DO GREEN BUILDINGS Make Dollars & Sense?

An analysis of operating costs, worker productivity and the benefits of LEED® certification in a commercial office portfolio

Green Building Study
ver. 2.0

Burnham-Moores
CENTER FOR REAL ESTATE
UNIVERSITY OF SAN DIEGO

CBRE
CB RICHARD ELLIS

McGraw Hill
CONSTRUCTION
Moderator

David L. Pogue, LEED® AP®
National Director, Sustainability
CB Richard Ellis, Inc.

Presenters

Charles C. Tu, Ph.D.
Mulvihill Professor of Commercial Real Estate
Burnham-Moores Center for Real Estate
University of San Diego

Harvey M. Bernstein, F. ASCE, LEED® AP®
Vice President, Global Thought Leadership & Business Development
McGraw-Hill Construction
The Study

David L. Pogue, LEED AP
CB Richard Ellis
Evidence Is Stacking Up

Doing Well By Doing Good? Green Office Buildings
Eicholtz, Kok and Quigley; Greening of Corporate America SmartMarket Report McGraw-Hill Construction; Do Green Buildings Make Dollars and Sense?
CB Richard Ellis/Burnham-Moores Center for Real Estate (University of San Diego); Pricing Sustainability Fuerst, Franz and Patrick McAllister; Does Green Pay Off?
Miller, Spivey and Florance; Green Design and the Market for Commercial Office Space Wiley, Benefield and Johnson; Urban Green Council Study prepared for the UGC by Davis Langdon; Why Do Companies Rent Green?
Eicholtz, Piet, Kok and Quigley; Socially Responsible Property Investment Ellison, Sayce and Smith; Estimates of Improved Productivity and Health from Better Indoor Environments Fisk and Rosenfeld
Data Points:

Development
USD (2009-10)

Survey Set
CBRE-managed office space

156 Buildings
Nationwide

588 Tenants
of 2,500 surveyed

52,506,624 SF
Rentable Space

Avg. 88
ENERGY STAR
2009:
Tenants in green buildings claim higher productivity levels and fewer sick days.
Separate metering impacts energy savings.
Rental rates higher and occupancy equal to/better than overall market.

2010 Findings
Higher occupancy and rental rates
Postive influence on employees
Interesting insights on LEED!
Insight:
“We must prioritize greening our cities, and cost is not the barrier some have made it out to be.”
Urban Green Council Study (2009)

Powerful Forces

Attitudes + Business Practices

have pushed the green building movement forward
Attitudes & Behavior
Perceptions of Green Space by Tenants and Occupants in a Large CBRE Managed Real Estate Portfolio

Charles Tu, Ph.D.
University of San Diego
Reveal:
Financial and Legal Services comprised 33% of sample
Top 10 industries represent 82% of the total sample

Type of Business

- Financial Svcs: 17%
- Legal Svcs: 16%
- Real Estate: 9%
- Insurance: 9%
- Computer/IT: 8%
- Healthcare: 7%
- Consulting: 5%
- Non-Profit: 4%
- Energy: 4%
- Engineering: 4%

1/3 of all businesses
Reveal:

Majority of respondents are private firms.

Breakdown of 2010 and 2009 samples are very similar.

Type of Organization

- Privately Held, 68%
- Publicly Traded, 25%
- Non-Profit, 7%
Number of Employees

- 1-5, 24%
- 6-10, 19%
- 11-25, 20%
- 26-100, 25%
- 100+, 12%

Survey sample is evenly distributed in terms of company size.
Reveal:

At time of survey:

- Approx. 1/2 of respondents in LEED buildings
- 10% undergoing LEED certification process

LEED® Certification

- Yes, 52%
- Underway, 10%
- No, 38%
Reveal:
38% of survey sample have staff dedicated to environmental and/or sustainable issues.
29% of survey sample organize a Green Team to implement sustainable office practices.
Approx. 1/3 of respondents have a formal written policy on sustainable goals that is shared with employees.
Reveal:

About 3/4 of those with a written policy also share it with clients.

Overall, more than 1/2 of survey respondents have implemented sustainable practices.

Policy Shared with Clients

- Yes, 73%
- No, 27%
Reveal:

More respondents in LEED buildings have implemented sustainable practices, however…

Difference is not statistically significant
**Reveal:**

Significant difference across type of organization in terms of sustainable practices.

Nearly 80% of publicly traded firms have implemented sustainable practices.
Reveal:

The firm’s size has a significant impact on implementing certain sustainable practices.

Size of Firm

<table>
<thead>
<tr>
<th>Size Range</th>
<th>Dedicated Staff</th>
<th>Green Team</th>
<th>Written Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>34%</td>
<td>21%</td>
<td>24%</td>
</tr>
<tr>
<td>6-10</td>
<td>33%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>11-25</td>
<td>39%</td>
<td>35%</td>
<td>26%</td>
</tr>
<tr>
<td>26-100</td>
<td>45%</td>
<td>44%</td>
<td>45%</td>
</tr>
<tr>
<td>100+</td>
<td>41%</td>
<td>41%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Charles Tu, Ph.D.
Survey respondents consider green features important when selecting office space.

On a scale of 1-5, average rating is 3.71.

Healthy indoor environment is the No. 1 factor.

### Importance of Factors

1. **Healthy indoor environment**: 4.51
2. **Daylight & view in the office**: 4.19
3. **Recycling program**: 3.86
4. **Lighting controls to conserve electricity**: 3.77
5. **Practices & fixtures to conserve energy**: 3.74
6. **Access to alternative transportation**: 3.71
7. **Management’s commitment to sustainability**: 3.64
8. **Practices & fixtures to conserve water**: 3.58
9. **Green cleaning practices & products**: 3.46
10. **Preferred parking for hybrid vehicles**: 2.64
Attitudes toward green features not affected by LEED status of building
Attitude is significantly influenced by type of organization. Non-profit and public firms consider green features more important.
Firm size also has quite significant effect on the attitude.
Reveal:
Over 60% agree that green office space is important for current employees.

Current Employees

- Agree, 46%
- Strongly Agree, 15%
- Neutral, 33%
- Disagree, 2%
- Strongly Disagree, 2%
34% agree that green office space is important to recruiting.
60% agree that green space creates a favorable impression on firm’s clients and customers.
Reveal:
Majority of respondents agree that green space creates a positive public image for firm’s owners or shareholders.

Public Image

- Agree, 42%
- Neutral, 31%
- Disagree, 3%
- Strongly Agree, 20%
- Strongly Disagree, 2%
Reveal:

Respondents in LEED buildings:
green space important for current employees and public image

Respondents in non-LEED buildings:
green space more important for clients and customers

In all aspects, respondents in LEED buildings felt more strongly
**Reveal:**

**Publicly traded:**
green space important, especially for public image

**Non-profit:**
green space more important for employees

**Sweet Spot:**
Larger publically traded firm in a LEED building

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**Type of Organization**

<table>
<thead>
<tr>
<th>Type of Organization</th>
<th>Current Employees</th>
<th>Prospective Employees</th>
<th>Clients &amp; Customers</th>
<th>Public Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publicly Traded</td>
<td>3.92</td>
<td>3.39</td>
<td>3.91</td>
<td>3.97</td>
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<tr>
<td>Privately Held</td>
<td>3.60</td>
<td>3.17</td>
<td>3.60</td>
<td>3.59</td>
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<tr>
<td>Non-Profit</td>
<td>3.81</td>
<td>3.23</td>
<td>3.65</td>
<td>3.55</td>
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</tbody>
</table>
Reveal:

Larger firms: green space more important

Size of Firm

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<th>Prospective Employees</th>
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<tr>
<td>1-5</td>
<td>3.59</td>
<td>3.14</td>
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<td>3.45</td>
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<td>6-10</td>
<td>3.66</td>
<td>3.24</td>
<td>3.59</td>
<td>3.56</td>
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<td>11-25</td>
<td>3.69</td>
<td>3.33</td>
<td>3.72</td>
<td>3.54</td>
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<td>26-100</td>
<td>3.82</td>
<td>3.38</td>
<td>3.82</td>
<td>3.68</td>
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<tr>
<td>100+</td>
<td>3.78</td>
<td>3.38</td>
<td>3.89</td>
<td>3.72</td>
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</tbody>
</table>

Charles Tu, Ph.D.
Green buildings demonstrate higher occupancy levels than the general market.

**Average Occupancy**

- **Survey Set**: 85.07%
- **Non LEED**: 86.17%
- **LEED**: 84.04%
- **Market**: 82.27%

**Higher Occupancy (Q1-3)**

- **Survey Set**: 3.4%
- **Non LEED**: 4.74%
- **LEED**: 2.15%

Higher occupancy on the bottom line...
Average Rental Rates

- **Survey Set**: $27.62
- **Non-LEED**: $25.91
- **LEED**: $29.23
- **Market**: $27.22

**Higher Rental Rates on Average (Q1-3)**

- **LEED**: 7.38%
- **Market**: 1.46%
- **Non-LEED**: -4.81%

Reveal:
Green buildings demonstrate higher rental rates than the general market.

Upshot:
on the bottom line…

David L. Pogue
Business Practices

Key Factors Driving Green Growth for Owners, Building Managers & Occupants

Harvey Bernstein
F.ASCE, LEED AP
McGraw-Hill Construction
Objective:
Understand Business and Human Factor Benefits as a Key Driver to Green

Agenda
- Owners Involved in LEED Commercial Buildings
- Building Manager Perspectives on LEED Commercial Buildings
- Occupants Experiences Working in Green Office Buildings
- Green Building Trends
Owners Involved in LEED Commercial Buildings
Commercial Building Owners Expect Increased Green Building Activity in 3 Years

- More than 90% of buildings: 31%
- 61%-90% of buildings: 8%
- 31%-60% of buildings: 23%
- 16%-30% of buildings: 15%
- 1%-15% of buildings: 23%

39% of buildings expect to do green at higher levels than in 2010.

46% expect to do green at higher levels than in 2010.

2010

- More than 90% of buildings: 31%
- 61%-90% of buildings: 8%
- 31%-60% of buildings: 23%
- 16%-30% of buildings: 15%
- 1%-15% of buildings: 23%

2013

- More than 90% of buildings: 31%
- 61%-90% of buildings: 15%
- 31%-60% of buildings: 15%
- 16%-30% of buildings: 31%
- 1%-15% of buildings: 8%
All Owners Expect to Pursue LEED Certification on Other Existing Buildings

- LEED-EBO&M Certified: 100%
- EnergyStar Labeled: 83%
- LEED-NC Certified: 33%
- LEED - Other Certification: 8%
Owners Expected Benefits from Green Buildings

- Decreased Operating Costs: 93%
- Attracting New Tenants: 79%
- Increased Building Return on Investment (ROI): 71%
- Higher Tenant/Customer Retention and Renewal: 64%
- Increased Building/Asset Value: 64%
- Greater Productivity of Building Occupants: 36%
- Increased Tax Incentives: 39%

2009 Corporate America executives (MHC/Siemens)
2010 Commercial Building Owners (CBRE/MHC/USD)
Benefits Being Tracked by Owners

Corporate America (2009)
- Yes: 14%
- No: 86%

Owners (2010)
- Yes: 43%
- No: 57%

Benefits Tracked

- Retention/ Turnover: 66%
- Customer Loyalty: 59%
- Health Care Claims: 62%
- Worker Productivity: 48%

- Customer Related: 66% + 59% = 125%
- Staff Related: 62% + 48% = 110%

2010 Commercial Building Owners (CBRE/MHC/USD)
Corporate America executives in 2009 (MHC/Siemens)
Owners Believe Green Can Be Achieved Affordably with Low-Cost Features

- Strongly Agree: 36%
- Agree: 43%
- Neutral: 14%
- Disagree: 7%

79% of owners strongly agree or agree that green can be achieved affordably with low-cost features.
Owners Driven Most by Holistic Business Benefits

 governo not seen as a big driver

- Reduction in energy needs for the building: 79%
- Competitive advantage from offering 'green' features: 72%
- Overall savings in operating expenses: 65%
- Overall increase in energy prices: 50%
More than half do not see ANY major obstacle to doing green building.

- **High initial investment**: 43%
- **Tenant unwillingness to pay**: 28%
- **Difficulty in measuring ROI and benefits**: 28%
- **Difficulty maintaining green features**: 14%
- **Lack of green products and services**: 14%
Business Benefits Expected Across the Industry by Business Owners

Lower ROI expected in 2010 vs. 2009 study

→ 2009: Some Class B upgrades to Class A

→ 2010: Class A only

14% of tenants firms would pay 2%–3% more for green

- Decreased Operating Costs: 8.5% → 2009
- Increased Building Values: 6.8% → 2009
- Improvement in ROI: 19.2% → 2009
- Increased Occupancy: 2.5% → 2009
- Rent Rise 1.0% → 2009

2010 CBRE/MHC/USD survey

- Decreased Operating Costs: 8.0% → 2010
- Increased Building Values: 4.8% → 2010
- Improvement in ROI: 4.1% → 2010
- Increased Occupancy: 5.3% → 2010
- Rent Rise 1.0% → 2010


Note: Surveys include similar populations of commercial building owners.
What Have We Learned from the Owner Data?

- Owners consistently report increases in ROI, occupancy and rent premiums from green building.
- Owners are motivated by profit measures—not just operational cost savings.
- Tools that help owners measure and benchmark business and human benefits would be extremely valuable and marketable.
- An Owner who invests in green building is committed to doing so in the future—so target LEED/green building owners for products and services.
Building Manager Perspectives on LEED Commercial Buildings
Agents Influencing Building Manager Green Decisions

- Building Owner: 96% total, 9% influential, 87% very influential
- Management Company (e.g., CBRE): 85% total, 26% influential, 59% very influential
- LEED-EB Consultant: 72% total, 37% influential, 35% very influential
- Tenant Demand: 50% total, 37% influential, 13% very influential
- Public Pressure: 17% total, 15% influential, 2% very influential
Building Manager Driven by Cost Savings

Triggers to Investment in Green

- Government not seen as a big driver

- Overall savings in operating expenses: 94% (Owners: 65%)
- Overall increase in energy prices: 89% (Owners: 50%)
- Reduction in energy needs for the building: 89% (Owners: 79%)
- Competitive advantage from offering 'green' features: 81% (Owners: 72%)
Building Managers See Higher Tenant Satisfaction After Green Upgrades

### Before Green Upgrade
- Very Satisfied: 53%
- Somewhat Satisfied: 28%
- Somewhat Unsatisfied: 16%
- Neutral: 3%

### After Green Upgrade
- Very Satisfied: 94%
- Somewhat Satisfied: 7%
- Somewhat Unsatisfied: 3%
- Neutral: 3%

**Current Satisfaction Level**
- Very Satisfied: 91%
- Somewhat Satisfied: 7%
- Somewhat Unsatisfied: 2%
Building Managers Observe Many Green Features Impacting Tenant Satisfaction

<table>
<thead>
<tr>
<th>Products &amp; Practices</th>
<th>Moderate Impact</th>
<th>Great Impact</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Efficiency Plumbing Fixtures</td>
<td>53%</td>
<td>31%</td>
<td>84%</td>
</tr>
<tr>
<td>Green Cleaning Products</td>
<td>59%</td>
<td>25%</td>
<td>84%</td>
</tr>
<tr>
<td>Energy-Efficient Lighting</td>
<td>63%</td>
<td>19%</td>
<td>82%</td>
</tr>
<tr>
<td>Indoor Air Quality Practices</td>
<td>47%</td>
<td>28%</td>
<td>75%</td>
</tr>
<tr>
<td>Energy-Efficient Equipment</td>
<td>53%</td>
<td>22%</td>
<td>75%</td>
</tr>
</tbody>
</table>
Green Products Installed by Building Managers

**Energy**
- Individual Temperature Controls: 76%
- Low-E Window Films: 41%
- White/Cool Roof: 39%
- Replaced Hinged Door with Revolving One: 17%
- Added Insulation: 15%

**Water**
- Low-Flow Toilet: 91%
- Motion-Sensitive Faucets: 67%
- Waterless Urinals: 17%
- Recycled Rain/Waste Water for Toilet Flushing: 7%
## Building Managers Are Including Green O&M Practices in at Least 94% of Buildings

<table>
<thead>
<tr>
<th>Products &amp; Practices</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Non-Toxic/Low VOC Cleaning Supplies</td>
<td>100%</td>
</tr>
<tr>
<td>Recycling Program</td>
<td>98%</td>
</tr>
<tr>
<td>Environmentally Preferable Paper Products</td>
<td>98%</td>
</tr>
<tr>
<td>Restrictive Plumbing Devices</td>
<td>98%</td>
</tr>
<tr>
<td>Building Controls</td>
<td>96%</td>
</tr>
<tr>
<td>Energy Conservation Products</td>
<td>96%</td>
</tr>
<tr>
<td>Energy-Efficient Heating and Cooling Systems</td>
<td>94%</td>
</tr>
<tr>
<td>Waste Audit</td>
<td>94%</td>
</tr>
<tr>
<td>Integrated Pest Management Program</td>
<td>94%</td>
</tr>
<tr>
<td>Use of CFL Lighting</td>
<td>94%</td>
</tr>
</tbody>
</table>
What Have We Learned from the Building Managers Data

- Building managers are most concerned with cost savings
  - Emphasizing energy, water and operational cost savings is extremely critical

- Building managers are focused on selecting and installing green building products and services
  - Particularly for products that improve water and energy efficiency and indoor environmental quality

- More than 1/3 of building managers have installed renewable energy into LEED buildings
  - LEED is encouraging its use

- Tracking green building performance could help encourage higher levels of investment in green building
Occumant Experiences Working in Green Buildings
16% of Building **Occupants** Observe Productivity Increases

In comparison, **10%** of tenant firms expect increase in productivity.

- **16%** More Productive
- **9%** No Change
- **4%** Less Productive
- **71%** Don't Know
Preliminary Findings Suggest Building Occupants Have High Satisfaction Rates

- **After Green Upgrade**
  - Very Satisfied: 15%
  - Satisfied: 39%
  - Somewhat Satisfied: 36%
  - Somewhat Unsatisfied: 15%

- **Current Satisfaction Level**
  - Very Satisfied: 26%
  - Satisfied: 49%
  - Somewhat Satisfied: 18%
  - Somewhat Unsatisfied: 7%

54% are Satisfied
Building **Occupants** of LEED Buildings More Satisfied with Green Features

- **Daylight and Views**: 73% LEED, 62% Non-LEED
- **Access to Public Transportation**: 60% LEED, 42% Non-LEED
- **Healthy Indoor Air Quality**: 57% LEED, 40% Non-LEED
- **Energy Conserving Lighting Controls**: 53% LEED, 44% Non-LEED
- **Comfortable Indoor Temperature**: 52% LEED, 40% Non-LEED
- **Energy-Efficient Practices and Products**: 47% LEED, 35% Non-LEED
Case Study:
McGraw-Hill Higher Education
Dubuque, Iowa; LEED Silver

- 93% more satisfied after move to green building
- 61% more productive
- 55% producing higher quality work
- 12% healthier, fewer sick days
- 74% think LEED certification is important
- Most value the day lighting
- Improved level of employee engagement in corporate activities – 84% now engaged versus 73%
What Have We Learned from the Building Occupants?

- People who work in buildings care about things that affect their health
  - If employers capitalize on this, they can gain large business savings
  - Product and service providers that can prove benefits in this area can increase market share

- People are satisfied by things they notice
  - Managers and owners should communicate and engage people working in their buildings to point out and capitalize on green efforts

- People working in Class A LEED buildings are more satisfied with green products as compared to those in non-LEED buildings
  - Those working in the certification industry should take note
Green Construction Trends
2015 Offers Significant Opportunity for Green Building in New Non-Residential

- $145 billion (48% of market)
- $154 billion (35% of market)
- $182 billion (12% of market)
- $302 billion

New Office Construction Remains Strong Green Market Despite Overall Downturn

**New Office Construction**

- **2008**
  - $27 billion
  - 30% of market
  - $8 billion
    - Office: $8 billion
    - Green Share: $8 billion

- **2010**
  - $15 billion
  - 53% of market
  - $8 billion

Conclusions: Trends Are Emerging in Research Studies

- The green building market – both new and retrofit – is growing dramatically: 35% of new construction in 2010

- Tangible business benefit – such as ROI, occupancy and rent increases – from green are reported – and consistent over time

- Green building occupants are reporting higher productivity and health benefits

- LEED is recognized in the market

- Benchmarking measurement is a challenge, but recognized as critical to show real value

- Energy efficiency in buildings is good business
Contact the presenters...

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