Green Buildings

Evidence for Investors

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Co-Founder, Responsible Property Investment Project
Key Points

1. Use the due diligence process to verify what’s green about green and conventional buildings.

2. It is probably easier to build new green properties or green-up existing ones than to find existing green deals.

3. Despite the hype, the economics debate remains unsettled. But since green buildings can cost the same to build, cost less to run, be favored by tenants, and mitigate certain risks, I expect them to perform financially as well or better than conventional properties.

4. There are real opportunities for “green repositioning” in asset management which will add value, reduce risk and accomplish more than “green acquisitions” for global warming and other societal issues.
Vocabulary

- **Green Building**: any healthy, eco-efficient property
- **Certified Green**: verified as in compliance with voluntary standards established by USGBC, GBI or others
  - Standards
    - LEED: registered, certified, silver, gold, platinum
    - Green Globes: 1, 2, 3, 4 globes
    - Others systems worldwide
  - The systems differences on energy, prerequisites, process
  - **Caveat Emptor**:
    - Certification does not guarantee performance
    - Property attributes can vary within LEED and Green Globe levels
    - A property can be green without being officially certified
- **Energy Star Labeled** (EPA) – 75th percentile in energy use
- **High Performance** (DOE) – energy efficient, healthy, and comfortable
- **Sustainable or Responsible**: strong social, financial, and environmental performance
# Green Globes v.0 vs. LEED 2.2

<table>
<thead>
<tr>
<th>Harmonized Category</th>
<th>Pnts.</th>
<th>%</th>
<th>%1G</th>
<th>%2G</th>
<th>%3G</th>
<th>%4G</th>
<th>Harmonized Category</th>
<th>Pnts.</th>
<th>%</th>
<th>%C</th>
<th>%S</th>
<th>%G</th>
<th>%P</th>
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</thead>
<tbody>
<tr>
<td>Energy use</td>
<td>300</td>
<td>30%</td>
<td>86%</td>
<td>55%</td>
<td>43%</td>
<td>35%</td>
<td>Energy use</td>
<td>15</td>
<td>22%</td>
<td>58%</td>
<td>45%</td>
<td>38%</td>
<td>29%</td>
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<tr>
<td>Water use</td>
<td>75</td>
<td>8%</td>
<td>21%</td>
<td>14%</td>
<td>11%</td>
<td>9%</td>
<td>Water use</td>
<td>4</td>
<td>6%</td>
<td>15%</td>
<td>12%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Pollution (emissions, solid waste, effluents)</td>
<td>100</td>
<td>10%</td>
<td>29%</td>
<td>18%</td>
<td>14%</td>
<td>12%</td>
<td>Pollution (emissions, solid waste, effluents)</td>
<td>6</td>
<td>9%</td>
<td>23%</td>
<td>18%</td>
<td>15%</td>
<td>12%</td>
</tr>
<tr>
<td>Material/Product Inputs</td>
<td>90</td>
<td>9%</td>
<td>26%</td>
<td>16%</td>
<td>13%</td>
<td>11%</td>
<td>Materials</td>
<td>11</td>
<td>16%</td>
<td>42%</td>
<td>33%</td>
<td>28%</td>
<td>21%</td>
</tr>
<tr>
<td>Indoor air quality &amp; occupant comfort</td>
<td>200</td>
<td>20%</td>
<td>57%</td>
<td>36%</td>
<td>29%</td>
<td>24%</td>
<td>Indoor air quality &amp; occupant comfort</td>
<td>14</td>
<td>20%</td>
<td>54%</td>
<td>42%</td>
<td>36%</td>
<td>27%</td>
</tr>
<tr>
<td>Transport</td>
<td>80</td>
<td>8%</td>
<td>23%</td>
<td>15%</td>
<td>11%</td>
<td>9%</td>
<td>Transport</td>
<td>4</td>
<td>6%</td>
<td>15%</td>
<td>12%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Site ecology</td>
<td>115</td>
<td>12%</td>
<td>33%</td>
<td>21%</td>
<td>16%</td>
<td>14%</td>
<td>Site ecology</td>
<td>9</td>
<td>13%</td>
<td>35%</td>
<td>27%</td>
<td>23%</td>
<td>17%</td>
</tr>
<tr>
<td>Other sustainable systems &amp; processes</td>
<td>40</td>
<td>4%</td>
<td>11%</td>
<td>7%</td>
<td>6%</td>
<td>5%</td>
<td>Other sustainable systems &amp; processes</td>
<td>6</td>
<td>9%</td>
<td>23%</td>
<td>18%</td>
<td>15%</td>
<td>12%</td>
</tr>
<tr>
<td>Total Available/Required Points</td>
<td>1000</td>
<td>350</td>
<td>650</td>
<td>700</td>
<td>850</td>
<td></td>
<td>Total Available/Required Points</td>
<td>69</td>
<td>26</td>
<td>33</td>
<td>39</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>

*Percentages refer to the percentage of points required at the respective certification level that could be attained based on the respective category alone.
Recommendation: Use the underwriting process to know what green features you’re getting and check for green attributes that add value

• Key Systems that can Add Value
  – Energy efficient lighting, heating, boilers, a/c
  – Ventilation
  – Daylighting
  – Transit location
  – Water efficient landscaping, cooling towers, toilets and fixtures

• Key Performance Measures
  – Absenteeism, productivity, SBS
  – Energy efficiency
  – Water efficiency
DEAL FLOW PERSPECTIVE
LEED NEW CONSTRUCTION NUMBERS*

LEED-NC: LEED FOR NEW CONSTRUCTION & MAJOR RENOVATIONS (NEW COMMERCIAL CONSTRUCTION, INSTITUTIONAL, AND HIGH RISE RESIDENTIAL).

SQUARE FEET, IN MILLIONS

2002 | 2003 | 2004 | 2005 | 2006 | 2007
---|---|---|---|---|---
0 | 100 | 200 | 300 | 400 | 900

*AS OF JULY 2007; ALL NUMBERS ARE CUMULATIVE
Its not easy finding green

- Non government, tenant occupied buildings > 25,000 feet: 13,000
- LEED certified: 0-300 (2%)
- Energy Star labeled: 0-300 (2%)
- Non government tenant occupied LEED Certified in CA and NY listed on USGBC website: 0

- Recommendation: Consider building new green properties or the “green repositioning” of existing ones.
COST PERSPECTIVE
The expected green premium

Figure 12: Estimates of cost premium for "a certified sustainable building"

- Overall: 17%
- France: 12%
- Germany: 17%
- Spain: 19%
- US: 16%
- Brazil: 22%
- China: 28%
- India: 11%
- Japan: 16%

Source: Lippincot Research and World Business Council for Sustainable Development
1. Many projects are achieving LEED within their budgets, and in the same cost range as non-LEED projects.
2. Construction costs for all buildings have risen dramatically, but projects are still achieving LEED.
3. The idea that green is an added feature continues to be a problem.

**Recommendation:** Be suspicious of claims about green premiums.
DRIVERS OF GREEN BUILDING

- Increasing Energy Costs: 75%
- Government Regulations/Tax Incentives: 40%
- Global Influences: 26%

Adding value by lowering expenses

- Marketability
- Environmental Capitalization rate
- Cash Expenses
  - Leasing & Mgt
  - Maintenance
  - Taxes & Insurance.

- Net income
- Depreciation
- Risk Premium

Value added by
- Increasing Net Income

- Conventional Properties
  - Net income
    - Taxes & Insurance
    - Maintenance
    - Leasing & Mgt
    - Cost of New Tenants

- Green Properties
  - Net income
    - Added value
    - Taxes & Insurance
    - Maintenance
    - Leasing & Mgt
    - Cost of New Tenants

Cost of New Tenants

Net income

Conventional Properties vs. Green Properties

The University of Arizona
## Theoretical Asset Value Increase From Pennies Saved on Energy

*(10 Million Square Foot Portfolio)*

(Average energy cost per office square foot = $1.90)

Average Total Expenses (Operating + Fixed Costs per square foot = $10)

<table>
<thead>
<tr>
<th>Energy Savings Per Square foot</th>
<th>2¢</th>
<th>4¢</th>
<th>6¢</th>
<th>8¢</th>
<th>10¢</th>
<th>20¢</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pct of Total Expenses Saved</td>
<td>0.2%</td>
<td>0.4%</td>
<td>0.6%</td>
<td>0.8%</td>
<td>1.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Reduction in energy costs</td>
<td>$200,000</td>
<td>$400,000</td>
<td>$600,000</td>
<td>$800,000</td>
<td>$1,000,000</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Asset Value (Potential)</td>
<td>$2.5 Mil</td>
<td>$5 Mil</td>
<td>$7.5 Mil</td>
<td>$10 Mil</td>
<td>$12.5 Mil</td>
<td>$25 Mil</td>
</tr>
<tr>
<td>Value Added per sq. ft.</td>
<td>$0.25</td>
<td>$0.50</td>
<td>$0.75</td>
<td>$1.00</td>
<td>$1.25</td>
<td>$2.5</td>
</tr>
</tbody>
</table>

*Assuming 8% capitalization rate*
# Energy Star Buildings Cost Less to Operate

## Table 1. Energy Performance Differentials and Cost Savings for ENERGY STAR Labeled Buildings by Region

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>ENERGY STAR10</td>
<td>CBECS Subset</td>
<td>Differential</td>
</tr>
<tr>
<td>United States</td>
<td>61.6</td>
<td>103.2</td>
<td>41.6</td>
</tr>
<tr>
<td>1- New England</td>
<td>65.2</td>
<td>106.7</td>
<td>41.5</td>
</tr>
<tr>
<td>2- Middle Atlantic</td>
<td>68.2</td>
<td>101.2</td>
<td>33.0</td>
</tr>
<tr>
<td>3- East North Central</td>
<td>55.9</td>
<td>111.5</td>
<td>55.6</td>
</tr>
<tr>
<td>4- West North Central</td>
<td>63.2</td>
<td>134.0</td>
<td>70.8</td>
</tr>
<tr>
<td>5- South Atlantic</td>
<td>64.0</td>
<td>103.2</td>
<td>39.2</td>
</tr>
<tr>
<td>6- East South Central</td>
<td>59.4</td>
<td>101.9</td>
<td>42.5</td>
</tr>
<tr>
<td>7- West South Central</td>
<td>61.4</td>
<td>89.0</td>
<td>27.6</td>
</tr>
<tr>
<td>8- Mountain</td>
<td>61.9</td>
<td>100.9</td>
<td>39.0</td>
</tr>
<tr>
<td>9- Pacific</td>
<td>60.9</td>
<td>94.2</td>
<td>33.3</td>
</tr>
</tbody>
</table>

*Source: Capital E Analysis of EPA and EIA Data*
Savings per foot

**SUMMARY OF SAVINGS (20 YEAR NPV)**

Office build costs stated at $150-$250 psf, Green Premium is just $3-5, or 2% (but premium varies 0-7%).

- Energy: 5
- Emissions: 0
- Water: 0
- Waste: 0
- O&M: 10
- Productivity/Health: 35
- Green Cost Premium (initial outlay): 0
Recommendation: Consider Operational Savings in Underwriting
“For a 12 million SF portfolio with a 6% rollover, $900,000 per year could be added to the bottom line for every 10 percent of expiring space that was renewed rather than retenanted.”

John McMahan, Handbook of Commercial Real Estate Investing, 2006

*What are the keys to tenant satisfaction and retention? How does green building affect these?*
Health & Productivity Research

“A 1% increase in employee productivity would equal about a 15% decrease in property cost (rent, utilities) since the share of employee costs is almost 15 times larger than the share of property costs”

Better IEQ including daylighting, ventilation rates, and thermal comfort can increase productivity by 1-10%.
Kumar and Fisk, Lawrence Berkeley National Lab, 2001

LEED (1 point): Increase outdoor air ventilation rates by at least 30% above the minimum rates required by ASHRAE Standard. (Not in all LEED buildings; remember to check)
Figure 1. Castcon production yearly productivity.
Average Scores by Category

- General Satisfaction-Building: 0.93
- General Satisfaction-Workspace: 0.84
- Office Layout: 0.95
- Office Furnishings: 0.84
- Thermal Comfort: -0.16
- Air Quality: 0.21
- Lighting: 1.12
- Acoustics: -0.2
- Cleanliness and Maintenance: 0.91

Legend:
- Green diamond: LEED/green bldgs (n=21)
- Blue diamond: rest of CBE database (n=160)

Fard, 2006, UC Berkeley
Occupper Views

| Willingness to Pay More to Occupy a Greener Office in the Finance and Business Services Sector |  
| Marginally More | 69% |
| Moderately More | 10% |
| No More | 21% |

“...occupiers will expect to pay relatively less for low sustainability offices in the future”

Source: GVI Grimley/CBI Survey, 2006
Recommendation: Consider Health and Productivity during underwriting by looking for these:

1. Lighting and comfort system controllability for workstations and shared spaces
2. Good daylight illumination levels
3. Line of sight to the outdoors
4. Additional outdoor air ventilation
RISK PERSPECTIVE
Risk Components of Green Buildings

Will changes in the perception of risks components increase the value of green and reduce the value of conventional?
The Depreciation Issue

Will Non-Green Retain Class A status?

- **Class A** …high quality standard finishes, a) state of the art systems, b) exceptional accessibility and a c) definite market presence.

- **Class B** …finishes are fair to good for the area and systems are adequate

- In the 1980s, finance firms in NYC moved to new computer capable properties, abandoning office which were then converted to residential uses.
Exhibit 1
A Classification of Depreciation and Obsolescence

DEPRECIATION

Property factors

Tenure factors

Site value changes

Building depreciation

Supply/demand

Environmental obsolescence

Physical deterioration

Building obsolescence

External appearance

Internal specification

Configuration

Technical Obsolescence – things that can become technically inefficient (curable)

Functional Obsolescence – whole building problem with layout, inability to accommodate new info technology (incurable)
“the criterion “ecological sustainability” receives a relatively high maximum risk premium since the authors believe that the success of property investments will depend on sustainability issues to a very large extent in future years”  Lorenz et al JPIF, 2006

0.5% added to the cap rate = 5% in valuation = 6 months in average annual total returns based on NCREIF office index
Recommendation: Use Asset Management to manage the risk minimize obsolescence

• Curable at acceptable cost
  – Inefficient energy and water systems
  – Mediocre ventilation
  – Lack of individual lighting controls?
  – Lack of individual thermal controls?
  – No LEED or Energy Star certification

• Incurable
  – Auto dependent location
  – Mediocre daylighting
Recommendation: Use risk adjusted cap or discount rates

Source: Lorenz et al, JPIF 2006
RETURNS PERSPECTIVE
Will green perform like historic & urban regeneration?
CoStar Energy Star Study

What We Found – Direct Rental Rates

What We Found – Occupancy Rates

What We Found – Sales Prices / Square Foot
The opportunity is now

According to the *Green Building SmartMarket Report 2006* (*McGraw Hill*), professionals expect greener buildings to garner an average 7.5% increase in value over comparable standard buildings, together with a 6.6% better return on investment.

*But at some point, green will become a known “amenity” that is capitalized into the price at acquisition and disposition and no longer contributes to outperformance. The green window of opportunity may be now.*
Key Points

1. When underwriting, verify green components in green certified and conventional buildings

2. It may be easier to build new green properties or green-up existing ones than to find existing green deals.

3. Despite the hype, the economics debate remains unsettled. But my conclusion for now is that since green buildings can cost the same to build, do cost less to run, may become favored by tenants, and do mitigate certain risks, they should perform financially as well or better than conventional properties.

4. There are real opportunities for “green repositioning” in asset management which will add value, reduce risk and accomplish more than “green acquisitions” for global warming and other societal issues.
Contact information

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Consider joining:
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RPI Project
UN Property Working Group