The Green Face

of the Building Industry

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PA Dept. of Environmental Protection
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What is a Green Building?

It focuses on the “triple bottom line:”

- People
- Economics
- Environment
Why Build Green?

- Less building maintenance
- Lower operating costs
- Higher student test scores
- Improved occupant health & comfort
- Increased worker productivity
- Less absenteeism
- Reduced environmental impacts
Why Build Green? (cont.)

In the United States alone, buildings account for:

- 40% of primary energy use,
- 72% of electricity consumption,
- 39% of CO₂ emissions,
- 40% of raw materials use (globally),
- 30% of waste output (136 million tons annually), and
- 13.6% of potable water consumption.
USGBC membership growth reflects the expansion of green buildings in the market.

*As of September 2009

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## Projected Green Building Market Value

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2010</th>
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</thead>
<tbody>
<tr>
<td><strong>Projection U.S. Market</strong></td>
<td>$12 billion (new)</td>
<td>$30-$60 billion (new)</td>
</tr>
<tr>
<td></td>
<td>$130 billion (renovation)</td>
<td>$240 billion (renovation)</td>
</tr>
<tr>
<td><strong>Commercial &amp; Institutional</strong></td>
<td>$4 billion</td>
<td>$10-$20 billion</td>
</tr>
<tr>
<td><strong>Residential</strong></td>
<td>$8 billion</td>
<td>$20-$40 billion</td>
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</tbody>
</table>

## DEP Southeast Regional Office Building

**LEED® Project # 0419**

**LEED Version 2 Certification Level: GOLD**

**March 30, 2005**

### Points Achieved

<table>
<thead>
<tr>
<th>Category</th>
<th>Possible Points</th>
<th>Y</th>
<th>X</th>
<th>Possible Points</th>
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</thead>
<tbody>
<tr>
<td><strong>9. Vegetative Site</strong></td>
<td>13</td>
<td>Y</td>
<td>X</td>
<td>13</td>
</tr>
<tr>
<td><strong>2. Urban Redevelopment</strong></td>
<td>1</td>
<td>Y</td>
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<tr>
<td><strong>3. Brownfield Redevelopment</strong></td>
<td>1</td>
<td>Y</td>
<td>X</td>
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<tr>
<td><strong>4. Alternative Transportation, Public Transportation Access</strong></td>
<td>1</td>
<td>Y</td>
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<tr>
<td><strong>5. Alternative Transportation, Bicycle Storage &amp; Changing Rooms</strong></td>
<td>1</td>
<td>Y</td>
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<tr>
<td><strong>6. Alternative Transportation, Alternative Fuel Refueling Station</strong></td>
<td>1</td>
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<td><strong>7. Stormwater Management, Water Quality</strong></td>
<td>1</td>
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<tr>
<td><strong>8. Landscape &amp; Exterior Design to Reduce Heat Islands, Non-Roof</strong></td>
<td>1</td>
<td>Y</td>
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<tr>
<td><strong>9. Landscape &amp; Exterior Design to Minimize Heat Islands, Roof</strong></td>
<td>1</td>
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<tr>
<td><strong>10. Light Pollution Reduction</strong></td>
<td>1</td>
<td>Y</td>
<td>X</td>
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<td><strong>11. Water Efficiency</strong></td>
<td>5</td>
<td>Y</td>
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<td>5</td>
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<td><strong>12. WaterUse Reduction, 20% Reduction</strong></td>
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<td><strong>13. WaterUse Reduction, 5% Reduction</strong></td>
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<td><strong>14. WaterUse Reduction, 1% Reduction</strong></td>
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<td><strong>15. WaterEfficient Landscaping, Reduce by 10%</strong></td>
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<td><strong>16. WaterEfficient Landscaping, No Potable Use or No Irrigation</strong></td>
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<td><strong>17. Innovative Wastewater Technologies</strong></td>
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<td><strong>18. Energy &amp; Atmosphere</strong></td>
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<td><strong>19. Fundamental Building Systems Commissioning</strong></td>
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<td><strong>20. CEC project in HVAC equipment</strong></td>
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<td><strong>21. Optimize Energy Performance, 20% New/10% Existing</strong></td>
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<tr>
<td><strong>22. Optimize Energy Performance, 40% New/30% Existing</strong></td>
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<tr>
<td><strong>23. Optimize Energy Performance, 60% New/40% Existing</strong></td>
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<tr>
<td><strong>24. Renewable Energy, 1%</strong></td>
<td>1</td>
<td>Y</td>
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<tr>
<td><strong>25. Renewable Energy, 10%</strong></td>
<td>1</td>
<td>Y</td>
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<tr>
<td><strong>26. Additional Commissioning</strong></td>
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<td>Y</td>
<td>X</td>
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<td><strong>27. Ozone Depletion</strong></td>
<td>1</td>
<td>Y</td>
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<tr>
<td><strong>28. Measurement &amp; Verification</strong></td>
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<td>Y</td>
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<tr>
<td><strong>29. Green Power</strong></td>
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<td>Y</td>
<td>X</td>
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<tr>
<td><strong>30. Innovation &amp; Design Process</strong></td>
<td>5</td>
<td>Y</td>
<td>X</td>
<td>5</td>
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<tr>
<td><strong>31. Innovation in Design: Exemplary Performance WEI2</strong></td>
<td>1</td>
<td>Y</td>
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<td><strong>32. Innovation in Design: Exemplary Performance WEI3</strong></td>
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<td>Y</td>
<td>X</td>
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<td><strong>33. Innovation in Design: Exemplary Performance MHR2</strong></td>
<td>1</td>
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<tr>
<td><strong>34. Innovation in Design: Exemplary Performance MHR4</strong></td>
<td>1</td>
<td>Y</td>
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<tr>
<td><strong>35. LEED® Accredited Professional</strong></td>
<td>1</td>
<td>Y</td>
<td>X</td>
<td>1</td>
</tr>
</tbody>
</table>
Sustainable Sites

- Use of brownfield
- Urban infill
- Pervious paving
- Rainwater harvesting
Sustainable Sites (cont.)

- Light pollution reduction
- Green roof
- High reflectivity roof / cool metal roof
- Alternative transportation
Water Efficiency

- Waterless urinals
- Graywater systems
- Landscaping using native vegetation & drip irrigation systems
Energy & Atmosphere

• Low-emissivity (low-e) windows
• Green power
• Tankless water heater
• Daylighting controls
• Occupancy sensors
Energy & Atmosphere (cont.)

- Renewable energy
- Commissioning
- Passive solar
- Light shelves
- Indirect lighting
Materials & Resources

- FSC-certified wood products
- Rapidly renewable materials
- Material reuse
- Construction waste management
- Building reuse
- Recycled content materials
- Locally harvested / manufactured goods
Indoor Environmental Quality

- Daylighting
- Low-emitting materials
- Better ventilation
- Control of thermal comfort
So, how much does it cost?

- “An upfront investment of < 2% of construction costs yields life-cycle savings of over 10x the initial investment.”

- If more time is spent in design phase, then actual construction costs may not be more than that of conventional bldg.

- If less expensive green technologies are blended w/ green technologies that cost same or slightly more, then possible to construct a green bldg. that costs same as conventional one.

- Hire an architect/general contractor with green experience.
So, how much does it cost?
LEED Rating Systems

- LEED for New Construction
- LEED for Existing Buildings
- LEED for Core & Shell
- LEED for Commercial Interiors
- LEED for Schools
- LEED for Homes
- LEED for Healthcare
- LEED for Neighborhood Development
- LEED for Retail
Overview of LEED 2009

- Re-weighting credits based on human health & environmental impacts

- All non-residential LEED rating systems have 100-point scale, with extra points available in regional priority & innovation in design credits

- Beginning on June 27, 2009, all new projects must register for LEED 2009
Who’s “going green” in our area?

- Aerzen USA (Coatesville)
- Swarthmore College
- Haverford College
- PSU
- Liberty Property Trust
- Muhlenberg College
- Twin Valley School District
- PNC Bank
- Geisinger Medical System
- Scott Honda of West Chester
- Lower Merion School District
- Downingtown School District
- Coatesville School District
- Radnor School District
- West Chester Univ.
- Philadelphia School District
- Chestnut Hill Academy
- Villanova University
- Nestle Bottling Plant (Lehigh Valley)
- Lehigh Valley Hospital
- Waste Management (Phila.)
- PECO
- Chester County
- Dansko
- Mercy Suburban Hospital
- LL Bean Store (Center Valley)
- Tasty Baking Company
- Commonwealth of PA
- PP&L (Allentown)
LEED Initiatives

• In the form of legislation, executive orders, resolutions, ordinances, policies, & incentives
  – Incentives include tax credits, tax breaks, density bonuses, fee reductions or waivers, expedited permitting, & free technical assistance

• Established in
  – 138 cities
  – 36 counties
  – 28 towns
  – 34 state governments
  – 17 public schools
  – 41 institutions of higher education
  – 14 federal agencies
Green Homes

**NAHB’s National Green Building Standard™**
- ANSI-approved standard as of Jan. ‘09
- Designed by builders for builders
- Home size adjustment is less stringent
- Has online scoring tool
- Certification fee of $200/home (members) and $500/home (non-members)
- Service fee also charged by NAHB verifier
- Bronze, silver, gold, or emerald designation

**LEED for Homes**
- Launched Nov. ‘07
- Meant to be a leadership standard
- Home size adjustment is more stringent
- Certification & reg. fees are $375/home (members) and $525/home (non-members)
- Service fee also charged by LEED provider
- Certified, silver, gold, or platinum designation
Green Homes (cont.)

This ICF home in the Cayman Islands withstood the Category 5 devastation of Hurricane Ivan (2004)
Green Homes (cont.)
First Steps

Energy audit via:

• RESNET HERS Rater
  http://www.natresnet.org/
• BPI accredited professional
  http://www.bpi.org/

Online Energy Audits

• Home Energy Saver
  http://hes.lbl.gov/
• Home Energy Yardstick
  http://www.energystar.gov/
Green Resources

Organizations
Dela. Valley Green Bldg. Council
www.dvgbc.org
National Assoc. of Home Builders
www.nahbgreen.org

TV channel
Planet Green
www.planetgreen.discovery.com

Labeling program
EPA’s WaterSense program
www.epa.gov/watersense
GREENGUARD Environmental Institute
www.greenguard.org

Green home websites
USGBC’s Green Home Guide
www.greenhomeguide.org
Regreen
www.regreenprogram.org
Green Building Advisor
www.greenbuildingadvisor.com
Green Resources (cont.)

Stores
Environmental Home Store
www.environmentalhomestore.com
Earth Mart
www.earthmartonline.com
Greenable
www.greenable.net/
Alternative Energy, Inc.
www.altern-energy.com/
Home Depot
www.homedepot.com/ecooptions
Habitat for Humanity ReStores
www.habitat.org/env/restores.aspx
Questions?