

Savings in Sustainability

How Green Buildings & Operations Save Money

economics

commerce DEVELOPMENT

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Savings in Sustainability


- What is Sustainability?
- What are the Financial & Environmental Benefits of Green/ Energy Star / LEED rated buildings?
- What's involved in Green Building Implementation?




Triple Bottom Line- 3P's



The diagram illustrates the Triple Bottom Line (3P's) concept. It features three circular icons arranged in a triangle. The top-left icon is orange and contains a white silhouette of a person, with the word "People" written in a grey arc above it. The top-right icon is green and contains a white globe, with the word "Planet" written in a grey arc above it. The bottom icon is blue and contains a white Euro symbol (€), with the word "Profit" written in a grey arc below it.



What is Sustainability?



The diagram is a Venn diagram with three overlapping circles. The top circle is labeled "Social", the bottom-left circle is labeled "Environment", and the bottom-right circle is labeled "Economic". The intersection of the "Social" and "Environment" circles is labeled "Bearable". The intersection of the "Social" and "Economic" circles is labeled "Equitable". The intersection of the "Environment" and "Economic" circles is labeled "Viable". The central intersection where all three circles meet is shaded in a darker green and labeled "Sustainable".




What is Sustainability?

"meet present needs without compromising the ability of future generations to meet their needs"



Source: 1987 UN conference



What's the problem?

- The built environment has a profound impact on our natural environment, economy, health, and productivity.
- In the US alone, buildings account for:
 - **72% of electricity consumption**
 - **39% of energy use**
 - **38% of all carbon dioxide (CO₂) emissions**
 - **40% of raw materials use**
 - **30% of waste output (136 million tons annually), and**
 - **14% of potable water consumption**




Green / Sustainable Buildings

Green, or sustainable, building is the practice of creating and using healthier and more resource-efficient models of construction, renovation, operation, maintenance and demolition.”



Source: EPA Green Building <http://www.epa.gov/greenbuilding/>



Green Building Occupants Are Healthier & More Productive

- In the U.S., people spend, on average, 90% or more of their time indoors*
- Green buildings typically have better indoor air quality and lighting
- LEED certified project case studies illustrate 2-16% increased worker and student productivity**

* Source: The Total Exposure Assessment Methodology (TEAM) Study. EPA 600/S6-87/002. U.S. Environmental Protection Agency, 1987.
** Source: LEED project data, USGBC



Immediate Impacts of Green Buildings


- Lower Operating Costs
- Improved Indoor Air Quality
- Increased Value
- Reduced Liability
- Improved Risk Management
- Include Enhanced Productivity
- Enhanced Recruitment & Retention
- Reduced Absenteeism
- Governmental Incentives



Long Term Impacts of Green Buildings


- Creation of “green-collar” jobs
- Improved air quality
- Improved public health
- Reduced urban heat island effect
- Reduced peak demand for electricity
- Reduced utility costs for businesses and consumers
- Economic development opportunity
- Reduced demand for potable water
- Reduced need for land fills






Energy Star Rated Buildings

- 13.5% higher market values per square foot
- 5.9% higher net income per square foot
- 9.8% lower utility expenditures
- 4.8% higher rents
- 0.9% higher occupancy
- 0.5% lower cap rates



Source: Investment Returns from Responsible Property Investments: Energy Efficient, Transit-Oriented and Urban Regeneration Office Properties in the US from 1998-2008, Gary Pivo and Jeffrey Fisher, March 3, 2009



Commercial Buildings Energy-Efficient Tax Deduction

- **Federal Tax Deduction for building owners and tenants**
- **179-D Tax deduction**
 - \$0.30 - \$1.80/SF
- **Must attain a 50% reduction in the total annual energy usage over a 2001 standard**


Applies to: Interior lighting systems Heating & cooling, hot water The building envelope Can receive partial credit



LEED CERTIFICATION




Performance-based
Third-party
Credible and recognized



Leadership in Energy and Environmental Design (LEED)

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**

A leading-edge system
for certifying the
greenest performing
buildings in the world

LEED® Facts
Building size 12,500 square ft
Type of building
LEED for Core & Shell Development
Certification awarded July 27, 2009
Platinum 49*

Sustainable Sites	5
Water Efficiency	5
Energy & Atmosphere	5
Materials & Resources	5
Indoor Environmental Quality	5
Innovation & Design	5

*Out of a possible 62 points

LEED Projects

Commercial LEED Registered Projects
Total Currently Registered

30,116 ❁

Commercial LEED Certified Projects
(Cumulative)

8,579 ❁

Square Footage of Commercial LEED Certified Projects
(Cumulative)

1.4 billion ❁

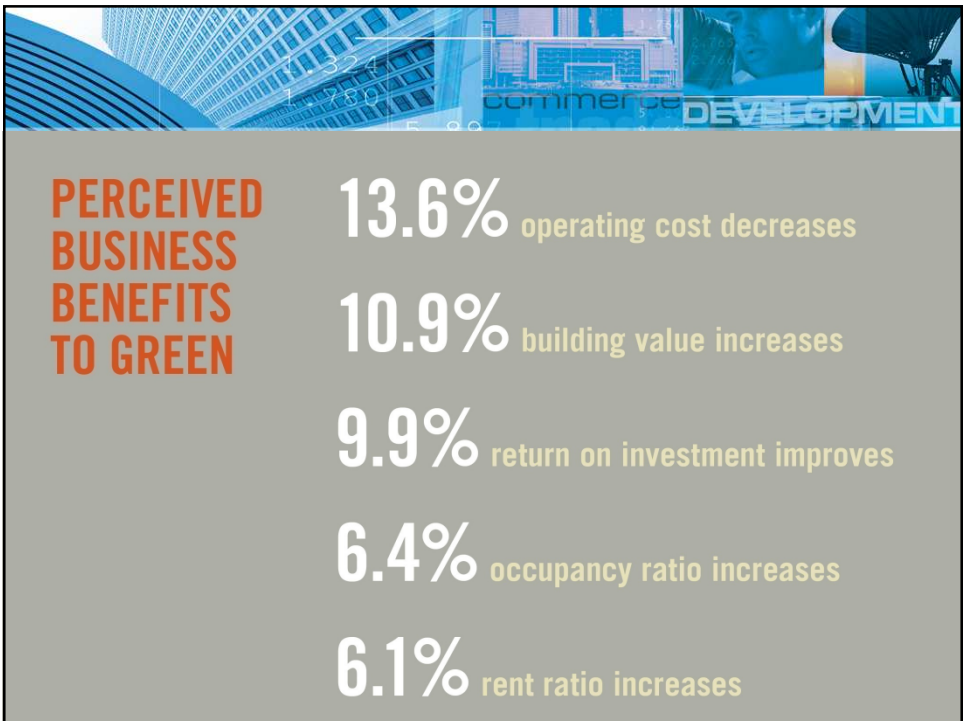
As of March 2011



The graphic features a background image of a modern building facade with the word 'DEVELOPMENT' overlaid. Below the image, the title 'LEED Certification Levels' is displayed in blue. Underneath the title are four circular logos for LEED certification levels: Certified (green), Silver (blue), Gold (yellow), and Platinum (grey). Each logo contains the text 'U.S. GREEN BUILDING COUNCIL' and 'LEED CERTIFIED USGBC' along with a leaf icon. Below the logos is a bulleted list of the certification levels and their corresponding point ranges.

LEED Certification Levels

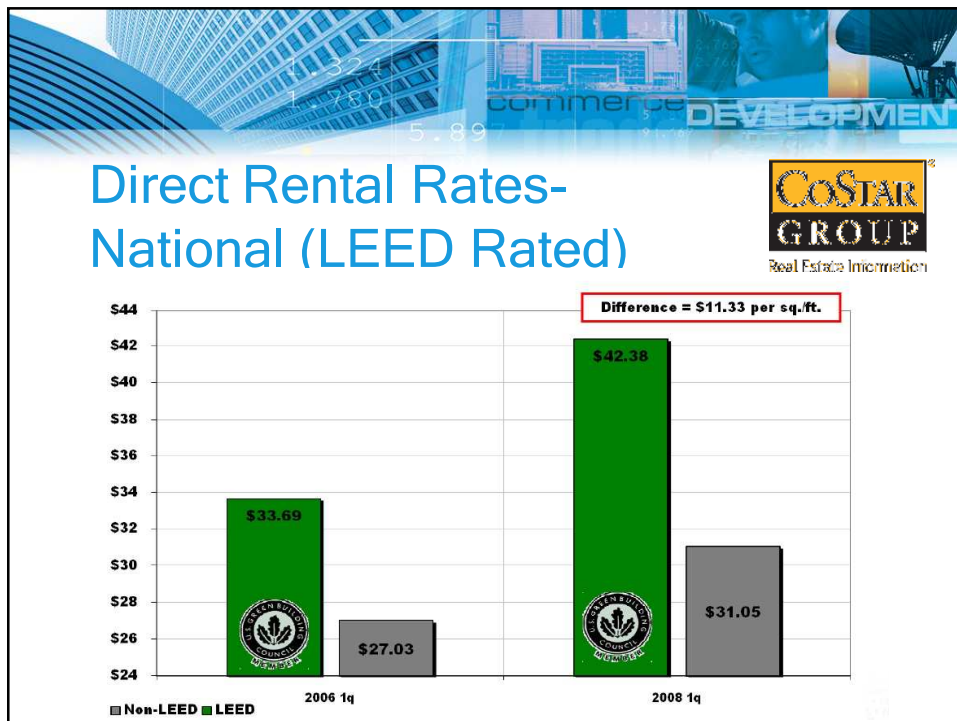
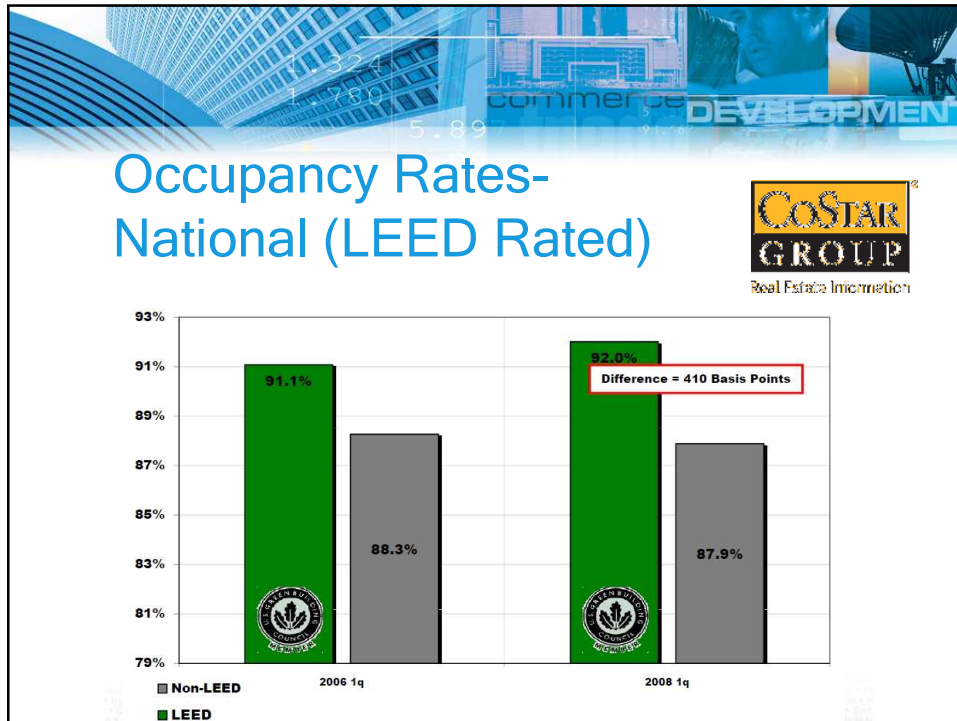
- **Certified** 40-49 points
- **Silver** 50-59 points
- **Gold** 60-79 points
- **Platinum** 80+ points

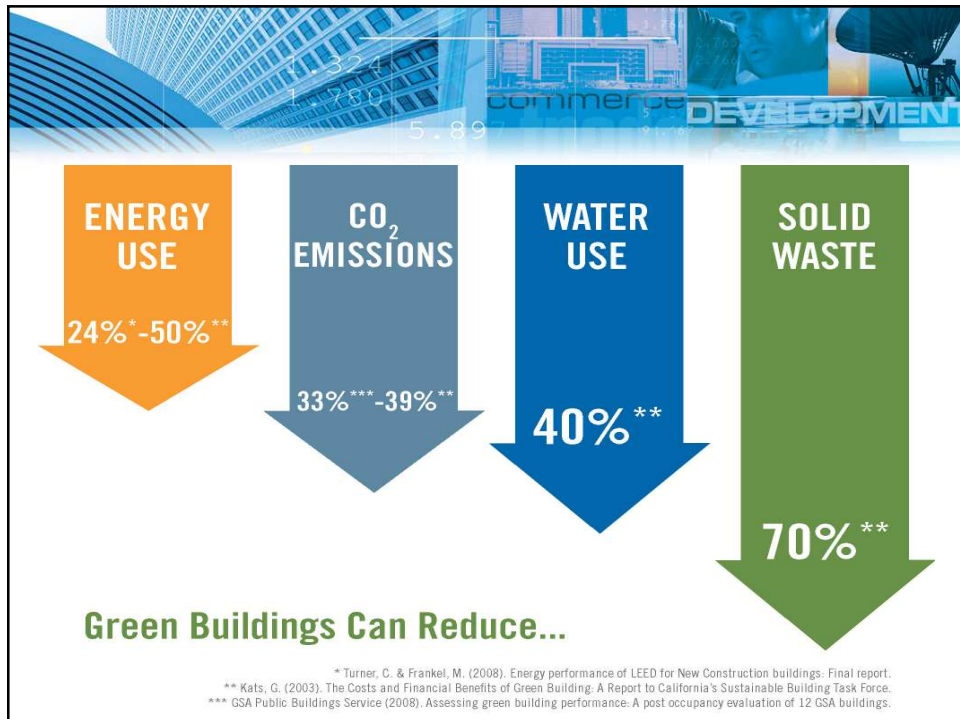
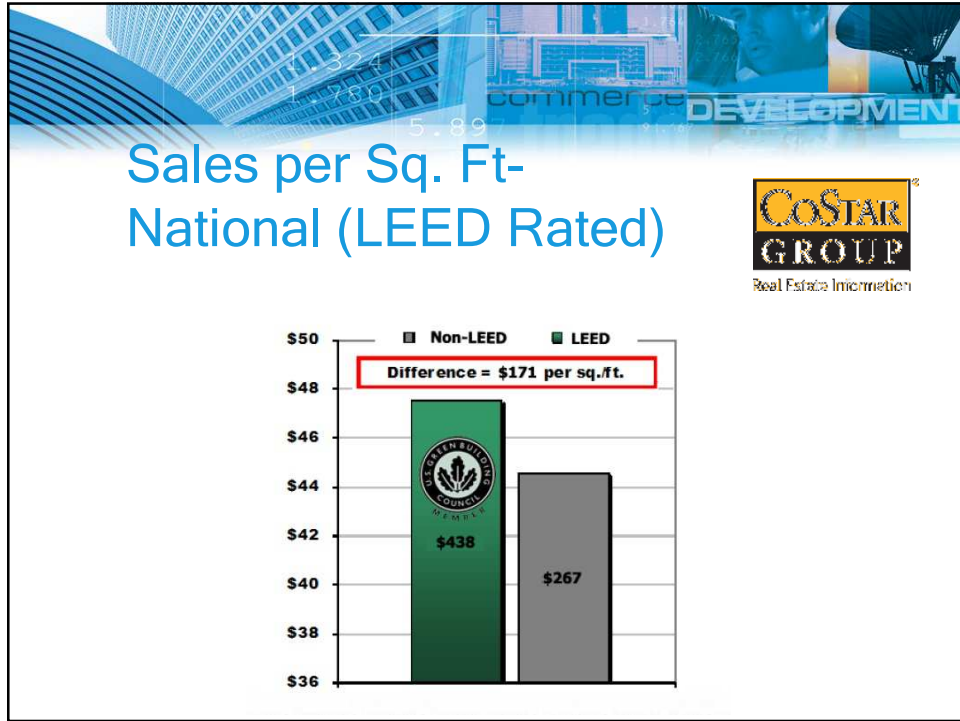


The graphic features a background image of a modern building facade with the word 'DEVELOPMENT' overlaid. Below the image, the title 'PERCEIVED BUSINESS BENEFITS TO GREEN' is displayed in orange and white. To the right of the title are five statistics, each consisting of a percentage and a description of the benefit.

PERCEIVED BUSINESS BENEFITS TO GREEN

- 13.6% operating cost decreases
- 10.9% building value increases
- 9.9% return on investment improves
- 6.4% occupancy ratio increases
- 6.1% rent ratio increases





LEED EBOM Scorecard

LEED 2009 for Existing Buildings: Operations & Maintenance

Project Name: _____ Date: _____

Sustainable Sites		Possible Points: 26	Materials and Resources, Continued		Possible Points: 15
<input type="checkbox"/>	SS-1 LEED Certified Design and Construction	4	<input type="checkbox"/>	MR-10 Solid Waste Management—Waste Stream Audit	1
<input type="checkbox"/>	SS-2 Building Exterior and Landscape Management Plan	1	<input type="checkbox"/>	MR-11 Solid Waste Management—Engaging Customers	1
<input type="checkbox"/>	SS-3 Integrated Site Mgmt., Erosion Control, and Landscape Mgmt. Plan	1	<input type="checkbox"/>	MR-12 Solid Waste Management—Recycle Goals	1
<input type="checkbox"/>	SS-4 Alternative, Commuting Transportation	0 to 15	<input type="checkbox"/>	MR-13 Solid Waste Management—Facility Alterations and Additions	1
<input type="checkbox"/>	SS-5 Site Development—Protect or Restore Open Habitat	1	Indoor Environmental Quality		
<input type="checkbox"/>	SS-6 Stormwater Quality Control	1	Possible Points: 15		
<input type="checkbox"/>	SS-7 Heat Island Reduction—New Roof	1	<input type="checkbox"/>	EQ-1 Minimum IAQ Performance	1
<input type="checkbox"/>	SS-8 Heat Island Reduction—Roof	1	<input type="checkbox"/>	EQ-2 Environmental Tobacco Smoke (ETS) Control	1
<input type="checkbox"/>	SS-9 Light Pollution Reduction	1	<input type="checkbox"/>	EQ-3 Green Cleaning Policy	1
Water Efficiency			Possible Points: 14		
<input type="checkbox"/>	WE-1 Minimum Indoor Plumbing Fixture and Fitting Efficiency	1 to 2	<input type="checkbox"/>	EQ-4 IAQ Mgt. Practices—IAQ Management Program	1
<input type="checkbox"/>	WE-2 Water Performance Measurement	1 to 5	<input type="checkbox"/>	EQ-5 IAQ Mgt. Practices—Outdoor Air	1
<input type="checkbox"/>	WE-3 Additional Indoor Plumbing Fixture and Fitting Efficiency	1 to 5	<input type="checkbox"/>	EQ-6 IAQ Mgt. Practices—Increased Ventilation	1
<input type="checkbox"/>	WE-4 Water Efficient Landscaping	1 to 5	<input type="checkbox"/>	EQ-7 IAQ Mgt. Practices—Reduce Particulate in Air Distribution	1
<input type="checkbox"/>	WE-5 Cooling Tower Water Management—Chemical Management	1	<input type="checkbox"/>	EQ-8 IAQ Mgt. Plan—IAQ Mgt. for Facility Alterations and Additions	1
<input type="checkbox"/>	WE-6 Cooling Tower Water Management—Non-Potable Water Source Use	1	<input type="checkbox"/>	EQ-9 Occupant Comfort—Occupant Survey	1
Energy and Atmosphere			Possible Points: 35		
<input type="checkbox"/>	EA-1 Energy Efficiency Best Management Practices	1 to 10	<input type="checkbox"/>	EQ-10 Controllability of Systems—Lighting	1
<input type="checkbox"/>	EA-2 Minimum Energy Efficiency Performance	2	<input type="checkbox"/>	EQ-11 Occupant Comfort—Thermal Comfort Monitoring	1
<input type="checkbox"/>	EA-3 Fundamental Refrigerant Management	1 to 10	<input type="checkbox"/>	EQ-12 Daylight and Views	1
<input type="checkbox"/>	EA-4 Optimize Energy Efficiency Performance	2	<input type="checkbox"/>	EQ-13 Green Cleaning—High Performance Cleaning Program	1
<input type="checkbox"/>	EA-5 Existing Building Commissioning—Investigation and Analysis	2	<input type="checkbox"/>	EQ-14 Green Cleaning—Outdoor Air Intake Accumulation	1
<input type="checkbox"/>	EA-6 Existing Building Commissioning—Ongoing Commissioning	2	<input type="checkbox"/>	EQ-15 Green Cleaning—Sustainable Cleaning Products, Materials and Practices	1
<input type="checkbox"/>	EA-7 Performance Measurement—Building Automation System	1	<input type="checkbox"/>	EQ-16 Green Cleaning—Sustainable Cleaning Equipment	1
<input type="checkbox"/>	EA-8 Performance Measurement—System Level Monitoring	1 to 2	<input type="checkbox"/>	EQ-17 Green Cleaning—Indoor Chemical and Pesticide Source Control	1
<input type="checkbox"/>	EA-9 On-site and Off-site Renewable Energy	1 to 6	<input type="checkbox"/>	EQ-18 Green Cleaning—Indoor Integrated Pest Management	1
<input type="checkbox"/>	EA-10 Enhanced Refrigerant Management	1	Innovation in Operations		
<input type="checkbox"/>	EA-11 Enquirer Prediction Reporting	1	Possible Points: 6		
Materials and Resources			Possible Points: 10		
<input type="checkbox"/>	MR-1 Sustainable Purchasing Policy	1	<input type="checkbox"/>	IO-1 Innovation in Operations—Specific Title	1
<input type="checkbox"/>	MR-2 Solid Waste Management Policy	1	<input type="checkbox"/>	IO-2 Innovation in Operations—Specific Title	1
<input type="checkbox"/>	MR-3 Sustainable Purchasing—Engaging Customers	1	<input type="checkbox"/>	IO-3 Innovation in Operations—Specific Title	1
<input type="checkbox"/>	MR-4 Sustainable Purchasing—Electric	1	<input type="checkbox"/>	IO-4 Innovation in Operations—Specific Title	1
<input type="checkbox"/>	MR-5 Sustainable Purchasing—Furniture	1	<input type="checkbox"/>	IO-5 LEED Accredited Professional	1
<input type="checkbox"/>	MR-6 Sustainable Purchasing—Facility Alterations and Additions	1	<input type="checkbox"/>	IO-6 Documenting Sustainable Building Outcomes	1
<input type="checkbox"/>	MR-7 Sustainable Purchasing—Recycled Materials in Lamps	1	Regional Priority Credits		
<input type="checkbox"/>	MR-8 Sustainable Purchasing—Food	1	Possible Points: 4		
Total			Possible Points: 110		

Credits: 40 of 40 points. Score: 32 of 39 points. Goal: 55 to 79 points. Maximum: 82 to 110

Green Building Rating System Categories

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation in Operations
- Regional Priority





Green Building Policies & Procedures

- Water Efficient Policy for Plumbing Fixtures and Fittings
- Sustainable Purchasing Policy for Ongoing Consumables
- Durable Goods, Facility Alterations & Additions & Reduced Mercury in Lamps
- Solid Waste Management Policy
- Green Cleaning Policy
- Building Exterior and Hardscape Management Plan
- Integrated Pest Management, Erosion Control, and Landscape Management Plan
- Cooling Tower Water Management Plan
- Building Operating Plan
- Indoor Air Quality Plan for Facility Alterations & Additions
- High Performance Green Cleaning Program
- Integrated Pest Management Program (Indoor)




Owners plan to green their real estate portfolios

- 79% Owners believe green is affordable
- 93% Expect Operating Costs to lower 8%
- 79% Expect to Attract New Tenants - up 5.3%
- 71% Expect Increased ROI - up 4.1%
- 64% Expect Increased Retention/Renewal
- 64% Expect Increased Asset Value - up 4.8%

Source: McGraw Hill: O&M Reference Guide 2009





Why Green Cleaning & Recycling?

- Cleaner Environment
- Lower Operating Expenses
- Increased Asset Values
- Increased Productivity
- Healthier and Safer for Occupants
- Land Fill Waste Diversion



Why Green Clean & Divert Waste?

Figure 25. Estimated county-level cancer risk from the 2002 National Air Toxics Assessment (NATA2002). Darker colors show greater cancer risk associated with toxic air pollutants.



Median Risk Level	
0 - 25 in a Million	Lightest Yellow
26 - 50 in a Million	Yellow
51 - 75 in a Million	Orange
76 - 100 in a Million	Dark Orange
> 100 in a Million	Dark Brown



Why should we care?

“With the U.S. population doubling over the past 50 years, our thirst for water tripling, and at least 36 states facing water shortages by 2013, the need to conserve water is becoming more and more critical.”

- US Environmental Protection Agency



Why Water Reduction?

- Buildings are major users of our potable water supply
- 14% potable water consumption
- 15 trillion gallons water per year
- Encourage smart use of water



Source: LEED Green Building: O&M Reference Guide 2009



Walmart

- Sustainable Products Index
- Daylight Harvesting
 - Cost \$200,000 per store
 - Annual Savings \$100,000
- Parking Lot Light Upgrades
 - LED lights 3-5x more expensive Metal Halides
 - Reduce Maintenance and Energy
 - 3 year payback



Walmart

- Refrigerated Case Lighting
 - 95% less maintenance
 - 50% less energy while
 - 50% more light
 - Save \$15K-\$21K per store annually
- Water Conservation
 - Save \$1 Million in Water Utilities Annually





Lowe's Home Improvement

- 40-70% more energy efficient
 - Lighting Retrofits
 - Green Power Purchasing
- 50% more water efficient
- 1,700 In Store Recycling Centers
- ENERGY STAR® Sustained Excellence Award in Retail in 2010 & 2011
- WaterSense® Partner of the Year in 2010
- Expedited permitting 3 vs 15 months
- Profits projected at \$85,000 per day





Jack Evans Police Headquarters

- LEED SILVER New Construction
- **40%** energy use reduction, **\$246,000** in annual savings expected
- Redeveloped brown-field site
- **100%** of building irrigation is from collected and stored rain water
- **50%** reduction of potable water use
- **80%** of construction waste diverted from the landfill
- **25%** regionally manufactured building materials



Jack Evans Police Headquarters
Constructed In: 2005
350,000 SF




Granite Park III

- **LEED EBOM SILVER (v3.0)**
- **36%** Indoor plumbing water usage reduction: (521,730 gal./yr)
- Renewable Energy Purchased: **37.5%** (reduced CO2 emissions by approximately 1,386 metric tons)
- Ongoing consumables waste diversion: **53%** (52,143 lbs)
- **88%** Durable goods waste diversion: (802 lbs)
- Sustainable cleaning product purchases: **93%** (by cost)
- Energy Star Rating: **86 / 100**




Granite Properties
Constructed In: 2006
369,000 SF



Comerica Tower

- **LEED EBOM CERTIFIED (v3.0)**
- **42%** Indoor plumbing water usage reduction
- Renewable Energy Purchased: **25%** (reduced CO2 emissions by approximately 22,384,963 lbs)
- Ongoing consumables waste diversion **56%**
- **97%** Durable goods waste diversion
- Sustainable cleaning product purchases **98%** (by cost)
- Energy Star Rating: **70 / 100**




Metropolitan Real Estate Investors
Constructed In: 1987
1,725,571 SF

LEED Buildings Simple Payback

Built	Building Square Footage	Total Performance Period Retrofit Costs to Meet LEED Requirements PER SQUARE FOOT	Total Performance Period Retrofit Costs to Meet LEED Requirements PER SQUARE FOOT	Total Certification Process Costs (ASHRAE Audit+Waste Audit+USGBC Registration and Review fees)	Total Certification Process Costs (USGBC fees) PER SQUARE FOOT	Total Certification Process Costs (includes retrofit and USGBC fees)	Total Certification Process Costs (includes retrofit and USGBC fees) PER SQUARE FOOT	Total Annual Net Savings	Projected Post-Certification Annual Net Savings PER SQUARE FOOT*	Simple Payback (YEARS)	Performance Period Length (MONTHS)	LEED Existing Building Certification Level Achieved
2006	375,848	\$6,018	\$0.02	\$19,175	\$0.05	\$88,107	\$0.23	\$18,204	\$0.05	4.84	6	Silver
1987	1,725,571	\$105,000	\$0.06	\$52,400	\$0.03	\$177,530	\$0.10	\$41,066	\$0.02	4.32	5	Certified
1984	288,928	\$22,742	\$0.08	\$16,568	\$0.06	\$92,310	\$0.32	\$12,201	\$0.04	7.57	4	Silver
1985	256,543	\$5,760	\$0.02	\$13,096	\$0.05	\$41,806	\$0.16	\$8,527	\$0.03	4.90	8	Certified
1999	267,900	\$11,530	\$0.04	\$15,937	\$0.06	\$33,787	\$0.13	\$9,542	\$0.04	3.54	5	Gold
2001	265,000	\$11,550	\$0.04	\$15,850	\$0.06	\$33,807	\$0.13	\$9,892	\$0.04	3.42	5	Gold
1998	256,535	\$5,304	\$0.02	\$13,096	\$0.05	\$44,667	\$0.17	\$12,094	\$0.05	3.69	6	Silver
		\$23,986.29	\$0.04	\$20,874.57	\$0.05	\$73,144.86	\$0.18	\$15,932.29	\$0.04	4.61	5.57	

Sale of LEED Buildings

- Private Multi-Tenanted LEED Buildings both built in 2005
- 95% leased in less than one year
- One Dearborne St.
 - Built = \$200 Million
 - Sold = \$344 Million
 - 72% ROI
- 111 S. Wacker
 - Built = \$270 Million
 - Sold = \$386 Million
 - 43% ROI






What can be done?

Progress on energy efficiency and depletion of our environmental resources depends heavily on people in the building industry being aware of the importance of the issues, and then being able and willing to act on it.



As occupants of buildings, it's up to you!!!



Where do I start?



- Office Operations
 - Implement Green Policies & Procedures
 - Set Obtainable Goals (Recycle, Carbon Footprint Reduction, Recycled Products Purchases, etc.)
 - Look for Efficiencies that will bring savings (Occupancy Sensored Lighting, Low Flow flush valves / Aerators on Sinks, Individually meter your Electricity consumption)
- Building Operations
 - Energy Star Rating
 - Green Building Assessment (LEED GAP Analysis)
 - ASHRAE Audits- Level I & II
 - LEED Certification





Speaker Information

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