findings

1. Many projects are achieving LEED within their budgets, and in the same cost range as non-LEED projects.
2. Construction costs have risen dramatically, but projects are still achieving LEED.
3. The idea that green is an added feature continues to be a problem.

## Executive Summary

The 2006 study shows essentially the same results as 2004: there is no significant difference in average costs for green buildings as compared to non-green buildings. Many project teams are building green buildings with little or no added cost, and with budgets well within the cost range of non-green buildings with similar programs. We have also found that, in many areas of the country, the contracting community has embraced sustainable design, and no longer sees sustainable design requirements as additional burdens to be priced in their bids. Data from this study shows that many projects are achieving certification through pursuit of the same lower cost strategies, and that more advanced, or more expensive strategies are often avoided. Most notably, few projects attempt to reach higher levels of energy reduction beyond what is required by local ordinances, or beyond what can be achieved with a minimum of cost impact.

The cost of documentation remains a concern for some project teams and contractors, although again, as teams become accustomed to the requirements, the concern is abating somewhat.

We continue to see project teams conceiving of sustainable design as a separate feature. This leads to the notion that green design is something that gets added to a project – therefore they must add cost. This tendency is especially true for less experienced teams that are confronting higher levels of LEED certification (Gold and Platinum). Until design teams understand that green design is not additive, it will be difficult to overcome the notion that green costs more, especially in an era of rapid cost escalation.

Average construction costs have risen dramatically the past three years - between 25% and 30%. And yet we still see a large number of projects achieving LEED within budget. This suggests that while most projects are struggling with cost issues, LEED is not being abandoned.

*"....there is no significant difference in average cost for green buildings as compared to non-green buildings."*

County Court of Victoria
Victoria, Australia

The Leadenhall Building
London, England

## Analyzing the Data – Cost Analysis of Similar Buildings

In this study, we compared construction costs of buildings where LEED certification was a primary goal to similar buildings where LEED was not considered during design. The building types analyzed included the three previously evaluated - academic buildings, laboratories and libraries - and two new types - community centers and ambulatory care facilities. Projects in the study used either LEED NC 2.1 or 2.2; for consistency, all project checklists were adjusted to 2.2 standards. It should be noted that LEED 2.2 is significantly different from 2.1 in ways that impact cost; this is particularly the case for EA Credit 1, where the energy efficiency credits have become appreciably more challenging.

A total of 221 buildings were analyzed. Of these, 83 buildings were selected which were designed with a goal of meeting some level of the USGBC's LEED certification. The other 138 projects were buildings of similar program types which did not have a goal of sustainable design.

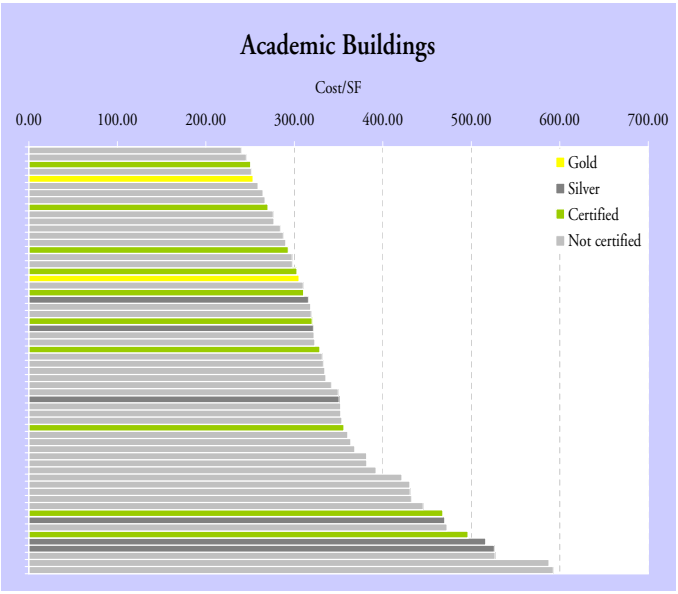
All costs were normalized for time and location in order to ensure consistency for the comparisons. It is important to note that the only distinction made between the buildings was the intent to incorporate sustainable design in order to achieve LEED rating. Many of the non-LEED buildings might have earned some LEED points by virtue of their basic design. Cost per square foot was compared between all projects – LEED-seeking and non-LEED.

Buildings are compared by category, as follows. In the graphs presented, LEED levels are denoted by the different colors. Green bars indicate Certified buildings, silver bars indicate Silver buildings, and gold bars indicate Gold buildings. There are no platinum rated projects in our sample.

## Analyzing the Data – Cost Analysis of Academic Buildings

A total of 60 academic classroom buildings – 17 LEED-seeking and 43 non-LEED – were analyzed. Academic buildings are classroom, computer lab or faculty office buildings in higher education settings. These buildings are located on college and university campuses across the country, and include a range of architectural forms and styles. The higher LEED scoring designs in this category tended to find points in sites, energy efficiency, and indoor environment.

As can be seen, the LEED seeking academic buildings are scattered broadly through the population, with no significant difference in the average costs of LEED seeking and non-LEED seeking buildings. It is worth noting that the Silver buildings do tend to fall in the higher range, both within the population of green buildings and in the overall population, while the Gold buildings are in the lower range, although the sample size for the Gold buildings is too small to draw meaningful conclusions on the cost of Gold within the population. However, it can be said the Gold projects by and large seemed to have kept costs low by using simple approaches to sustainability, rather than adding technologies to achieve green. Both levels achieved similar numbers of points for Credit EA 1, but the Gold projects did not use photovoltaics to achieve fairly high energy efficiency points, and achieved 3 or 4 Innovation Points.



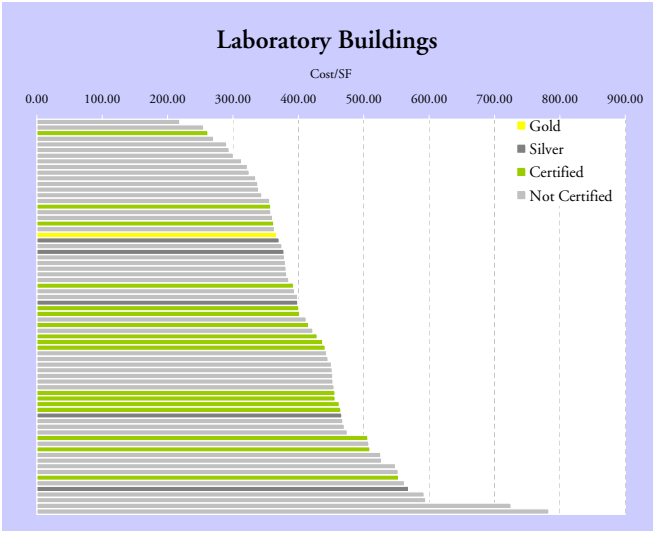

The Cooper Union for the Advancement of Science & Art
New York, New York

# Analyzing the Data – Cost Analysis of Laboratory Buildings

A total of 70 laboratories – 26 LEED-seeking and 44 non-LEED – were analyzed. The laboratories include both wet and dry science buildings, covering a wide range of science disciplines, in teaching, research and production settings. LEED projects in this category tended to score high in the Energy category; these buildings tend to have robust mechanical systems, and find ways to increase efficiency therein.

Again, no significant statistical difference was noted between the average costs per square foot for LEED-seeking versus non-LEED laboratories. Even though there is a fairly large standard deviation in price between the labs, the sustainable projects are scattered quite broadly through the population. The Silver buildings are also quite widely distributed and, as with academic buildings, the Gold population is too small for meaningful conclusions on cost within the population.

Donald Bren School of Environmental Science & Management
University of California, Santa Barbara

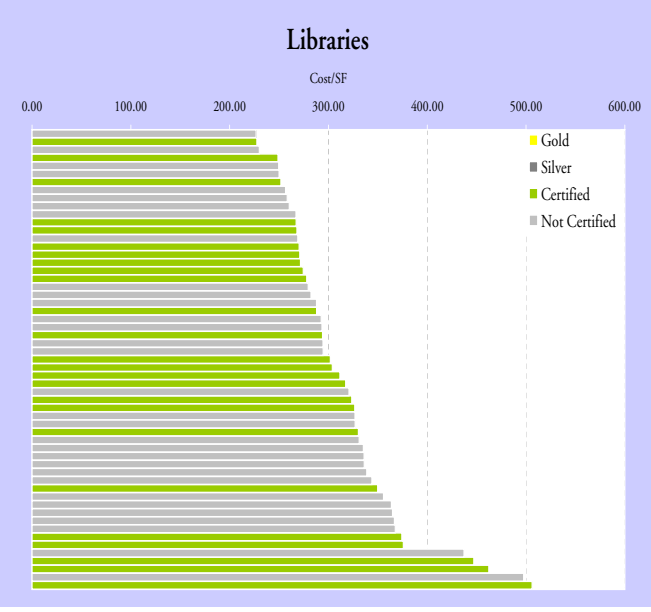


Alexandria Library
Alexandria, Egypt

## Analyzing the Data – Cost Analysis of Library Buildings

A total of 57 libraries – 25 LEED-seeking and 32 non-LEED – were analyzed. The library buildings include community branch libraries, main public libraries and university campus libraries. LEED projects in this category tended to score well in indoor environmental quality.

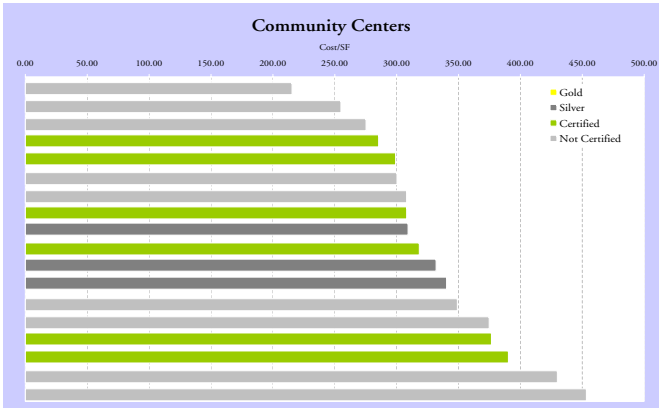
As the graph demonstrates, there is no indication that the LEED-seeking projects tend to be any more expensive than the non-LEED projects. In fact, the green population tends to fall more towards the lower end of the overall population. It is also worth noting that this category has one of the highest green to non-green ratios. Over the past several years, libraries have become one of the more common categories of new construction to embrace sustainable design.



# Analyzing the Data – Cost Analysis of Community Centers

A total of 18 community centers – 9 LEED-seeking and 9 non-LEED – were analyzed. The community center buildings usually include meeting rooms, classrooms, recreational facilities and community gymnasiums. Many include warming kitchens for catering for events in the centers. These projects tended to score high in the indoor environmental quality and site categories.

As with libraries, community centers are generally fairly simple buildings, and provide opportunities for cities to demonstrate green buildings within the community. While the data set is quite small, and not adequate for true statistical analysis, it is still possible to see the broad trend that the green buildings are indistinguishable from the greater population on a cost basis.



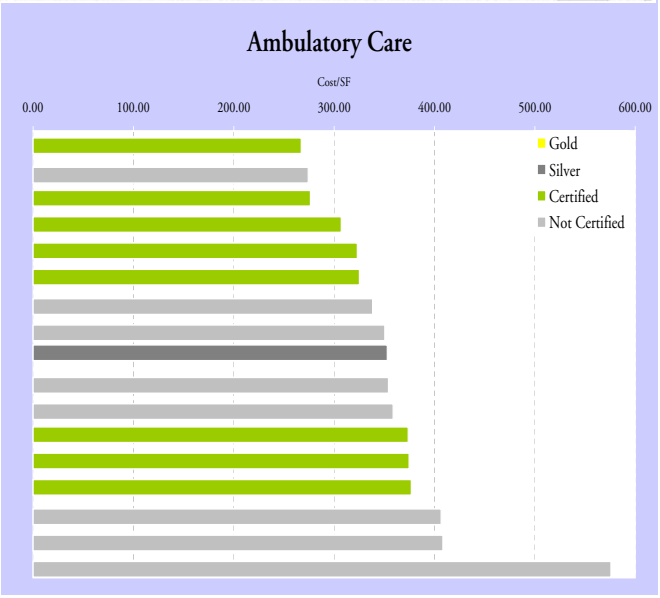

West Hollywood Community Center
Hollywood, California

# Analyzing the Data – Cost Analysis of Ambulatory Care Facilities

Johns Hopkins Medical Center
Baltimore, Maryland

A total of 17 ambulatory care facilities – 9 LEED-seeking and 8 non-LEED – were analyzed. Ambulatory Care Facilities are medical buildings that do not provide inpatient care, or come under the 'I' occupancy designation of the building code. The buildings in the sample include cancer treatment centers (excluding any radiation treatment elements), same-day surgery suites, and ambulatory care centers. Medical Office buildings were not included.

As with community centers, the sample size is not sufficient to develop robust statistical data, but it is still evident that the green buildings fall well within the range of the overall population of costs.



## LEED-Seeking versus Non-LEED

Throughout these comparisons the two groups compared have been referred to as LEED-seeking and non-LEED. However, it is important to keep in mind that the difference between these groups is simply that the LEED-seeking buildings were designed with LEED certification in mind, while this was not one of the goals for the non-LEED buildings. Non-LEED buildings qualified for at least some LEED points by virtue of their design, location, and other factors. Based on our earlier paper and subsequent studies, we find that most non-LEED projects achieve between 10 and 20 points with their established designs.

### Conclusion

Four key conclusions can be drawn from the analysis of construction costs for LEED-seeking versus non-LEED seeking projects:

- There is a very large variation in costs of buildings, even within the same building program category.
- Cost differences between buildings are due primarily to program type.
- There are low cost and high cost green buildings.
- There are low cost and high cost non-green buildings.

There is such a wide variation in cost per square foot between buildings on a regular basis, even without taking sustainable design into account, that this certainly contributed to the lack of statistically significant differences between the LEED-seeking and non-LEED buildings.

The overall conclusion is that comparing the average cost per square foot for one set of buildings to another does not provide any meaningful data for any individual project to assess what – if any – cost impact there might be for incorporating LEED and sustainable design. The normal variations between buildings are sufficiently large that analysis of averages is not helpful; buildings cannot be budgeted on averages.

## Analyzing the Data – Initial Budget

One of the most common methods used to establish the cost of green has been to compare the final construction costs for the project to the established budget. In other words, was the budget increased to accommodate the sustainable elements, or were those elements incorporated into the project within the original available funds. For many, this is the ultimate test of affordability; could green be acquired within the funds available. This measure is, however, challenging to use, since it is difficult to assess the reasonability of the original budget, or what other factors may have contributed to a project's budget performance. It is, therefore, the most subjective of the three measures.

In our earlier study, we found that the majority of projects did achieve their sustainable goals within their original budget. Subsequent analysis supports this finding. It is likely that, in some of these cases, budgets were set with sustainability in mind, making the finding for those projects less meaningful, but in general, we find that projects with budgets set without reference to sustainable goals are still achieving certification with little or no adjustment to their budget.

We also found that the population data is statistically highly skewed; that is to say that the distribution is not evenly spread about the average, but instead is highly weighted towards the lower end premiums with a long tail containing a few high premium projects. This, coupled with the fact that very few projects, if any, will report coming in under budget due to sustainable features, means that the average reported cost (mean) is typically higher than the reported cost for the average project (median), which is in turn, likely to be higher than the premium for the typical project (due to the absence of any reported negative premiums).

It is worth noting that the past three years have seen unprecedented construction cost escalation, with escalation running at over 10% per annum in many parts of the country. This has put tremendous pressure on all aspects of project design, including the sustainable features. Even with this pressure, many projects are still able to deliver successful green strategies, and achieve their sustainable goals. The most successful are those which had clear goals established from the start, and which integrated the sustainable elements into the project at an early stage. Projects that viewed the elements as added scope, tended to experience the greater budget difficulties.

### Conclusion

As the various methods of analysis showed, there is no 'one size fits all' answer to the question of the cost of green. A majority of the buildings we studied were able to achieve their goals for LEED certification without any additional funding. Others required additional funding, but only for specific sustainable features, such as the installation of a photovoltaic system. Additionally, our analysis suggests that the cost per square foot for buildings seeking LEED certification falls into the existing range of costs for buildings of similar program type.

From this analysis we can conclude that many projects can achieve sustainable design within their initial budget, or with very small supplemental funding. This suggests that owners are finding ways to incorporate the elements important to the goals and values of the project, regardless of budget, by making choices and value decisions.

# Feasibility and Cost

The LEED-NC version 2.2 rating system comprises 7 prerequisites and 69 elective points, grouped into 6 categories. The following section discusses the feasibility of each LEED point and overall likely cost effect (if any) for construction cost, soft cost, and documentation cost.

### Sustainable Site Credits (SS)

Many of the credits in Sustainable Sites have very low cost impacts. The credits tend to be either readily achievable at little cost, or impractical for a given project. Some credits are more suited to urban locations, others to more open locations. In many cases, the driver for these credits is the degree of urbanization. It is our experience that building project sites are rarely selected for their LEED-related impact.

The first four points have to do with site selection, urban density, brownfield reclamation, and proximity to mass transit; the ability of a project to get any of these points is usually unconnected to whether or not the project has a LEED goal. The distribution of points being pursued is generally in line with the findings in our earlier study.

SS Prerequisite 1: Construction Activity Pollution Prevention
In order to comply, it is necessary to develop a compliant site sedimentation and erosion control plan. These plans are mandatory in many parts of the country. Compliance with this credit is generally within customary practices for design and construction teams.

In most cases, this credit has no construction or soft cost impact. The standards and technologies required for this point are standard to most projects; if not, they are achieved at minimal added cost. The credit can generate a very small reduction in overall construction costs by reducing cleanup and corrective action which would otherwise arise following significant storm events.

SS 1: Site Selection
Most site selection is driven by a wide range of factors, and appropriateness of site is usually a result, not a driver, of the site selection. There are typically no construction or soft costs associated with the credit, since there is no mitigation other than avoiding non-compliant sites. However, choice of location can affect feasibility and cost of sustainable design measures, and thus overall project costs. Possible costs would be related to land value where appropriate sites are available at an added cost.

SS 2: Development Density and Community Connectivity
As with SS 1, this credit is usually a result, rather than a driver, of site selection, and credit compliance is a consequence of other factors. The credit is usually suited to urban projects and suburban projects, where the site happens to comply either because of density or proximity to amenities. In certain cases, it may be possible to achieve the point by increasing project density. The costs associated with increased density are related to the development of multi-story buildings and structured parking. There can also be added costs associated with lack of staging and lay-down space in very dense site locations. The greatest cost impact of this credit is likely to be felt in smaller rural or suburban buildings which might otherwise be built as single story buildings with surface parking. For these types of projects, the cost impact of increasing the density of the project could be substantial.

SS 3: Brownfield Redevelopment
This credit is usually a result, rather than a driver, of site selection, and credit compliance is a consequence of other factors.

This credit is achieved either by soils remediation, or removal/abatement of asbestos or other hazardous materials from an existing facility (to be renovated or demolished).

There are a variety of strategies for mitigating soils contamination, including encapsulation, remediation, etc. These can lead to a variety of costs, depending on the strategies selected, or required (such as hazardous materials removal or encapsulation during demolition or renovation, removal or encapsulation of contaminated soils, and/or remediation of contaminated soils using chemical additives).

While the cost of this credit can be substantial, it is rarely a significant factor in site selection for most projects. A brownfield site may be selected for other reasons, such as property availability, transit connections, etc. Costs to mitigate hazardous materials in an existing building (demolition or renovation) would typically be incurred regardless of sustainable design goals.

The cost of basic remediation of a brownfield site can range from $50,000 / acre to as much as $2 million per acre, although the typical range is $300,000 to $500,000 per acre. For development densities of 80,000 SF to 120,000 SF / acre, this amounts to $3.00 to $6.00/SF of building area. There will also be additional soft cost for design, testing and monitoring. These costs would be typically required in a brownfield remediation, regardless of pursuit of the LEED credit.

SS 4-1: Alternative Transportation - Public Transportation Access
This credit is usually a result, rather than a driver, of site selection, and credit compliance is a consequence of other factors. Because of this, the credit is usually suited to urban projects, where the site happens to comply.

If the site is not close to public transportation, it may be possible to work with transit providers to bring bus lines to the site. The project can also provide shuttle buses to transport staff and patients from the project site to bus or train stops to meet the credit requirements. These measures can reduce the amount of parking needed, and therefore reduce project costs.

In practice, this credit typically has no construction or soft cost implications.

SS 4-2: Alternative Transportation - Bicycle Storage and Changing Rooms

This is a relatively inexpensive credit with low design impact and simply requires the installation of adequate bicycle racks and shower/changing facilities. The cost for this credit is likely to show up not as cost per square foot, but rather in the additional square footage to be built, or reduced useable square footage within a building from the development of the shower facilities.

In practice, this credit typically has very small construction or soft cost implications. The number of racks and showers required to meet this credit is usually quite small. Encouragement of the building users to use bicycles and other alternate transportations may alleviate the need for parking spaces and actually save money.

SS 4-3: Alternative Transportation - Low-Emitting and Fuel-Efficient Vehicles

This credit is typically achieved in the least costly manner – that is, by providing preferred parking for efficient and alternatively fueled vehicles. Refueling stations can be added almost any time during design and construction. This point could also be awarded if the owner provides a fleet of alternatively fueled vehicles, but typically few facilities take this route.

This credit typically has very minor construction and soft cost implications; electric refueling stations typically cost between $5,000 and $20,000 for a two car station, while costs for signage are negligible.

SS 4-4: Alternative Transportation - Parking Capacity

As with SS 4-3, this credit is not difficult to achieve, but compliance may be unacceptable in many facilities due to restrictions on available parking for users. Where sites are highly constrained and parking limited by available space, the credit may be met simply as a result of the program limitations. Also, in many projects parking is constrained to such a degree that it would not be possible to exceed local zoning requirements.

This credit can actually reduce construction and soft costs by reducing overall parking and vehicular circulation area.

SS 5-1: Reduced Site Disturbance - Protect or Restore Habitat

For greenfield sites, the main strategies relate to managing the construction and ensuring that construction activities are kept within the limitations specified in the requirement. While this is a construction management issue, it is essential that the design team understand the constraints, and that these are detailed within the construction bid documents.

Credit requirements can be difficult if not impossible to achieve at greenfield sites where excavation below grade of more than one story is required.

For previously developed sites, the main strategies relate to designing appropriate site restoration. This credit can be challenging to achieve in urban areas because of limitations in site area which make it difficult to find the required site area for restoration.

For urban sites with large impervious areas, such as surface parking lots, strategies can include construction of parking structures to allow for conversion of paved areas into landscaped areas. Green roofs at parking structures and buildings can contribute to this point.

Many of the strategies for achieving this credit can be combined with other credits. For example, landscaped areas can be designed to provide natural habitat, to manage and filter stormwater, and to facilitate both heat island credits. In many jurisdictions, strict stormwater mandates can be cost-effectively met using native landscape. Where strategies and credits can be integrated, costs can be greatly minimized.

This credit typically does not incur significant construction costs, where sufficient land is available to answer parking needs and leave room for native plantings. Where space is a premium and parking must be put underground or in a structure to provide space for natural habitat, costs can be significant or prohibitive. If measures can be used that allow achievement of several sustainable design goals at once, costs can be controlled.

There are usually relatively small soft cost implications.

SS 5-2: Reduced Site Disturbance - Maximize Open Space

The typical strategy for meeting this credit is to limit hardscape and parking areas, to allow sufficient open space. For projects that earn SS 2, this point is typically achieved by providing a green roof and pedestrian oriented hardscape. For campus projects, this point can be achieved at no cost by providing open space elsewhere. Cost impacts for this credit are typically zero to minimal for rural, suburban, and campus sites. For dense urban sites, costs can be minimal to significant due to densification of the building and/or addition of a green roof.

SS 6-1: Stormwater Management - Quantity Control

Stormwater can be detained on site prior to release to the stormwater system. Detention can involve dissipating the flow through swales, or holding the water in detention ponds, surge chambers or tanks. Water can also be retained on site for other uses, or for infiltration into the ground. Retention can involve holding the water in ponds, surge chambers or tanks, or the use of landscaped areas or permeable paving for infiltration. Detention ponds or tanks are usually smaller than retention ponds or tanks, since they typically need to hold water for shorter periods.

Site size plays a significant role in whether or not the stormwater related points result in additional cost. Swales tend to have a minimal cost impact; retention or detention ponds are more expensive, and

installation of stormwater collection tanks can be very costly. Projects on large sites tend to install swales or ponds, while buildings on limited sites (usually urban) use collection tanks and filters to meet the requirements.

Increasingly, stormwater management is required by local jurisdictions; in such cases the cost is included in the base design, not added. In some cases, the project may be required to foot the bill to increase capacity of the local infrastructure; in such cases onsite measures may be more cost-effective.

Local weather patterns will impact cost; frequency and amount of rainfall will determine the scale of both landscape and tank interventions. Soil conditions also can affect cost; sites with clay soils, high water tables or bedrock will not be able to use the swale and surface infiltration approaches.

Diversion of rainwater for use in irrigation or sewage conveyance will satisfy point requirements, and is becoming a more accepted and used approach to compliance. The provision of tanks and additional piping can represent a significant cost.

In practice, many projects may not have sufficient site area to develop the less costly solutions to this credit. If this is the case, the point can be challenging to achieve.

SS 6-2: Stormwater Management - Quality Control

The strategies for meeting this point typically depend on the extent of site area available for stormwater management. In sites with large landscaped areas, it is possible to provide treatment through the use of landscape elements such as vegetated swales and retention ponds to infiltrate water. Where site conditions do not allow use of landscaping to meet this credit, it is necessary to provide filtration tanks and oil separators at inlets. On very constrained sites, it may be necessary to capture rainwater in tanks and reuse it for irrigation and/or cooling towers.

An additional element is the development of a landscape management plan, aimed at reducing the total phosphorus load entering the stormwater system. This management plan includes both selection of appropriate landscaping and planting, and long-term fertilizer management by the facility.

In practice, some projects may not have sufficient site area to develop the less costly solutions to this credit, and as a result, the credit can be very challenging or expensive to achieve. However, many jurisdictions require the filtration of stormwater before it enters the municipal system; in such cases the cost is included in the base design, not added. An integrated design that uses landscape and other design elements to help meet credit requirements will reduce construction and operations costs.

Diversion of rainwater for use in irrigation or sewage conveyance can satisfy, or assist in satisfying, point requirements, and is becoming a more accepted and used approach to compliance. The provision of tanks and additional piping can represent a significant cost.

SS 7-1: Heat Island Effect - Non-Roof

This credit is most often achieved by changing the color of concrete paving and adding shade elements at relatively low cost. Where surface parking is provided, this credit can be achieved at minimal or no added cost by using white asphalt or by providing open grid paving or gravel at parking stalls, leaving only the aisles asphalt.

By providing a parking structure, site area can be freed for use in landscaping, which will help achieve other LEED credits including stormwater management and filtration, open space and natural habitat, and places of respite.

In practice, this credit typically has very minor construction and soft cost implications, since the most economical way in which to achieve this credit is to provide shade trees in parking areas. We have not seen projects chose to provide structured parking simply to achieve this point.

SS 7-2: Heat Island Effect - Roof

The typical approach to this credit is to use a high emissivity roof. While costs for these are usually slightly ($1 - $2/SF) more than conventional black roofs, the overall impact on the cost of the project is usually relatively low, since roofs make up a very small part of the total project cost.

Increasingly, projects use a green roof to achieve this credit. The added cost is significant, adding typically between $10 and $30/sf, but green roofs can facilitate achievement of LEED credits for stormwater management and filtration, open space, and natural habitat, as well as contributing to energy efficiency. The use of green roofs is increasing as designers and owners become more familiar with them and as the value of green roofs for stormwater management are more widely accepted.

SS 8: Light Pollution Reduction

The primary strategy for this credit involves careful site lighting design and fixture selection. Many projects attempt this credit, but not all achieve it. Clients and code officials often perceive this point to be at odds with security requirements, although this situation is increasingly rare. In order to be successful with this credit, therefore, it is important to include site lighting in the earliest stages of site planning, and to include security and site safety in the considerations of the design.

Where the credit is attempted, the credit typically has very low cost impact, both for construction and soft costs.

# Water Efficiency Credits (WE)

Of the credits in Water Efficiency, most projects try for WE 1.1 and 3.1; few attempt the other credits, which can be quite challenging, unless they are seeking the higher levels of LEED certification. The noticeable difference here is that few projects appear to be attempting credit 2. This could simply be within the normal range of statistical variance, but could also reflect the recognition of the costs associated with this credit.

WE 1-1 & 1-2 Water Efficient Landscaping –Reduce by 50% and No Potable Use or No Irrigation

There are two main strategies for meeting these credits. The first is to use landscaping that requires less irrigation primarily by reducing the extent of grass and by increasing the use of native, drought tolerant plants. The second is to use more efficient irrigation methods or reclaimed water for irrigation. LEED requires both strategies to achieve this credit.

There can be a perceived sanitation issue with using reclaimed, grey, or rainwater for irrigation. Some projects address such concerns by ensuring that the irrigation water is never touchable by humans; this is done by using below-ground irrigation.

Specific actions include:

- Providing native, drought tolerant plants
- Avoiding the use of turf grass
- Using high efficiency irrigation methods such as drip irrigation or automated controls with moisture sensors
- Using municipally provided reclaimed water for irrigation
- Capturing site rainwater to reuse for irrigation
- Using HVAC condensate or cooling tower waste water for irrigation (only possible with non-chemical cooling tower treatments systems)
- Installing temporary irrigation for establishment of plants only (hose bibbs)

In practice, these credits typically have very small construction and soft cost implications, and the election to pursue these credits is driven more by preference for appearance than by cost. If no permanent irrigation system is installed, costs can actually be reduced. WE 1-1 is usually accomplished by the use of drought tolerant planting and efficient irrigation.

Where municipally provided reclaimed water is used, the cost is limited to the cost of connecting to the reclaimed water system, and of providing filtration if needed. In many areas where reclaimed water is municipally provided, it is mandatory to use it for irrigation; in such cases there is no added cost.

The most expensive strategies involve rainwater storage. The costs for water storage can be significant, if large volumes are required for irrigation. This strategy is typically not attempted in areas with very short rainy seasons.

If cooling tower waste water is to be used for irrigation, storage tanks can be minimal in size, since cooling towers are likely to be running year round and will provide a consistent supply of water. Costs associated will be for collection, storage, and minimal filtration.

While potable water costs are currently quite low, it is extremely likely that costs will rise dramatically in the near future. Minor design changes now could save major costs later.

WE 2: Innovative Wastewater Technologies

Low-flow and waterless flush fixtures are typically available at no added cost. Reclaimed water, gray water, and rainwater systems (which would typically include cisterns and filtration systems) all require the provision of additional supply. Typically this could be expected to add $4 - $8/SF over the cost of the entire building. There would be minor increases in design and inspection costs, and moderate documentation costs associated with the necessary calculations and demonstration of compliance. On-site wastewater treatment adds significantly to the cost of a facility.

WE 3-1 & WE 3-2: Water Use Reduction – 20 Percent Reduction & 30 Percent Reduction

The typical approach is to use low flow fixtures for lavatories and showers, motion sensor operated devices, reduced flush or dual flush toilets, and waterless or reduced flush urinals. These strategies have little premium costs, and in most cases will be sufficient to ensure achievement of the first point associated with this credit, and often the second. For healthcare and other facilities with different potable water demands, or where potable water flow is required for hygiene or infection control reasons, this credit can be challenging.

# Energy and Atmosphere Credits (EA)

Our project data indicate that the Energy and Atmosphere credits are not strongly pursued in many cases, other than the initial two to four points for energy cost reduction. This is similar to the findings from our earlier study. Energy credits do require a high degree of focus, and can be challenging for many projects. Oddly, these are some of the credits which have the most readily calculated Life Cycle costs and the clearest business case.

EA Prerequisite 1: Fundamental Commissioning of the Building Energy Systems

This credit has construction and soft cost implications, although increasingly facilities undertake basic commissioning regardless of this credit. Usually commissioning is viewed as a soft cost, and so the primary cost impact shows up in that category. There are, however, some additional construction costs related to commissioning arising from the additional work required of the contractor to support the commissioning process, and the corrective work required as a result of the commissioning. Basic commissioning typically costs in the range of $1.50 - $3.00/SF.

This credit can provide significant benefits, both in the short and long term. The greatest benefits are achieved with the use of Additional Commissioning (EA 3), but the basic conditioning under this prerequisite can provide significant benefits.

In the short term, commissioning can help the project team develop an efficient design, and in conjunction with design modeling, serve to reduce overall design and construction time. In the long term, the commissioning has been shown to have very strong improvements in system performance and reduced operating cost[1].

EA Prerequisite 2: Minimum Energy Performance

The energy performance standards set by the prerequisite are not particularly difficult to meet, and should not typically lead to significant increases in first cost. If the decision to pursue energy efficiency is made early in design, it should be possible to meet minimum requirements without adding cost. With an integrated design approach, savings may even be realized. If energy efficiency is not addressed early the costs can become significant.

EA Prerequisite 3: Fundamental Refrigerant Management

Most new facilities will automatically meet this prerequisite, unless an existing central plant uses CFC refrigerants. Equipment replacement can be costly and is typically undertaken only when that equipment has reached the end of its useful life. Since the prerequisite only requires the commitment to future replacement, there are no construction cost implications.

EA 1: Optimize Energy Performance (1 to 10 points)

Most projects in our sample that are pursuing LEED certification seek at least two of the energy optimization credits, and many aim for more. With the adoption of the requirement that all projects much achieve a minimum of two energy points, all LEED seeking projects will need to address energy performance issues in the future. The standards under LEED 2.2 are generally more challenging than those under LEED 2.1, but the 14% energy cost reduction required for the first two points should be achievable for most projects, with careful attention to energy performance and energy efficiency measures.

Many energy efficiency measures involve little or no additional cost, but rather focus on efficient design, right-sizing of equipment, and improvements in basic building systems. For many building types, these measures can be sufficient for meeting the two point prerequisite and beyond. Going beyond the first two to four points requires much more attention to integrated design and energy efficiency. For some building types, improvements in energy efficiency can actually lead to reduced construction cost, since the improvements come from reducing dependence on mechanical systems and improving the passive design of the building. Examples where this can occur include libraries, community centers, schools, and such like, particularly where the climate is relatively benign. For other building types, such as hospitals and laboratories, higher levels of energy efficiency can involve significant increases in first cost. Strategies considered include total heat recovery, careful zoning design with supply air temperature reset, control over air change rate in unoccupied areas, and decoupling of ventilation and thermal loads through such strategies as radiant heating and cooling. Taken together, these strategies can be very effective in delivering significant energy cost reductions even in very demanding buildings, but the cost premium can be quite high.

Common strategies for achieving the first two credits include:

- Energy Load Reduction
  - Occupancy and time of use analysis, leading to rightsizing of systems and careful zoning design
  - Analysis of actual loads in similar existing buildings
  - Envelope improvements, including improved insulation and glazing performance, reduced air infiltration
  - Sunshading and daylighting harvesting, reduced lighting power density
  - Decoupling of thermal and ventilation demands, including radiant heating and cooling
  - Heat recovery from air and water systems
- Improved Equipment Efficiency
  - Increased duct size leading to reduced fan power requirements
  - Variable frequency drives for motors
  - Condensing stack boilers
  - Sophisticated controls.

# Energy and Atmosphere Credits (EA)

EA 2: Onsite Renewable Energy (1 to 3 points)
On-site generation of renewable energy has a substantial construction cost impact. Installation of these systems usually provides a long-term cost savings, although the life cycle cost payback is usually very long even with available credits and incentives. Incorporating renewable energy into design will earn the project at least one additional energy use reduction point. This credit can be cost effective for projects where power needs are fairly low, and the cost of providing grid-based power to remote buildings are substantial.

EA 3: Enhanced Commissioning
This credit has construction and soft cost implications. Usually commissioning is viewed as a soft cost, and so the primary cost impact shows up in that category. There are, however, additional construction costs related to commissioning arising from the additional work required of the contractor to support the commissioning process and the corrective work required as a result of the commissioning. Additional commissioning typically costs in the range of $1.00 - $2.00/SF.

This credit can provide significant benefits, both in the short and long term. In the short term, it can help the project team develop an efficient design, and in conjunction with design modeling, serve to reduce overall design and construction time. The short term benefit can be found to some degree with Basic Commissioning (EA Prerequisite 1), but it is most achievable with the additional commissioning.

EA 4: Enhanced Refrigerant Management
This credit is becoming quite easy to achieve, as more and more manufacturers provide compliant equipment. Typically, this credit has minor construction cost implications if any, and minimal soft cost and documentation requirements.

EA 5: Measurement and Verification
The cost of metering to the level required by this credit can be significant, and the cost for writing and implementing the measurement and verification program can be substantial. Individual meters are relatively inexpensive, but to provide the quantity required and to provide a good quality reporting system can add $2.00 to $4.00/SF to the overall cost of the project. The cost to write and implement the measurement and verification program can range from $50,000 to $200,000. For some projects, the initial cost is sufficiently high that adoption of this credit is not considered. The cost of monitoring is usually independent of whether the building has a Building Management System (BMS), since BMS systems do not normally provide the level of monitoring required by this credit.

EA 6: Green Power Strategies
The first cost of green power contracts is relatively low, but operationally it can add to overall long term costs. The cost for green power or renewable energy credits varies widely, with green power contracts running from below $.01 per kWh in some areas, to over $.15 per kWh in others. Credits usually are in the range of $.02 per kWh. At this rate, it would represent a 15% to 20% increase in electricity cost for a typical user.

[1] Mills, Ethan, et al "The Cost-Effectiveness of Commercial-Buildings Commissioning" Lawrence Berkeley National Laboratory, Dec 2004 | http://eetd.lbl.gov/emills/PUBS/Cx-Costs-Benefits.html

# Materials and Resources

Materials and Resources credits fall into two sharply distinct categories, with most projects pursuing the credits related to construction waste management, and the first credits for recycled content and local content, and very few pursuing the others. This represents a slight change from our earlier analysis. More projects are pursuing the second construction waste recycling credit, reflecting an increased acceptance of this requirement by the construction community, and fewer projects are pursuing the second recycled content and local content credits, due to the raising of compliance thresholds in these points.

MR Prerequisite 1: Storage and Collection of Recyclables
In most cases, this credit has no construction or soft cost impact. Many buildings already have waste handling areas and procedures, and the incorporation of dedicated recycling areas represents a very small increase in program. In many projects, this is incorporated regardless of the credit.

MR 1-1 to 1-3: Building Reuse
These credits simply require the reuse of specified percentages of a building's fabric. While many projects involve the reuse of existing buildings, few projects incorporate these points. It can be difficult for remodeling projects to achieve other points, especially site and energy use reduction, without significant increase in cost. We find, therefore, that few remodel projects seek to pursue certification. These points in themselves do not necessarily add cost to a project; it is the impact of the cost of achieving other necessary points that tends to prohibit remodel projects from achieving LEED.

MR 2-1 & 2-2: Construction Waste Management - Divert From Landfill
The ease and cost of compliance with this credit varies greatly by location. In areas where construction waste management is widely used, the costs are minimal, if any. In other areas, or with contractors unfamiliar with construction waste management, the costs can be substantial.

While it is increasingly common for contractors to hire a waste hauler to take commingled waste and sort it off-site, many contractors have found that they can actually save costs by sorting waste onsite, if the space is available.

In most areas there is no substantial difference between the two points available. Once the contractor has committed to achieving the first point, the second usually follows.

The cost premium can be seen in two forms. In the first instance there is the direct cost of waste management: developing procedures, training, recycling charges, savings in dump fees, etc. The second cost impact is less measurable, and that is the impact on bidders. In periods of high construction demand and limited competition, inexperienced bidders may view these requirements as unduly onerous, and as a result decline to bid, or bid high to cover what they perceive as the risk. This can be mitigated to some degree through bidder outreach and training, but the cost can, nevertheless, be significant in certain locations at periods of low competition. Where the contractor can be engaged during the design process, the costs associated with this point can be reduced or eliminated.

There should be no additional soft cost, but there will be moderate documentation requirements if the project wishes to demonstrate compliance with the credit.

MR 3-1 and 3-2: Materials Reuse
These credits are usually not readily achievable, primarily because, for most buildings, there is not enough opportunity for use of salvaged, refurbished or reused materials, products or furnishings to meet the 5 percent or 10 percent thresholds. Even though some reclaimed materials or products can be incorporated at low cost or even for a reduction in cost, the cost for compliance with these credits can be significant since the percentage thresholds are quite high. Achievement of this credit may not be achievable for all but a very few projects.

MR 4-1 and 4-2: Recycled Content
The use of recycled content is usually not difficult for most projects, and can be done at minimal or no added cost. Most buildings qualify for at least one point for recycled content with no additional cost impact, and minimal or no design effort (projects typically use standard construction materials that already have high recycled content.) The second point can be challenging, however, since the thresholds (20 percent by value) are quite high, and concentrated effort is needed to identify high recycled content materials to replace more standard products.

There should be no additional soft cost, but there will be significant documentation requirements should the owner wish to demonstrate compliance with this credit.

Documentation involves tracking recycled content materials. This can be done with a simple one-page form that each trade is required to fill out for each product. Product manufacturers are familiar with this requirement and often provide recycled content data whether or not it has been requested. Trades are also being asked to isolate the cost for materials, separate of labor and other costs. Once the general contractor has set up a tracking document and process, the added labor is not significant.

MR 5-1 and 5-2: Local/Regional Materials
With the modifications made to this requirement under LEED 2.2, which added the requirement for local extraction as well as local manufacture, this credit became very difficult to achieve, even in areas with strong local manufacturing bases. It is difficult to assess what the cost implications might be, since strategies to achieve could have major impacts on the approach to basic design and structure of each project.

## Materials and Resources

MR 6: Rapidly Renewable Materials

Even though some rapidly renewable materials can be incorporated at low cost, the cost for compliance with these credits can be significant, since the percentage threshold is quite high for most projects, and it can be difficult to find sufficient suitable materials to comply with this credit .

For many projects, the obstacle is not the cost of renewable materials, but the feasibility of identifying enough materials to meet the required threshold. For this reason, the compliance threshold has been lowered in LEED 2.2, making this credit more available.

There should be no additional soft cost but there will be significant documentation requirements.

MR 7: Certified Wood

The cost of certified wood varies widely with location and timing, and is dependent primarily on supply and demand. Project teams should continually monitor supply and price and consider making a final decision as close to bid as possible.

For buildings using certified wood only in finished carpentry, and in areas where there is more than one supplier, the cost premium is minimal. For buildings requiring large quantities of dimensional softwood or sheet goods, the cost can be significant.

There should be no additional soft cost but there will be significant documentation requirements.

# Indoor Environmental Quality Credits (EQ)

Indoor Environmental Quality is the most popular section for credit achievement, with many of the credits well represented in all projects. The distribution of credits is similar to our earlier study, and does not show any significant shift in the credit profile of projects.

EQ Prerequisite 1: Minimum IAQ Performance
In most cases, this prerequisite has no construction or soft cost impact. The standards and technologies required for this point are standard to most projects. The documentation requirements are not onerous.

EQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control
The simplest way to achieve this credit is to eliminate smoking in the building; with this approach there is no added construction cost. If smoking is permitted, the cost to provide designated smoking areas with adequate ventilation systems range from moderate to substantial.

In most cases, this prerequisite has very little construction or soft cost impact. The standards and technologies required are standard to most projects or easily achieved at minimal added cost.

EQ 1: Outdoor Air Delivery Monitoring
In most cases, this credit has little construction or soft cost impact. The added sensors and the modifications to the control systems make a very small contribution to the overall cost of the air conditioning systems. The standards and technologies required for this point are standard to most projects or easily achieved at minimal added cost.

EQ 2: Increase Ventilation
Compliance with this credit has a very small construction cost impact, whether through the use of operable windows for natural ventilation or through the increased use of outside air in mechanical ventilation systems, but can have a significant impact on the operational cost of the facility, particularly in areas where the outside air temperature or humidity is significantly different from the required indoor conditions.

Increasing outdoor air through the use of natural ventilation can have an impact on mechanical system controls, as well as on fenestration costs.

Increasing outdoor air quantities in mechanical ventilation systems will usually lead to increased coil sizes, and possibly increased chilling and heating plant capacity. The increased operational costs can be offset to some degree through the use of total heat recovery.

EQ 3-1: Construction IAQ Management Plan - During Construction
This credit is one that many projects aim for. Even though acceptance of these requirements is growing within the construction community, it can be difficult to achieve because the credit requires significant coordination and management on the part of the contractor and all members of the construction crew, as well as a strong commitment by all members of the construction crew to abide by the rules.

The ease and cost of compliance with this credit varies greatly by location. In areas where construction IAQ management is widely used, the costs are minimal, if any. In other areas or with contractors unfamiliar with construction IAQ management the costs can be substantial.

The cost premium can be seen in two forms. In the first instance there is the direct cost of IAQ management: developing procedures, training, material handling, etc. The second cost impact is less measurable, and that is the impact on bidders. In periods of high construction demand and limited competition, inexperienced bidders may view these requirements as unduly onerous, and as a result decline to bid, or bid high to cover what they perceive as the risk. This can be mitigated to some degree through bidder outreach and training, but the cost can be significant in certain locations at periods of low competition.

There should be minimal additional soft cost, mainly related to collaboration with the contractor in developing and overseeing the operation of the IAQ plan, but there will be moderate documentation requirements in order to monitor and demonstrate compliance.

EQ 3-2: Construction IAQ Management Plan - Before Occupancy
The feasibility of this credit has changed under LEED 2.2, since it now allows for testing as an alternative to a building flush out, and the flush out requirement is no longer two weeks at 100% outside air. As a result of the change, more projects are considering pursuing this credit.

In hot, dry areas a two week flush-out with outdoor air is quite feasible as long as it is planned into the construction schedule. In areas where there is high humidity, however, flushing out is difficult in certain seasons, since a flush-out with outdoor air in wetter climates is more likely to expose the interior of the building to mold and other problems.

The costs for flush out are usually very small, in the range of $0.25 to $0.50/SF, but the schedule impact may not be acceptable. The costs for testing are minimal, usually a few thousand dollars per area. For most buildings, there will be a limited number of areas, with test areas usually in the range of 10,000 to 20,000 SF.

# Indoor Environmental Quality Credits (EQ)

Low Emitting Materials: EQ 4-1: Adhesives and Sealants; EQ 4-2: Paints and Coatings; EQ 4-3: Carpet Systems; EQ 4-4: Composite Wood and Agrifiber Products
The first three of these credits are fairly easy to achieve. In some cases, local or regional ordinances may already require that projects meet the required standards. Where local or regional regulations do not already establish the use of low emitting materials, making use of these should have only minimal – if any – impact on cost, as these are usually widely available. The requirement for composite wood and agrifiber products can be harder to achieve, as suitable products are less readily available.

In most cases, these credits have no construction or soft cost impact. The technologies required for these points are standard to most projects, or easily achieved at minimal added cost. The one exception is EQ 4-4: Composite Wood and Agrifiber Products. Prices for composite wood materials with no added urea-formaldehyde can vary widely, depending on the product selected and market conditions. Documentation of the use of materials is a concern for contractors. Some states are considering banning building materials with added urea-formaldehyde; this should have a positive impact on costs.

EQ 5: Indoor Chemical and Pollutant Source Control
This credit is usually fairly easy to achieve with little added cost. Entry grates carry minimal costs, unless the building has multiple entries. In most cases, requirements for chemical mixing areas are already in the design. The use of MERV 13 filters usually represents a minimal added cost if any (many projects already require this as good practice). In smaller projects with small or package systems, it may not be possible to add the filters.

In most cases, this credit has minor construction and no soft cost impact.

EQ 6-1: Controllability of Systems – Lighting,
With the changes that came with LEED 2.2, this point can be easily achieved in most projects. The cost impact comes from enhanced lighting controls, which are increasingly being incorporated as part of the energy efficiency strategies implemented by projects. These costs can range from minimal to significant.

EQ 6-2: Controllability of Systems – Lighting, Thermal Comfort
Where areas are under the control of the single occupants, the cost of controlling thermal comfort can be fairly high, since it includes not only the control point, but also control valves on the air or hydronic supply to the space. These can be expensive in most conventional systems, although when integrated into more sophisticated, or carefully planned systems, the cost per control can be significantly lower. This point is achieved in projects with VAV, radiant panels, or displacement air systems.

EQ 7-1: Thermal Comfort – Design;
Most projects are designed to comply with ASHRAE comfort standards, and meet requirements for no added cost. The point is not easily achieved in projects with smaller systems, or that are trying to reduce energy usage by relaxing comfort standards.

EQ 7-2: Thermal Comfort – Verification
This point is easily achieved in LEED 2.2. The costs associated with preparing a survey of building occupants are moderate. There are no implications to soft costs. Many owners, however, choose not to pursue this credit, from reluctance to survey occupants.

EQ 8-1: Daylight and Views - Daylight 75 Percent of Spaces,
There are two main elements in the strategy to achieve this point. The first is to reduce the maximum distance from the exterior by narrowing the floorplate as far as possible. The second is to maximize the daylight penetration into the building by the use of good orientation, high quality glazing, and effective light shelving.

In many projects, the floor plate size is set by program, and it can be challenging to reduce the overall depth of the floorplate. In other projects, such as office buildings, it is generally easier to configure the floorplates to allow for greater daylight penetration. Even so, it can be difficult to get enough daylight to achieve compliance.

Costs associated with this point are usually for high performance glazing and/or increased glazing opening sizes, and can range from minimal to significant.

EQ 8-2: Daylight and Views - Views for 90 Percent of Spaces
This point is usually achievable by the thoughtful arrangement of interior spaces, and the addition of glazing at interior partitions. Costs are minimal to moderate.

## Innovation and Design Process Credits (ID)

Most projects seek at least two Innovation in Design credits, plus the credit for having a LEED accredited professional on the project. The innovation credits come from two main sources:

- Exceeding thresholds in other credits, for example diverting 95 percent of waste from landfill, higher levels of recycled materials, or significantly higher use of public transit systems.
- Incorporating innovative environmental strategies not covered by other credits. These can include, among many options:
    - Developing an environmental educational program or community outreach program using the building. This requires a specific educational program, and not simply a passive 'poster' display.
    - Incorporation of green housekeeping strategies.
    - Extension of Materials and Resources credit requirements to Furnishings, Fixtures or Equipment (FF&E).
    - Use of extended Labs21 or Green Guide for Healthcare criteria where appropriate, or adoption of other LEED system requirements, such as LEED for Neighborhood Development credits.
    - Preconstruction surveys of other similar buildings to establish actual baseline performance, leading to right sizing of equipment.

## Feasibility and Cost – Conclusion

As we can see, there are a number of factors which can have a significant impact on both the ability to achieve specific LEED points, and on the cost to build a sustainable building. When considering cost and feasibility for pursuing LEED certification for any building, it is extremely important that the owner:

- Understand the feasibility of each point for the project
- Understand the factors affecting cost and feasibility

Costs are not necessarily cumulative. In many cases, a design feature that allows a project to meet one sustainable design criteria will also allow that project to meet other criteria, without any additional cost impact beyond that resulting from the first point.

Having a comprehensive understanding of these factors allows an owner to more accurately determine potential costs, and to make better choices as to which LEED points a particular building should pursue. The fact that a point may have a cost impact when assessed individually does not mean that it will have an impact on final budget. Quite a few points have the potential for cost impact when considered independent of the overall project design; it is the choices made by the project team that ultimately determine whether those design elements (and their associated costs) are included simply as part of the existing budget, the same as any other non-green-specific design element. It is for this reason that one of the most critical indicators of whether sustainable design goals will result in some form of cost premium is the willingness of the project team to embrace the project's sustainable goals and make the necessary choices to achieve that result.

# Budgeting Methodology for Green

When establishing a design and a budget for a LEED building, the key point to remember is that sustainability is a program issue, rather than an added requirement. Our analysis indicates that it is necessary to understand the project goals, the approach to achieving the goals, and the factors at play in for the project. Simply choosing to add a premium to a budget for a non-green building will not give any meaningful reflection of the cost for that building to meet its green goals. The first question in budgeting should not be "How much more will it cost?," but "How will we do this?"

This must be done as early as possible in the project and it must be considered at every step of design and construction. This is done by:

- Establishing team goals, expectations & expertise
- Including specific goals in the Program
- Aligning budget with program
- Staying on track through design and construction

Perhaps the most important thing to remember is that sustainability is not a below-the-line item.

### Establish Team Goals, Expectations and Expertise

When considering sustainability, it is important to understand your team. As we discussed previously, the feasibility and potential cost impact of a number of LEED points can be significantly increased or decreased by whether or not the members of the design and construction teams are familiar with sustainable practices, and willing to commit to following established protocols and procedures.

It is also important to ensure that the team includes the expertise that will be necessary to allow the sustainable elements to be incorporated smoothly. And finally, you must align the goals and values of the project such that all members of the team accept and understand them.

### Include Specific Goals

A LEED checklist should be prepared at the start of the project and at every program stage. This will enable the project team to clearly understand their current ability to meet the project's established goals and values. Additionally, the team should specify specific design measures to be employed in meeting the goals, and these should be routinely monitored to ensure complete compliance.

It may seem impractical to develop a sustainable design strategy during the program stage of design, when so little of the building is defined. It is our experience, however, that many of the features can be identified, visualized and incorporated into the cost model if sufficient attention is paid to them.

In the design, include contingency points, recognizing that some of the points may be unsuccessful. It is essential to plan for at least three or four points more than the minimum required for a given level. We have found that where projects need "just one more point", those last points tend to be difficult and very expensive.

It is also important to be specific in point selection. There will always be points which are uncertain, which should properly be counted as points in the 'maybe' column on the checklist. The 'maybe' column should not, however, be used as a substitute for thinking through the feasibility of a point; 'maybe' is not the same as indecision.

### Align Budget with Program

It is essential to align the budget with the program during the programming phase of the project. If there are insufficient funds to fulfill all of the program goals, either the goals must be reduced, or the budget increased. Too often projects move forward with a mismatch, either because the project team is unaware of the mismatch, or more often, due to wishful thinking that something will turn up to resolve the problem.

In order to align the budget with the program, a cost model should be developed, which allocates the available funds to the program elements. It is quite possible to develop a thorough cost model from program information, even when design information is limited. The program will dictate the majority of the cost elements, both in quantity and quality, and from that it is possible to build a cost model. The cost model will both reflect the program – highlighting areas of shortfall – and provide planning guidance for the design team by distributing the budget across the disciplines.

The cost model also provides a communication tool for the project team, allowing clear understanding of any budget limitations. These must be addressed by adjusting scope, design or funds. Proceeding with inadequate funding will lead to more drastic scope reductions at later stages in the design process, and greater conflict between competing interests in the program. It is in these cases that sustainable elements are most vulnerable to elimination as unaffordable expenses.

In order to align your budget with your program you must:

- Understand your starting budget.
- Generate a cost model for the project to understand where costs lie.
- Allocate funds.
- Address limitations in the budget at the Program stage.

It is the choices made during design which will ultimately determine whether a building can be sustainable, not the budget set.

# Budgeting Methodology for Green

### Stay On Track

Once you have a clear understanding of the goals and values for the project, as well as the budget available, it is important to stay on track throughout the entire process. The steps for staying on track include:

- *Documentation:* Begin any necessary documentation as early as possible, and maintain it as you go.
- *Update / Monitor Checklist:* Update and monitor the LEED checklist so you have a clear picture of how the sustainable goals are being met, and whether the LEED goal is succeeding.
- *Energy / Cost Models:* Use energy and cost models as design tools. Energy models are useful during all design phases to establish the design criteria necessary to meet selected LEED points. Cost models will allow you to track cost impacts from any necessary changes to design or procedure as the project progresses. Energy and cost models can be combined to make a very effective decision making tool, preferably early in design.

### Conclusion

The only effective way to budget for sustainable features within buildings is to identify the goals, and build an appropriate cost model for them. If they are seen as upgrades or additions, the cost of the elements will also be seen as an addition. It is possible to establish goals and budgets from the very beginning of the project. Other methods are ineffective and unnecessary.

**Contact:**
Peter Morris: pmorris@davislangdon.us
Lisa Fay Matthiessen: lmatthiessen@davislangdon.us
www.davislangdon.com

Spinelli HOMES, Inc.

July 14, 2008

To: Mayor Begich and the Municipality of Anchorage Assembly:

**Subject: Sustainable Building Ordinance**

As a professional Home Builder and as a concerned citizen I am in favor of the MOA adoption of a Sustainable Building Ordinance.

I believe that the benefits will greatly outweigh the investment and the MOA willingness to create this shows a great commitment to the evolution of construction in Anchorage.

Sincerely,

Andre Spinelli

1900 W. NORTHERN LIGHTS BLVD. • SUITE 200 • ANCHORAGE, ALASKA 99517 • 344-5678 • FAX: 344-1976

ahba
Affiliated with NAHB

**Subject: AN ORDINANCE AMENDING ANCHORAGE MUNICIPAL CODE CHAPTER 21.01 TO REQUIRE NEW AND RETROFITTED MUNICIPAL PUBLIC FACILITIES TO MEET A SUSTAINABLE BUILDING STANDARD, AND AMENDING CHAPTER 23.05 TO PROVIDE INCENTIVES TO MEET A SUSTAINABLE BUILDING STANDARD.**

To: Mayor Begich and the Municipality of Anchorage Assembly:

As an association of professionals concerned with the social, health, economic and general well being of our community we find the Municipalities of Anchorages consideration of a Sustainable Building Standard worthy of praise.

A voluntary sustainable building standard as it applies to privately funded projects creates an incentive for developers/builders meeting a higher standard.

The Anchorage Home Builders Association is supporting the Municipality of Anchorage in the adoption of a Sustainable Building Ordinance. Over the last year we have seen our membership as well as the clients of our member's interest spike in the 'Green Building' subject. This spring AHBA offered a Certified Green Building Professional designation course which was sold out. The Anchorage Home Builders Association is proud to say that we have sought the training and can provide the expertise to take advantage of the incentives offered by this ordinance.

Sue M. Wolfe — 7-8-08

Sue Wolfe
President
Anchorage Home Builders Association

Date

BOMA

Anchorage

BUILDING OWNERS & MANAGERS ASSOCIATION

**July 16, 2008**

**Sustainable Building Initiative Task Force**
**C/o Peter Briggs**
**3017 Sheldon Jackson Street**
**Anchorage, Alaska 99508**

**Re: Support for Municipal Ordinance for sustainable building design**

**Dear Task Force Members,**

**BOMA Anchorage is very supportive of efforts to promote sustainable building design. BOMA has been a leader in energy reduction and fully supports all efforts to achieve maximum energy efficiency.**

**BOMA recognizes that responsible building operating and management practices can significantly reduce energy consumption, provide significant cost savings and provide for more efficient buildings.**

**Your group's presentation of a sustainable building ordinance that requires Municipal buildings to be sustainable and provide incentives for sustainable buildings in the private sector is an excellent idea.**

**BOMA Anchorage fully supports this ordinance and would offer its assistance and resources to help make this ordinance a reality.**

**Sincerely,**

Ken Bauer

**Ken Bauer**
**BOMA Anchorage President**

200 W. 34TH, SUITE 205, ANCHORAGE, AK 99503
PHONE (907) 343-2662 FAX: (907) 564-2485
EMAIL: BOMA@CGPROP.COM

# AIA Alaska

A Chapter of the American Institute of Architects

May 7, 2008

Sustainable Building Initiative Task Force
c/o Peter Briggs
3017 Sheldon Jackson Street
Anchorage, AK 99508

Re: Support for Municipal ordinance for sustainable building design

Dear Task Force members,

The American Institute of Architects is highly supportive of efforts to promote sustainable building design. In a recent policy statement, the AIA stated that it "recognizes a growing body of evidence that demonstrates current planning, design, construction and real estate practices contribute to patterns of resource consumption that seriously jeopardize the future of Earth's population." Our profession is focusing attention on raising the public's awareness of this issue and focusing on effecting change in how buildings are designed, constructed and operated.

Your group is to be thanked for pursuing the idea of a sustainable building ordinance for Anchorage, one that requires Municipal buildings to be sustainable and provides incentives for sustainable building to the private sector. Our community will benefit from buildings that are more energy-efficient and are healthier for occupants.

AIA Alaska supports an ordinance that stipulates compliance with a building industry standard sustainability metric system, such as U. S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Rating System, or another nationally recognized, consensus-based green building guideline.

Sincere regards,

Marcie L. Moss Errico, AIA
2008 AIA Alaska President

P.O. Box 103563
Anchorage, Alaska 99510-3563
907-276-2834

AO 2008-93

**Content ID:** 006615

**Type:** Ordinance - AO

**Title:** AN ORDINANCE AMENDING ANCHORAGE MUNICIPAL CODE CHAPTER 23.05 REQUIRING CONSTRUCTION AND RENOVATION OF MUNICIPAL PUBLIC FACILITIES TO MEET A SUSTAINABLE BUILDING STANDARD AND PROVIDING INCENTIVES FOR PUBLIC AND PRIVATELY DEVELOPED FACILITIES.

**Author:** maglaquijp

**Initiating Dept:** ECD

**Select Routing:** Standard

**Review Depts:** Dev_Svs, Legal

**Date Prepared:** 7/22/08 1:10 PM

**Assembly Meeting Date:** 7/29/08

**Public Hearing Date:** 8/12/08

| Workflow Name | Action Date | Action | User | Security Group | Content ID |
|---|---|---|---|---|---|
| Clerk_Admin_SubWorkflow | 7/25/08 10:22 AM | Exit | Heather Handyside | Public | 006615 |
| MuniMgrCoord_SubWorkflow | 7/25/08 10:22 AM | Approve | Heather Handyside | Public | 006615 |
| MuniManager_SubWorkflow | 7/25/08 10:03 AM | Approve | Michael Abbott | Public | 006615 |
| MuniManager_SubWorkflow | 7/24/08 3:29 PM | Checkin | Joy Maglaqui | Public | 006615 |
| Legal_SubWorkflow | 7/24/08 3:01 PM | Approve | Rhonda Westover | Public | 006615 |
| OMB_SubWorkflow | 7/24/08 2:35 PM | Approve | Wanda Phillips | Public | 006615 |
| Dev_Svs_SubWorkflow | 7/22/08 1:50 PM | Approve | Ron Thompson | Public | 006615 |
| ECD_SubWorkflow | 7/22/08 1:39 PM | Approve | Jennifer Allen | Public | 006615 |
| AllOrdinanceWorkflow | 7/22/08 1:17 PM | Checkin | Jennifer Allen | Public | 006615 |

Addendum — CONSENT AGENDA - **INTRODUCTION**