Robert E. Beach Architects, LLC

www.rebarchitects.com

Demystifying LEED for Existing Buildings: Operations & Maintenance

(LEED EB: O&M)

Presented by Robert E. Beach, AIA, LEED AP

LEED EB O&M

Why Build Green?

Environmental Impact of Buildings*

Buildings in the U.S. alone account for:

- **72% of electricity consumption**
- **39% of energy use**
- **38% of carbon dioxide emissions**
- **40% of all raw material use (3 billion tons annually)**
- **30% of waste output (136 million tons) (approx. 2.8 lbs/person/day)**
- **14% of potable water consumption**

* ***Commercial and Residential***

LEED EB O&M

Why Build Green?

Environmental Impact of Buildings*

Cleaning Buildings in the U.S. alone requires:

- **5 billion** pounds of chemicals
- **4.5 billion** pounds of paper
- **36 billion** plastic trash liners
- **20 million** vacuum cleaners

Americans spend as much as 90% of time indoors

* ***Commercial and Residential***

LEED EB O&M

Why Build Green?

Green building has become an environmental and regulatory imperative in many places – it is a risk and an opportunity.

- As of March 2007, 53 cities offer incentives or set requirements for green buildings.
- In 2006, Washington DC signed the “Green Building Act of 2006,” that requires green building design in most new or renovated commercial buildings.

LEED EB O&M

What is LEED?

LEADERSHIP
in
ENERGY and
ENVIRONMENTAL
DESIGN

U.S. Green Building Council

LEED EB O&M

What is LEED?

U.S. Green Building Council (USGBC)

- National coalition representing all sectors of the building industry (founded in 1993).
- Promotes design, construction, operation of environmentally responsible, profitable, & healthy places to live and work.
- Launched LEED in 2000 – Rating system to guide sustainable projects.

LEED EB O&M

What is LEED?

LEED is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most:

- Energy savings
- Water efficiency
- CO2 emissions reduction
- Improved indoor environmental quality
- Stewardship of resources and sensitivity to their impacts.

The information in this presentation addresses LEED version 3.0.

LEED EB O&M

What is LEED?

LEED is Consensus-based.

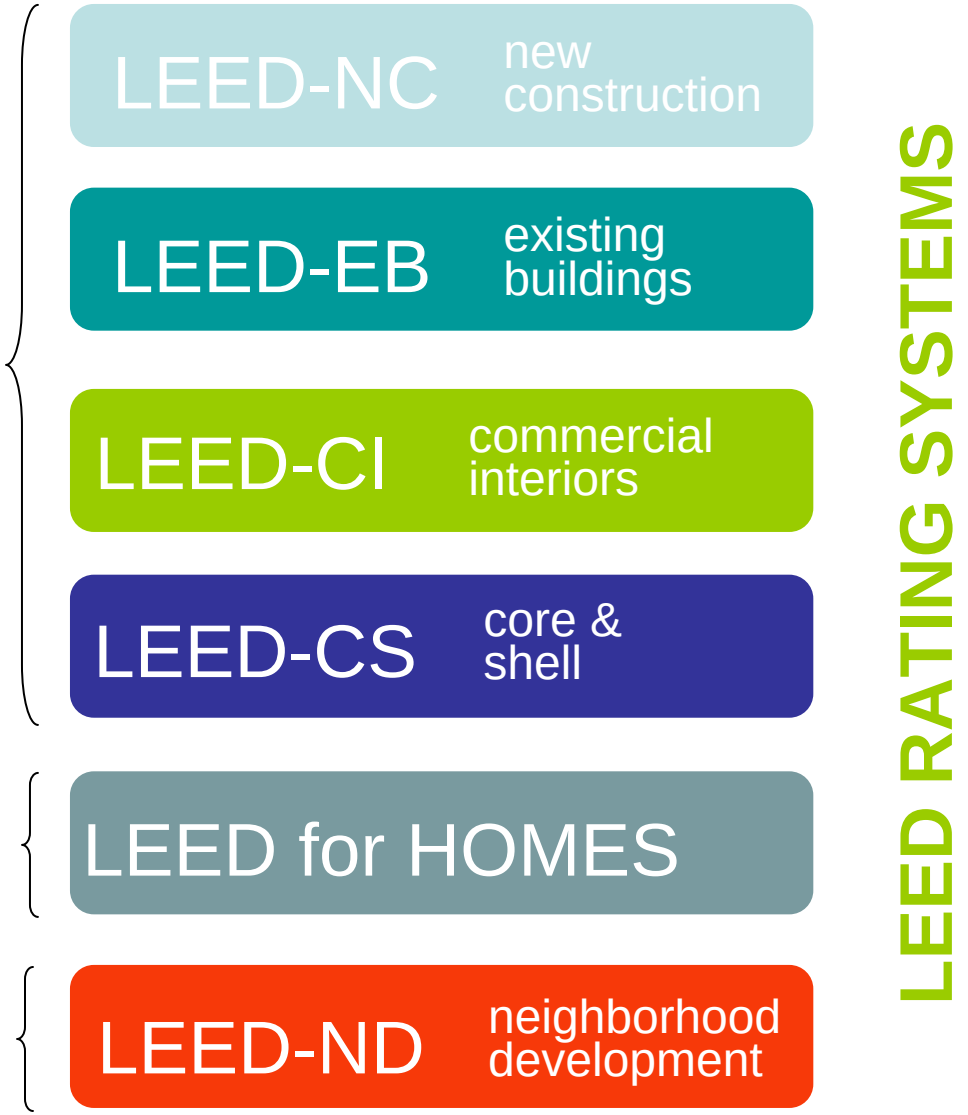
LEED EB O&M

What is LEED?

Commercial Buildings

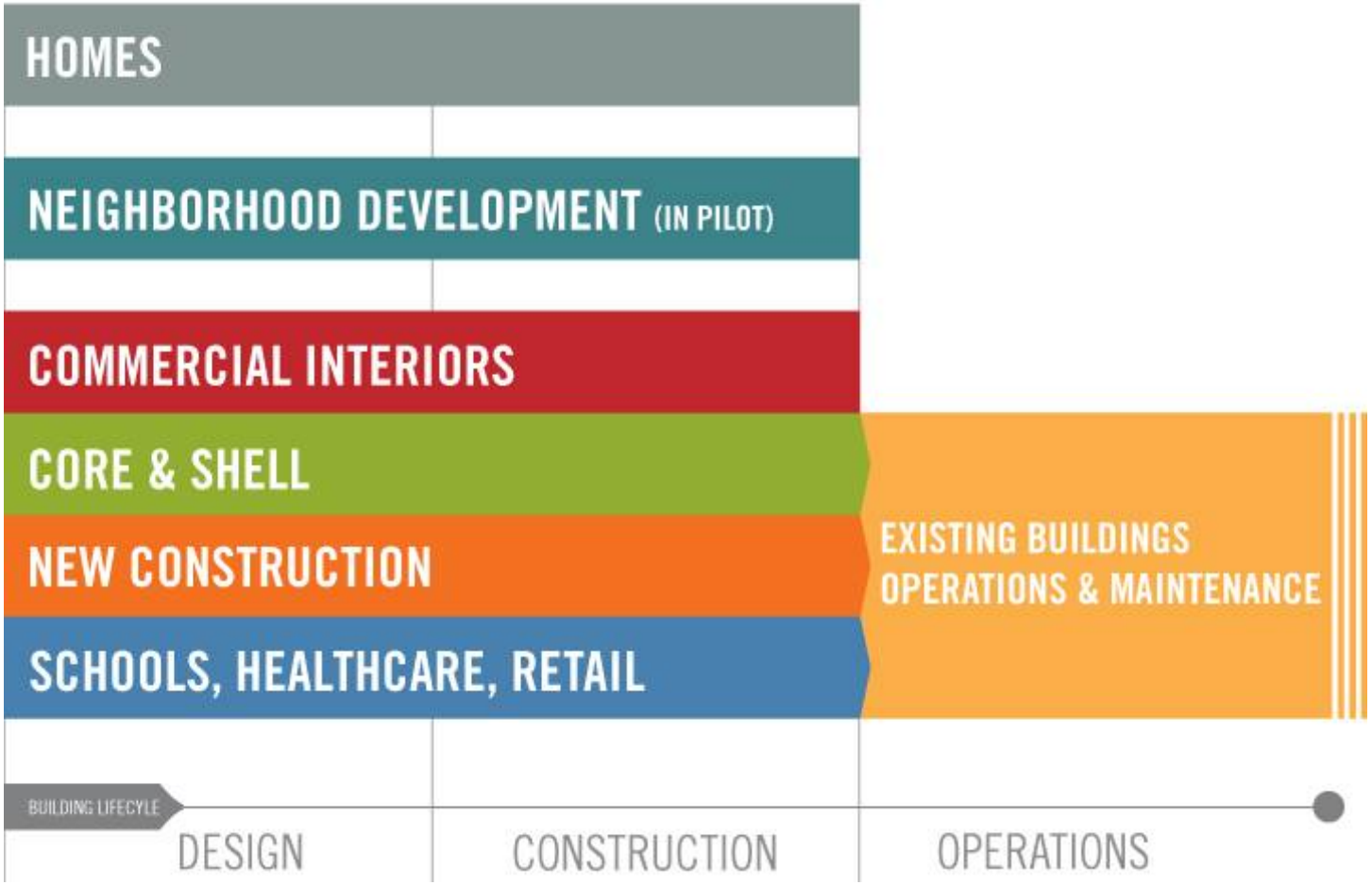
Low-rise Housing

Mixed-Use Developments



LEED EB O&M

LEED Addresses the complete life-cycle of buildings.



LEED EB O&M

Common Misconceptions

- There is no “s” in LEED.
- Only buildings can become “LEED Certified”
- Only people can become “LEED Accredited.”
- No products or companies can become “LEED Certified”
- Organizations can become members of the national USGBC organization.
- Individuals can become members of USGBC chapters.

LEED EB O&M

LEED Accredited Professional™

What is a LEED Accredited Professional™?

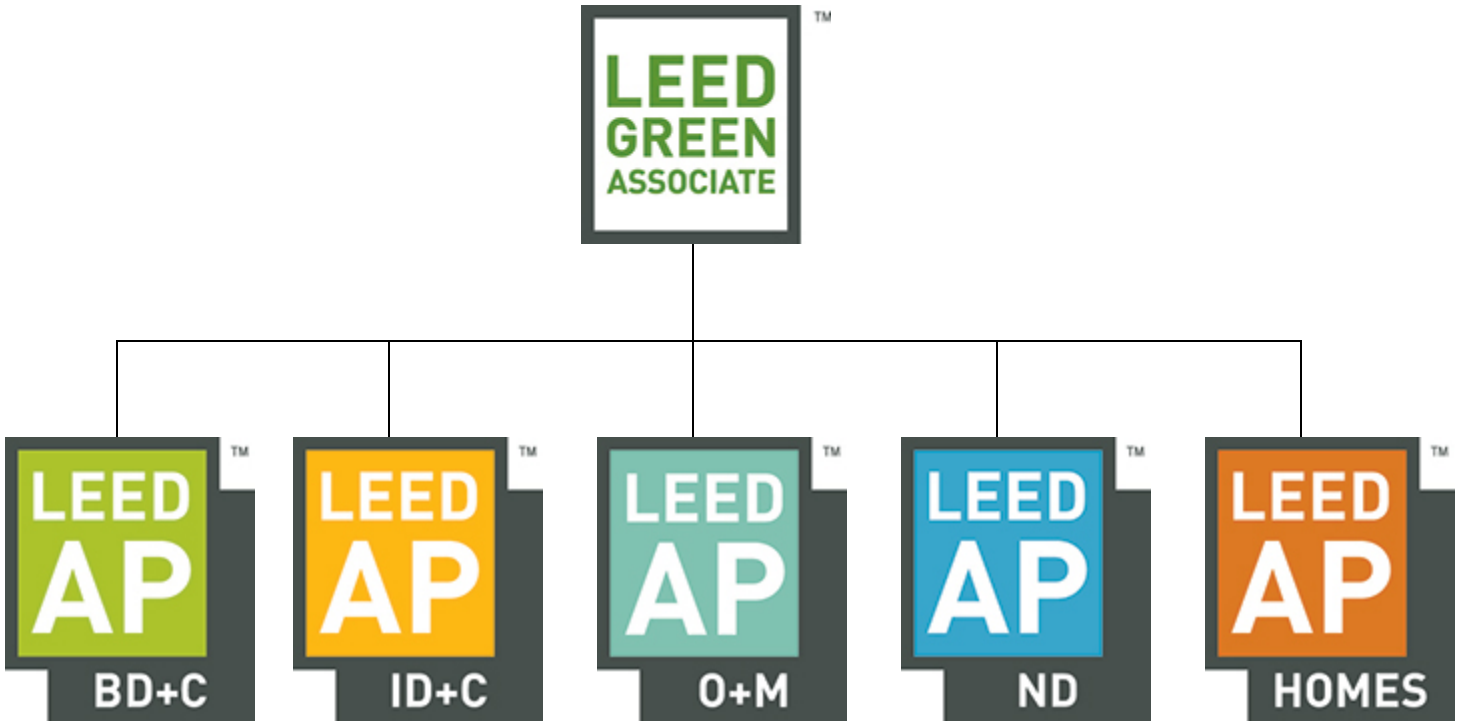
LEED Accredited Professionals (LEED APs) are experienced building industry practitioners who have demonstrated their knowledge and capacity to facilitate the LEED certification process by completing an exam. The exam tests an individual's understanding of green building practices and principles, and familiarity with LEED requirements, resources, and processes.

For more information visit the Green Building Certification Institute at www.gbci.org.

LEED EB O&M

LEED Accredited Professional™

Tiered Accreditation



Specializations

LEED EB O&M

Why use the LEED Rating System?

LEED Certification distinguishes building projects that have demonstrated a commitment to sustainability by meeting certain high performance standards.

- A defined program to evaluate the sustainability of a project.
- Allows design team to set targets and goals.
- Provides a defined vocabulary.
- Promotes an integrated design approach.
- Can be used as a road map and checklist.

LEED EB O&M

Why use the LEED Rating System?

1983 Greenhouse Addition Vienna, Virginia

- Promotes designing to reduce the negative environmental impact of construction, increase building performance, and benefit the health and comfort of building inhabitants.

The goals of going "green":

- Conservation of resources.
- Reduce our impact on the environment.
- Create more efficient buildings.
- Benefit the health of building occupants.
- Reduce building operating costs.
- Focus on quality and durability.

LEED EB O&M

Benefits of the LEED system.

Improved customer satisfaction

Market differentiation

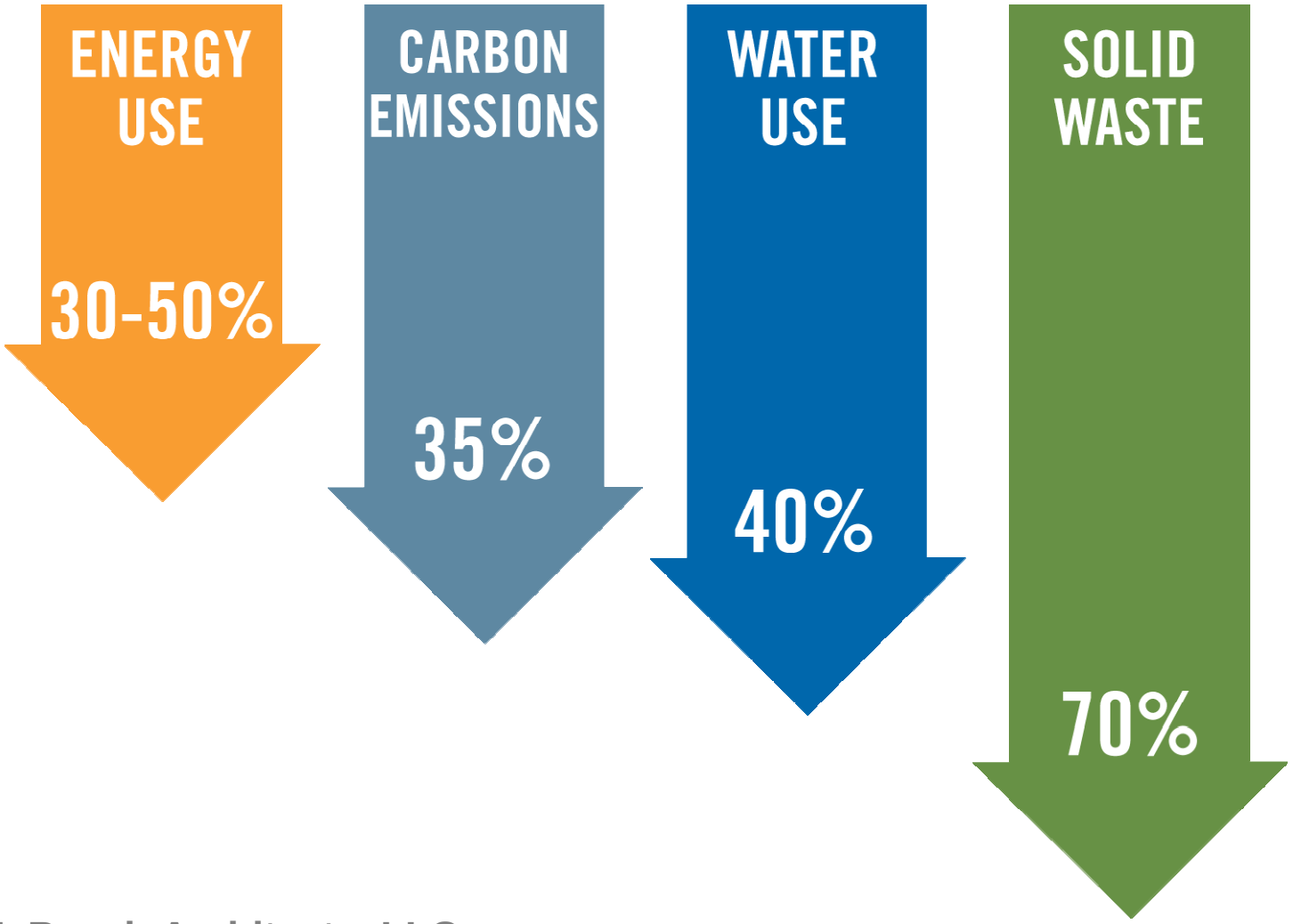
Increased value

Reduced risks

Higher profits

LEED EB O&M

Average Savings of Green Buildings



Benefits of LEED and Sustainable Design

Economic Benefits

- Competitive first costs.
- Integrated design allows high benefit at low cost by achieving synergies between disciplines and between technologies.
- Reduce operating costs.
- Significantly lower utility costs.
- Optimize life-cycle economic performance.

LEED EB O&M

Benefits of LEED and Sustainable Design

According to the 2008 study, "*Does Green Pay Off?*," sustainable green buildings impact an investor's bottom line.*

Higher rental rates*
ENERGY STAR labeled buildings' rental rates were $2.40 more per square foot
LEED certified buildings commanded rent premiums of $11.33 per square foot

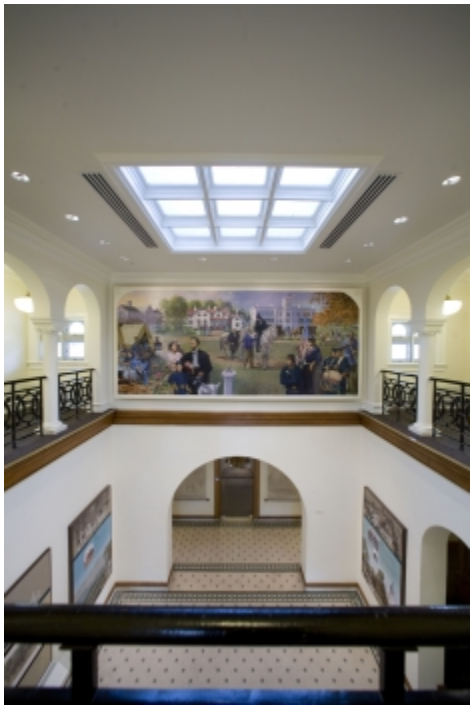
Higher occupancy rates*
ENERGY STAR buildings have had higher occupancy by 3.6%
LEED certified buildings have had 4.1% higher occupancy

Higher sales prices*
ENERGY STAR buildings sold for an average of $61 more per square foot
LEED certified buildings commanded $171 more per square foot

*From the 2008 study *Does Green Pay Off?*
by Norm Miller, Jay Spivey and Andy Florance

LEED EB O&M

Benefits of LEED and Sustainable Design



Lincoln Cottage – LEED NC – Gold

National Trust for Historic Preservation

RMJM Hillier

High-performance buildings incorporate technology and construction methods to improve the quality of space while reducing the impact on the environment.

Green buildings are more profitable

- Often cost no more to construct than standard buildings.
- Reduced operational costs equal increased profitability.

Green buildings are healthier

- Alternative materials have fewer toxins.
- Superior ventilation provides cleaner air.

Green buildings improve the environment

- Require fewer resources in construction.
- Consume less energy and water.
- Generate less greenhouse gas emissions.
- Less waste generated during construction.

LEED EB O&M

Benefits of LEED and Sustainable Design

Financial Drivers

- Leads to significant savings in energy and natural resource costs.
- Generates higher occupancy rates, higher rental rates, increases in overall building value, and increases in return on investment.

Non-Financial Drivers

- Increases workforce productivity.
- Attracts and retains quality workforce, interests customers.
- Creates competitive advantage by reducing carbon footprint.
- Mitigates risk caused by fluctuating energy prices.

Regulatory Drivers

- 53 cities offer incentives or set requirements for green building design.
- 11 federal agencies, 17 states, and 10 counties have passed green building requirements.

LEED EB O&M

Benefits of LEED and Sustainable Design

Productivity Benefits

- Improve occupant performance
- Estimated $29 –168 billion in national productivity losses per year.
- Student performance is better in daylit schools.

Reduce absenteeism and turnover

- Providing a healthy workplace improves employee satisfaction.
- Increase retail sales with daylighting.

Studies have shown ~40% improvement

LEED EB O&M

LEED for Existing Buildings:

Operations and Maintenance

Bank of America Tower

LEED Platinum

Architect: Cook + Fox Architects

LEED EB O&M

LEED for Existing Buildings: Operations & Maintenance

LEED for Existing Buildings (EB) – Launched in November 2004 as a set of performance standards for the sustainable operation of existing buildings.

LEED for Existing Buildings: Operations and Maintenance is targeted towards owners and operators and is applicable to building operations, processes, systems upgrades, and minor space use changes.

CCI Center – Pittsburg PA – LEED EB - Gold

Conservation Consultants, Inc.

LEED EB O&M

LEED for Existing Buildings: Operations & Maintenance

EcoDorm Warren Wilson College – LEED EB Platinum

Samsel Architects, P.A

LEED for Existing Buildings addresses whole-building cleaning and maintenance issues (including chemical use), recycling programs, exterior maintenance programs, and systems upgrades.

For existing buildings seeking LEED certification for the first time and to projects previously certified under LEED for New Construction, Schools, or Core & Shell.

LEED EB O&M

Who can use LEED for Existing Buildings – O&M?

- Existing commercial & institutional buildings
- Previously LEED certified or at least 2 yrs old.
- Building systems operating normally for 1 year.
- Offices, Retail, Service Establishments.
- Libraries, Schools, Museums, Churches, etc.
- Hotels and Residential with 4 or more stories.

A major renovation, alteration, or retrofit exceeds 50% of the existing square footage of the building, then LEED EB O&M should not be used. ***LEED NC at this point becomes more appropriate*****.**

LEED EB O&M

Who can use LEED for Existing Buildings – O&M?

- All buildings certified under LEED for Existing Buildings: Operation and Maintenance must be recertified.
- Buildings can be recertified as frequently as 1 year but must recertify at least once every 5 years.

Third Creek Elementary – Statesville, NC – LEED NC - Gold

Mosely Architects

LEED EB O&M

Certification Requirements

Minimum Program Requirements

- Building must be occupied for at least 12 months with 75% occupancy rate or greater per industry standards for building type
- 90%+ of the building SF must be included in LEED Certification (Up to 10% SF exclusion allowed but only for areas with separate use/management practices)
- Must meet all regulatory requirements for hazardous material management (PCB/Asbestos/Mercury in lamps) & waste water discharge
- Min. 3 month performance period required for all credits pursued (One year minimum for Energy)

LEED EB O&M

Certification Requirements

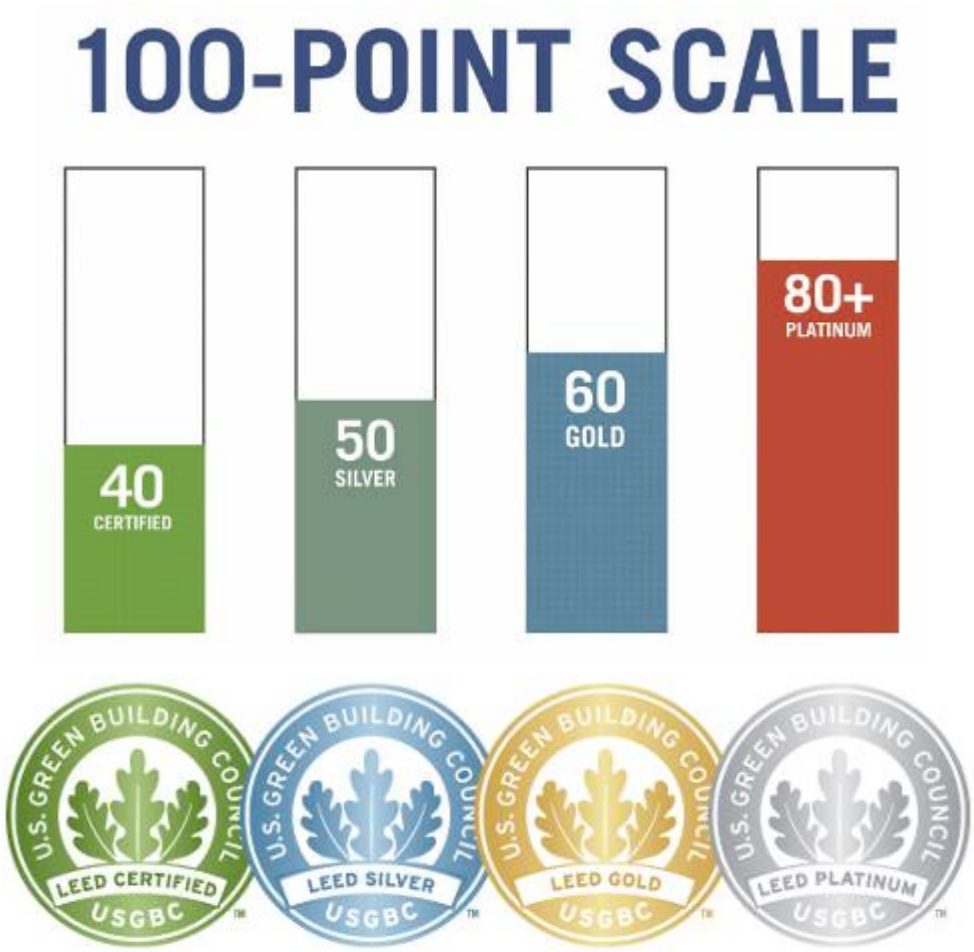
Minimum Program Requirements

- Must comply with Environmental Laws
- Must be a complete permanent building or space.
- Must use a reasonable site boundary.
- Must comply with minimum floor area requirements.
- Must comply with minimum occupancy rates.
- Must commit to sharing whole-building energy & water usage data.
- Must comply with a minimum building area to site ratio.
- Must fulfill the required prerequisites in each credit category.

LEED EB O&M

Certification Levels

- **Certified 40**
- **Silver 50**
- **Gold 60**
- **Platinum 80**
- **Maximum 100**



LEED EB O&M

Certification Requirements

Scores are tallied among five credit categories:

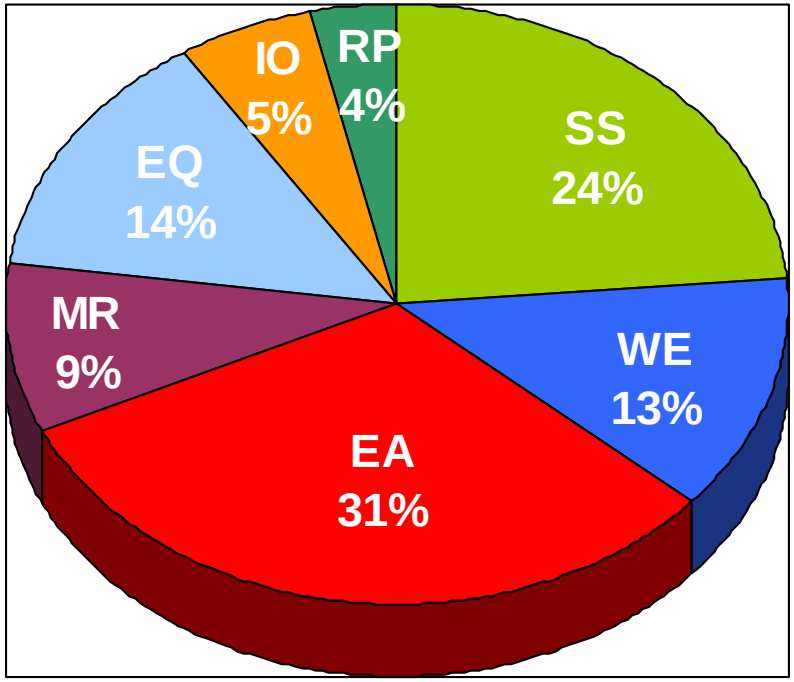
1. Sustainable Sites –SS –	26 points
2. Water Efficiency – WE –	14 points
3. Energy & Atmosphere –EA –	35 points
4. Material & Resources – MR-	10 points
5. Indoor Environmental Quality – EQ –	15 points
TOTAL -	100 points

Additional credits can be earned through:

Innovation in Operation and Upgrades - IO	6 points
Regional Priority considerations – RP	4 points

LEED EB O&M

Certification Requirements



Point Distribution

The largest amount of points are available in areas with the greatest environmental impact and human benefit.

LEED for Existing Buildings: Operations and Maintenance

Credit Categories

LEED EB O&M

Credit Categories

1. Sustainable Sites (SS) – 26 Points

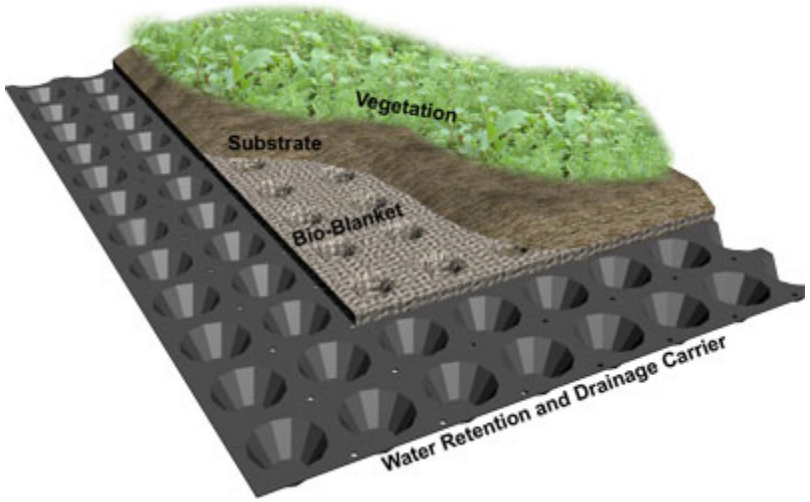
Goals:

- Protect and/or restore site.
- Reuse existing buildings and/or site.
- Protect natural and agricultural areas.
- Reduce need for automobiles.

LEED EB O&M

Credit Categories

1. Sustainable Sites (SS)



Strategies:

- Alternative commuting methods.
- Heat island reduction.
- Light pollution reduction.
- Stormwater management.

Credit Categories

2. Water Efficiency (WE) – 14 Points

Goals:

- Reduce potable water use.
- Reduce municipal water supply and treatment.

Credit Categories

2. Water Efficiency (WE)

Strategies:

- Installing high efficiency fixtures and fittings.
- Water efficient landscaping.
- Water performance measurement.

Credit Categories

3. Energy & Atmosphere (EA) – 35 Points

Goals:

- Optimize energy & system performance.
- Encourage renewable & alternative energy sources.
- Support ozone protection protocols.

LEED EB O&M

Credit Categories

3. Energy & Atmosphere (EA)

Strategies:

- Building commissioning.
- Refrigerant management.
- Renewable energy systems.
- Performance measurement. Building commissioning.
- Refrigerant management.
- Renewable energy systems.

Credit Categories

4. Materials and Resources (MR) – 10 Points

Goals:

- Reduce the amount of materials needed.
- Use materials with less environmental impact.
- Reduce & manage waste.

LEED EB O&M

Credit Categories

4. Materials and Resources (MR)

Strategies:

- Sustainable purchasing.
- Solid waste management.

Credit Categories

5. Indoor Environmental Quality (IEQ) – 15 Points

Goals:

- Establish good indoor air quality.
- Eliminate reduce and manage sources of indoor pollutants.
- Ensure thermal comfort and system controllability.
- Provide for occupant connection to the outdoor environment.

LEED EB O&M

Credit Categories

5. Indoor Environmental Quality (IEQ)

Strategies:

- ETS control
- Increased ventilation rates.
- Green cleaning.
- Occupant comfort controls.
- Daylighting & views.

Credit Categories

6. Innovation in Operations (IO) - 6 Points

Goals:

- Encourage innovative design strategies and exemplary performance.
- To streamline the application and certification process with the involvement of a LEED Accredited Professional.
- Document the cost impact of sustainable building.

LEED EB O&M

Credit Categories

6. Innovation in Operations (IO)

IFAW Headquarters – LEED NC – Gold

DesignLAB Architects

Strategies:

- Implement actions that substantially exceed an existing LEED 2009 for Existing Buildings: Operations
- & Maintenance performance credit requirement.
- Address actions not addressed in LEED 2009 for Existing Buildings: Operations & Maintenance that provide substantial added environmental benefits.

Credit Categories

7. Regional Priority (RP) – 4 Points

Goals:

- To provide an incentive for the achievement of credits that address geographically specific environmental priorities.

Credit Categories

7. Regional Priority (RP) – 4 Points

Strategies:

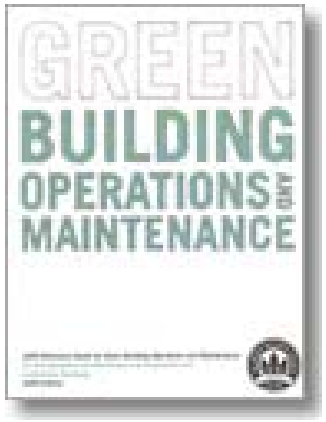
- Identify and satisfy credits that have been recognized by your local USGBC chapter as being of high local priority.
- Refer to the USGBC website for a list of priority credits by ZIP code.

LEED EB O&M

Additional Resources

The LEED 2009 Existing Buildings: Operations and Maintenance Reference Guide.

The credit and prerequisite requirements are available online.



LEED EB O&M

Areas of Concern

Nulhegan Administration Building and Visitor Contact Station – LEED EB Silver

Architect: Oak Point Associates

The typical cost increases associated with sustainable design.

- Quantifiable Costs.
- Record Keeping/Documentation Costs.
- Additional Construction Costs.

LEED EB O&M

The Perception of Added Expenses

Two Potomac Yard – Arlington, VA – LEED Gold

Crescent Resources, LLC

LEED EB Offers Low Cost Options for Achieving Sustainable Performance

LEED EB is a flexible tool that provides guidance for achieving sustainability goals without investing large amounts of capital. Many changes involve improving operating procedures that have little or no cost associated with them. In areas where system or building upgrades are needed, the integrated LEED-EB approach allows high benefits to be achieved at low costs because of synergies between areas of environmental protection and technologies

LEED EB O&M

Sustainable Design Cost Premiums

It has been estimated that the premiums nationally for these ratings are:

- Certified 0%
- Silver 0-12%
- Gold 12-15%
- Platinum 20+%

Points that contribute to these costs are Commissioning, Measurement + Verification, CO2 Monitoring, and contractors unfamiliar with the LEED process.

LEED EB O&M

Executing a LEED Project

All Documentation for submission is assembled online and verified and submitted by the LEED Project Administrator.

LEED-Online provides a central location for all involved parties to document the credits for which they are responsible.

The LEED System encourages an integrated approach to design.

LEED EB O&M

Executing a LEED Project

Typical Credit Responsibilities for Contractors

Materials and Resources – Credit 3

The contractor is responsible for documenting the types and costs of materials purchased for property alterations and additions.

At least 50% of total construction materials purchased (by cost) must meet the sustainable purchasing requirements to qualify for this credit.

- Purchases contain at least 10% postconsumer and/or 20% postindustrial material.
- Purchases contain at least 70% material salvaged from on-site, through an internal organization materials and equipment reuse program.
- Purchases contain at least 50% rapidly renewable material.
- Purchases contain at least 50% Forest Stewardship Council certified wood.
- Etc.

Executing a LEED Project

Typical Credit Responsibilities for Contractors

Materials and Resources – Credit 9

The contractor is responsible for documenting the volume, destination or hauler, types of materials, and diversion method for waste recycled or reused as well as the total amount of waste generated.

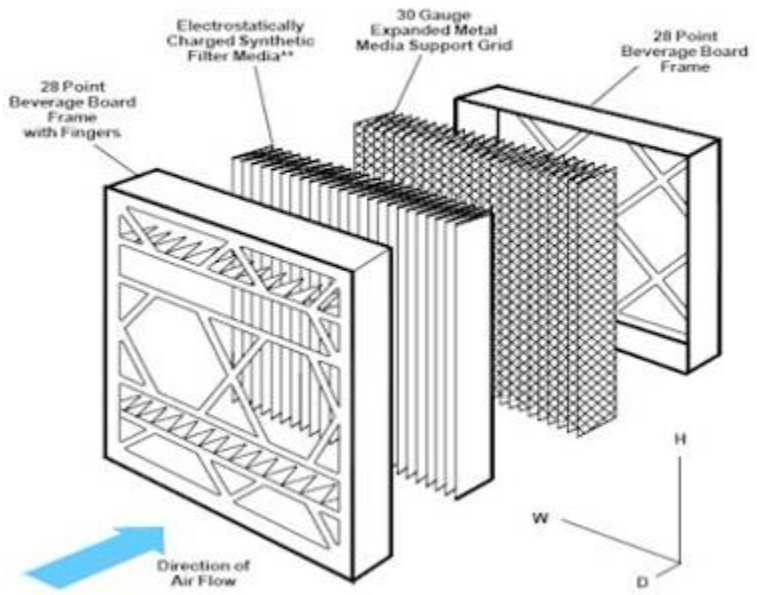
To meet the requirement of this credit, at least 70% of construction waste (by volume) must be diverted from landfills.

LEED EB O&M

Executing a LEED Project

Typical Credit Responsibilities for Contractors

Indoor Environmental Quality – Credit 1.5



The contractor may be responsible for documenting the methods used to maintain air quality during the course of construction.

This could include:

- Filtration media used during construction (if HVAC is in use.)
- Documentation and narrative of approach used to maintain air quality and building flush-out.

LEED EB O&M

Conclusions

- A project manager can use LEED as a tool for better quality projects.
- LEED helps to establish goals and provides a framework for the involvement of the design team and other key stakeholders.
- A great opportunity to building users about green design strategies and techniques.
- The result is a project with clear vision and enhanced teamwork, and one that can incorporate measurements of success for future projects.

LEED EB O&M

Questions?

Robert E. Beach Architects, LLC

Services:

- Site Analysis
- Feasibility and Facility Studies
- Development and Redevelopment Planning
- Sustainable Design
- Building Planning and Cost Evaluation
- Architectural Programming and Design
- Interior Design and Space Planning
- Schematic Design
- Construction/Contract Documents
- ADA Consulting
- Bidding and Negotiation
- Construction Administration
- Post Construction Reports