

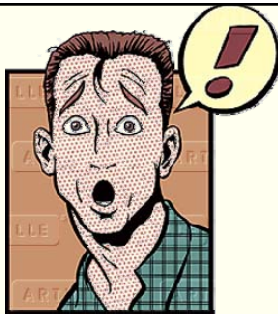
Cascadia Green Building Council Green Broker Conference

Green Building 101: What You Need to Know to be Dangerous!

May 22, 2008
Portland, Oregon



What is Green Building?



GREEN ? . . SUSTAINABLE?



Economic Sustainability:

“Meeting the needs of the present
without compromising the ability of
future generations to meet their
needs.”

World Commission on Economic Development (1987)



Ecological Sustainability: It's a Balancing Act

- Using resources at a rate they can be replaced
- Creating waste that can reasonably be assimilated



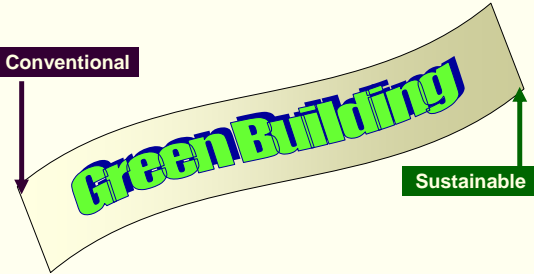
What Do Buildings Have to Do With it?

- Modern buildings use natural capital...
 - 25% of the world's timber harvest
 - 16% of the world's water withdrawals
 - 40% of inorganic raw materials
 - 40% of energy consumption
- Creating impacts
 - Strains resources flows being tapped more quickly than they can be replaced
 - Creates waste that must be assimilated but can't reasonably be due to volume or composition
 - Water, air, land, organic degradation
 - Exacerbates economic and social problems
 - Cost and access to resources/land/housing, health



Green Building: A Step Toward a Sustainable Balance

Conventional



Sustainable



Graphic: © O'Brien & Company, Inc. 2003



What is Green Building?

- “Green” or sustainable buildings
 - offer healthier, more comfortable interior spaces
 - reduce a building's ecological footprint
 - are essential to support sustainable patterns of living



What are qualities of green buildings?



What's driving green building in the commercial world?

- Triple Bottom Line
 - Energy savings
 - Water savings
 - Maintenance savings
 - Productivity increases from 6-16%
 - Higher employee retention rates
 - Higher sales in daylight stores
 - Positive corporate image
 - Futureproofing in an increasingly sensitive market and regulatory environment



Common Misconceptions

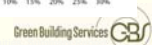
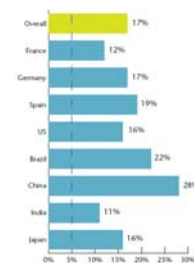
- “It costs more, period.”
- “Prospective tenants don't care about this.”
- “It slows down projects.”
- “Some green products don't last as long as the tried and true.”
- “Some green products don't fit into our building standards.”
- “Green doesn't meet code.”



Green Building Cost: Perception

- Survey of Professionals
 - 1,423 people interviewed between November 2006 to February 2007
 - Buildings' contribution to total emissions:
 - Perception: 19%
 - About 40% in reality
 - Certified green buildings cost premium:
 - Perception: 17%
 - 0-5% in reality

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



What is LEED®?

- Leadership in Energy and Environmental Design
 - Whole-building perspective
 - Provides common definition
 - Awards points for performance



What is LEED®?



What is LEED®?

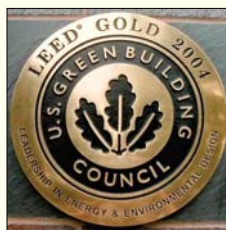
- Sustainable Sites
- Water Efficiency
- Energy & Atmosphere
- Materials & Resources
- Indoor Environmental Quality (IEQ)
- Innovation in Design

What is LEED®?



LEED® NC Process

- Register the project
- Include LEED strategies in design
- Submit "design phase" credits for review
- Document throughout construction
- Apply for certification
- Receive plaque



How NC, CS, CI & EB are Different

NC <i>Original rating system</i>	26 points minimum 69 points possible	Certification awarded only after construction
CS	23 points minimum 61 points possible	Precertification process
CI	21 points minimum 57 points possible	Certification awarded only after construction
EB	34 points minimum 92 points possible	Certification available only after 12 months of data post-occupancy

LEED® New Construction



LEED® Core & Shell



LEED® for Commercial Interiors



**Green Brokers:
what you need to know about
LEED-EB to be
extremely dangerous**



Green Building Services, Inc. © 2008



LEED-EB

» LEED for Existing Buildings:
Operations and Maintenance

*For building owners
and service providers
that address building
operation and on-going
upgrades and
performance
improvements.*



Oregon Convention Center, Portland, OR



What Existing Buildings Qualify?

- Operational for at least 12 months
- 75%+ Occupancy
- 100% of the floor area included in certification



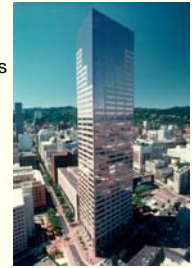
Why LEED-EB?

- LEED office buildings in Portland
 - New buildings – First to Market
 - Seeking highest LEED rating



Why LEED-EB?

- LEED office buildings in Portland
 - Existing buildings – Differentiation
 - Seeking LEED for Existing Buildings rating



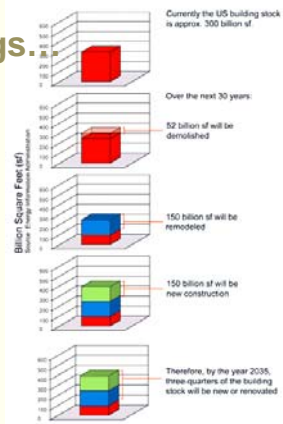
Why LEED-EB?

- Far more existing buildings than new construction
- LEED-NC is not a “good fit” for existing buildings
- Tracks O&M performance rather than focusing on design and construction practices



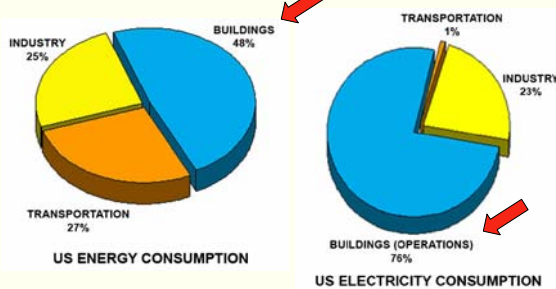
Existing Buildings

- 300 Billion Square Feet!
- In the commercial building sector, by 2030 we will:
 - Build 28 billion sq.ft.
 - Renovate 54 billion sq.ft.



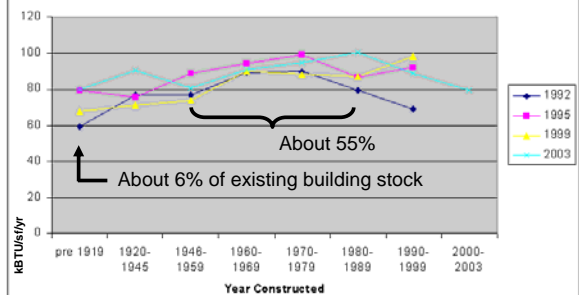
www.architecture2030.org

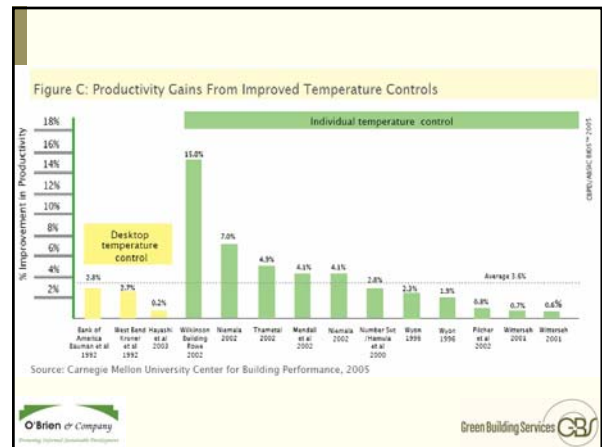
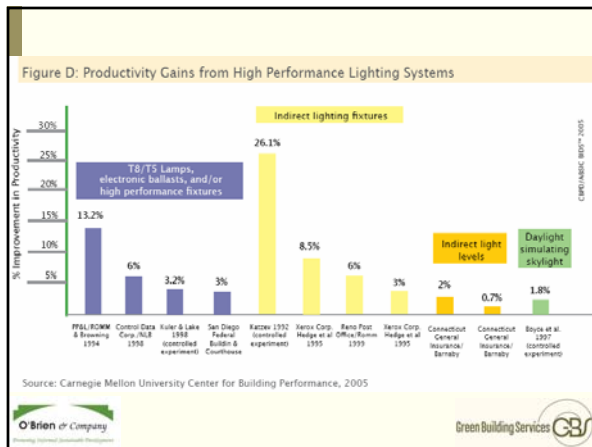
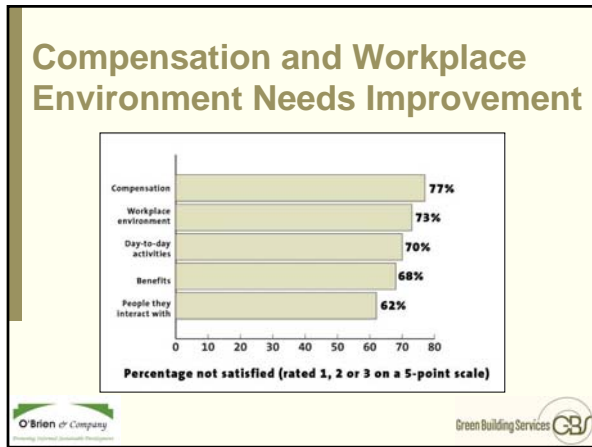
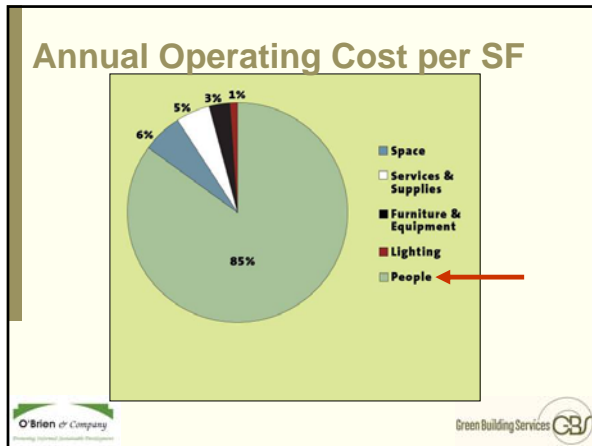
Because of this...



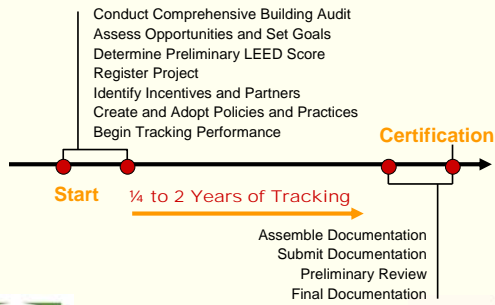
What have we learned?

Operating Energy: EUI by Age of Building





LEED-EB Certification Process



Sustainable Sites



LEED Scorecard

Existing	SUSTAINABLE SITES	12 points
	SSc1 LEED Certified Design and Construction	1
	SSc2 Building Exterior and Hardscape Management Plan	1
	SSc3 Integrated Pest Management, Erosion Control, and Landscape	1
	SSc4.1 Alternative Commuting Transportation, 10%	1
	SSc4.2 Alternative Commuting Transportation, 25%	1
	SSc4.3 Alternative Commuting Transportation, 50%	1
	SSc4.4 Alternative Commuting Transportation, 75% or greater	1
	SSc5.1 Reduced Site Disturbance - Protect or Restore Open Space	1
	SSc6 Stormwater Management	1
	SSc7.1 Heat Island Reduction - Non-Roof	1
	SSc7.2 Heat Island Reduction - Roof	1
	SSc8 Light Pollution Reduction	1
Total Points for Sustainable Sites		



Contracts: Exterior Management and Maintenance

Building Exterior and Hardscape Management Plan and Contract

- Does your plan provide language pertaining to the following areas?
 - Maintenance equipment
 - Snow and ice removal
 - Cleaning of building exterior
 - Paints and sealants used on building exterior
 - Cleaning of sidewalks, pavement and other hardscape



Sustainable Sites



Transportation Management Plan

- Alternative transportation commuting plan for employees?
- Bicycle racks for employees and visitors
- Changing and shower facilities
- Provide preferred parking for employees carpooling, access to mass transit or alternative-fuel refueling stations



Sustainable Sites



Transportation Management Plan

Transportation Survey- To be completed by each employee

Instructions: Please take a few minutes to answer the following questions about your transportation habits. Return the survey to your Green Team representative and the survey results will be compiled for the entire US Bancorp Tower and Plaza (USBT).

In the past week, how did you get to and from work?	M	T	W	Th	F
Drive alone					
Ride the Bus or Met					
Carpooled or Vanpooled					
Bicycled					
Walked					
Telecommuted					
TOOK DAY OFF FOR					
Compressed Work Week					
Work					
Other reason (regular day-off)					



Sustainable Sites

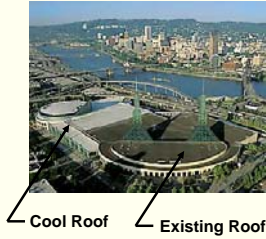


Heat Island Reduction

Building Roofing

- Suburban and Urban temperatures can be 2-10° warmer than surrounding undeveloped areas
- On a sunny 90° day a conventional roof can be 140-190° when a green roof is only 85°
- Reflective roofing materials also help

Oregon Convention Center



Sustainable Sites



Water Efficiency



LEED Scorecard

WATER EFFICIENCY		10 Points
WEp1	Minimum Indoor Plumbing Fixture and Fitting Efficiency	Required
WEc1.1	Water Performance Measurement - whole building metering	1
WEc1.2	Water Performance Measurement - submetering	1
WEc2.1	Additional Indoor Plumbing Fixture and Fitting Efficiency, 10%	1
WEc2.2	Additional Indoor Plumbing Fixture and Fitting Efficiency, 20%	1
WEc2.3	Additional Indoor Plumbing Fixture and Fitting Efficiency, 30%	1
WEc3.1	Water Efficient Landscaping - Reduce Potable Water Use by 50%	1
WEc3.2	Water Efficient Landscaping - Reduce Potable Water Use by 75%	1
WEc3.3	Water Efficient Landscaping - Reduce Potable Water Use by 100%	1
WEc4.1	Cooling Tower Water Management - Chemical Management	1
WEc4.2	Cooling Tower Water Management - Non-Potable Water Source Use	1
Total Points for Water Efficiency		10



Plumbing Fixtures and Fittings

- Which of the following codes does your building fall under?
 - Uniform Plumbing Code (UPC)
 - International Plumbing Code (IPC)
- Do you have a policy that provides a life cycle cost or economic assessment of conversion to high performance plumbing fixtures and fittings as part of any future indoor plumbing renovation?
 - The assessment or policy must account for potential water supply, disposal cost savings and maintenance cost savings



Water Efficiency



Plumbing Fixtures and Fittings

- Provide the following information for each fixture type

- Urinals
- Water Closets
- Lavatories
- Hand Wash Fountains
- Kitchen Sinks Showers
- Janitors Sinks
- Self Closing Faucets

Location Description	Fixture Model	Flow/Flush Rate [GPM or GPF]	Quantity of Fixtures	Number of Users



Water Efficiency



200 Market Building

Example

Water efficient fixtures and toilets

- \$53,000 Investment
- 1.5 Year Pay Back Period
- 67% Return on Investment
- Achieved 31.63% Water Use reduction beyond EPA Act



Fixtures	Current	EPA Act 1992
Water Closets	4.6 gpf	1.6 gpf
Urinals	3.6 gpf	1.0 gpf
Faucets	2.5 gpm	0.5 gpm



Water Efficiency



200 Market Building

Annual Water Use

Current Water Use
EP Act 1992
20% improvement over EP Act

O'Brien & Company
Russell Development Company, Inc., Cushman & Wakefield
Water Efficiency
Green Building Services GBS

Energy & Atmosphere

O'Brien & Company
Green Building Services GBS

ENERGY & ATMOSPHERE		30 Points
EA01	Energy Efficiency Best Management Practices - Planning	Required
EA02	Minimum Energy Efficiency Performance	Required
EA03	Refrigerant Management - Ozone Protection	1
EA1.1	Optimize Energy Performance, Energy Star Rating 67	1
EA1.2	Optimize Energy Performance, Energy Star Rating 69	1
EA1.3	Optimize Energy Performance, Energy Star Rating 71	1
EA1.4	Optimize Energy Performance, Energy Star Rating 73	1
EA1.5	Optimize Energy Performance, Energy Star Rating 75	1
EA1.6	Optimize Energy Performance, Energy Star Rating 77	1
EA1.7	Optimize Energy Performance, Energy Star Rating 79	1
EA1.8	Optimize Energy Performance, Energy Star Rating 81	1
EA1.9	Optimize Energy Performance, Energy Star Rating 83	1
EA1.10	Optimize Energy Performance, Energy Star Rating 85	1
EA1.11	Optimize Energy Performance, Energy Star Rating 87	1
EA1.12	Optimize Energy Performance, Energy Star Rating 89	1
EA1.13	Optimize Energy Performance, Energy Star Rating 91	1
EA1.14	Optimize Energy Performance, Energy Star Rating 93	1
EA1.15	Optimize Energy Performance, Energy Star Rating 95+	1
EA2.1	Existing Building Commissioning - Investigation and Analysis	2
EA2.2	Existing Building Commissioning - Implementation	2
EA2.3	Existing Building Commissioning - Ongoing Commissioning	2
EA3.1	Performance Measurement - Building Automation System	1
EA3.2	Performance Measurement - System-Level Metering, 40%	1
EA3.3	Performance Measurement - System-Level Metering, 80%	1
EA4.1	Renewable Energy - On-site 3% / Off-site 25%	1
EA4.2	Renewable Energy - On-site 6% / Off-site 50%	1
EA4.3	Renewable Energy - On-site 9% / Off-site 75%	1
EA4.4	Renewable Energy - On-site 12% / Off-site 100%	1
EA5	Refrigerant Management	1
EA6	Emissions Reduction Reporting	1
Total Points for Energy & Atmosphere		30

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Energy & Atmosphere
Green Building Services GBS

Energy-Best Management Practices

- Have you conducted an Energy Audit that meets the requirements of the ASHRAE Level 1 walk through assessment completed on your building?
 - Level I: a preliminary analysis of the "Energy Use Index" which is looking at the way energy is being used based on metering, the related bills and comparing them to a typical building in the same category

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Green Building Services GBS

Energy-Best Management Practices

- Provide a building operating plan that provides details on how your building is to be operated and maintained
 - Occupancy Schedule
 - Equipment run time schedule
 - Design set points for all HVAC equipments, and design lighting levels throughout the building
 - Identify any changes in schedules or set points for different seasons, days of the week and times of day
 - How do you confirm that the operating plan has been met?

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Energy Performance- Energy Star Compliance

- Conduct an EPA-Energy Performance Rating (Energy Star Rating) utilizing the EPA Portfolio Manager tool

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Energy Performance- Energy Star Compliance

- Energy Star Score of existing buildings



Energy Star Portfolio Manager



Commissioning

Investigation & Analysis

- Determine
 - Developed a retro-commissioning, re-commissioning or ongoing Cx plan for the building's major energy using systems.
- OR
- Conduct an energy audit that meet the requirements of ASHRAE, Level II, Energy Survey & Analysis
- Document the energy use breakdown
- Perform a savings and cost analysis of all practical measures
- List the identified capital improvements that will provide cost effective energy savings

Commissioning

Implementation

- Determine
 - No-low cost operation improvements and create a capital plan for major retrofits and upgrade
 - Provide training for management staff that addresses: energy efficiency and building, equipment and systems operations and maintenance
 - Show anticipated or observed costs and benefits of measures implemented
 - Update the building operating plan as necessary to reflect any changes in the occupancy schedule, equipment run-time schedule, design set points and lighting levels

Existing Building Commissioning

Ongoing Commissioning

- Implement commissioning program to include
 - planning, system testing, performance verification, corrective action response, ongoing measurement and documentation
- Provide the following information
 - A written plan that summarizes the overall commissioning cycle
 - The scope of work completed
 - Written updates that reflect any changes in operational schedules, design set points, lighting levels, or system specifications

Materials & Resources

LEED Scorecard

MATERIALS & RESOURCES			14 Points
MRp1	Sustainable Purchasing Policy	Required	1
MRp2	Solid Waste Management Policy	Required	1
MRc1.1	Sustainable Purchasing - Ongoing Consumables, 40%	1	1
MRc1.2	Sustainable Purchasing - Ongoing Consumables, 60%	1	1
MRc1.3	Sustainable Purchasing - Ongoing Consumables, 80%	1	1
MRc2.1	Sustainable Purchasing - Durable Goods, electric	1	1
MRc2.2	Sustainable Purchasing - Durable Goods, furniture	1	1
MRc3	Sustainable Purchasing - Facility Alterations and Additions	1	1
MRc4.1	Sustainable Purchasing - Reduced Mercury in Lamps, 90 pp/lum-hr	1	1
MRc4.2	Sustainable Purchasing - Reduced Mercury in Lamps, 70 pp/lum-hr	1	1
MRc5	Sustainable Purchasing - Food	1	1
MRc6	Solid Waste Management - Waste Stream Audit	1	1
MRc7.1	Solid Waste Management - Ongoing Consumables, 50%	1	1
MRc7.2	Solid Waste Management - Ongoing Consumables, 70%	1	1
MRc8	Solid Waste Management - Durable Goods	1	1
MRc9	Solid Waste Management - Facility Alterations and Additions	1	1
Total Points for Materials & Resources			14

0 0 0

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Policies

Structure of a Policy

- **Scope:** Describe the O&M process to which the policy applies. Describe the building components, systems & materials
- **Performance Matrix:** Describe the O&M process to which the policy applies
- **Goals:** Identify sustainability goals
- **Procedures and Strategies:** Outline the procedures & strategies in place to meet the goals and intent of the policy
- **Responsible Party:** Identify the team and individuals involved in activities pertaining to the policy

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Green Building Services GBS

Sustainable Purchasing Policy

- Develop an Environmental Preferable Purchasing (EPP) Policy
- Do policies address the following?
 - Sustainable Purchasing – Ongoing Consumables
 - Sustainable Purchasing – Durable Goods
 - Sustainable Purchasing – Facility Alterations and Additions
 - Toxic Material Source Reduction – Reduced Mercury in Lamps

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Solid Waste Management Policy

- Develop an Environmental Preferable Purchasing Policy (EPP)
- Do policies address the following?
 - Sustainable Purchasing – Ongoing Consumables
 - Sustainable Purchasing – Durable Goods
 - Sustainable Purchasing – Facility Alterations and Additions
 - Toxic Material Source Reduction – Reduced Mercury in Lamps



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Solid Waste Management

- Conduct solid waste audit
- Describe current waster stream, based on audit or visual reference
- Create Waste Reduction and Recycling Program that addresses
 - Ongoing Materials
 - Durable Goods
 - Facility Alterations and Additions



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Indoor Environmental Quality

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LEED Scorecard



INDOOR ENVIRONMENTAL QUALITY		19 Points
EQp1	Outdoor Air Introduction and Exhaust Systems	Required
EQp2	Environmental Tobacco Smoke (ETS) Control	Required
EQp3	Green Cleaning Policy	Required
EQc1.1	IAQ Best Management Practices - IAQ Management Program	1
EQc1.2	IAQ Best Management Practices - Outdoor Air Delivery Monitoring	1
EQc1.3	IAQ Best Management Practices - Increased Ventilation	1
EQc1.4	IAQ Best Management Practices - Reduce Particulates in Air Distribution	1
EQc1.5	IAQ Best Management Practices - IAQ Management for Facility	1
EQc2.1	Occupant Comfort - Occupant Survey	1
EQc2.2	Occupant Comfort - Occupant Controlled Lighting	1
EQc2.3	Occupant Comfort - Thermal Comfort Monitoring	1
EQc2.4	Occupant Comfort - Daylight and Views, 50% Daylight / 45% Views	1
EQc2.5	Occupant Comfort - Daylight and Views, 75% Daylight / 90% Views	1
EQc3.1	Green Cleaning - High Performance Cleaning Program	1
EQc3.2	Green Cleaning - Custodial Effectiveness Assessment, < 3	1
EQc3.3	Green Cleaning - Custodial Effectiveness Assessment, < 2	1
EQc3.4	Green Cleaning - Sustainable Cleaning Products and Materials, 30%	1
EQc3.5	Green Cleaning - Sustainable Cleaning Products and Materials, 60%	1
EQc3.6	Green Cleaning - Sustainable Cleaning Products and Materials, 90%	1
EQc3.7	Green Cleaning - Sustainable Cleaning Equipment	1
EQc3.8	Green Cleaning - Entryway Systems	1
EQc3.9	Green Cleaning - Indoor Integrated Pest Management	1

Total Points for Indoor Environmental Quality

Outdoor Air Introduction and Exhaust Systems



- Supply outdoor air ventilation rate required by ASHRAE 62.1-2007
- If not, modify system to provide >10 CFM of outdoor air per person
- Take measurements at system level
- Implement HVAC systems maintenance program to ensure proper operations and maintenance
- How often do you test and maintain operation of building exhaust systems




Indoor Environmental Quality
Green Building Services 

Occupant Comfort

- Do you have a method of assessing occupant's comfort in the following areas?
 - Thermal comfort
 - Acoustics
 - Indoor Air Quality
 - Lighting Levels
 - Building Cleanliness
- If so, what corrective actions have you implemented to date?




Indoor Environmental Quality
Green Building Services 

Occupant Comfort

Building Occupant Comfort Survey- To be completed by each employee

Instructions:
Your company's US Energy Tower and Plans (USBT) Green Team member will distribute this survey least once a quarter to 30% of employees. Please take a few minutes to fill out the following questions. Usico has developed a plan for corrective action to address any identified problems or concerns according to your responses below. The survey should take less than 10 minutes.



Thermal Comfort	
	Please describe below
What is the approximate outside air temperature (in: 60 deg F)?	
Is the sky clear or overcast?	
Are the seasonal conditions normal?	
What clothing are you wearing (shorts/ dress, lightly dressed)?	


Indoor Environmental Quality
Green Building Services 

Green Cleaning Policy

- Green Cleaning Policy addresses the following:
 - Development of guidelines for storing hazardous chemicals
 - Development of staff training in general maintenance and handling of hazardous materials
 - Feedback loop from occupants and means to measure continuous improvements




Indoor Environmental Quality
Green Building Services 

Innovation in Operations


Indoor Environmental Quality
Green Building Services 

LEED Scorecard

INNOVATION IN HIGH PERFORMANCE OPERATIONS		7 Points
IPc1.1	Innovation in Operations	1
IPc1.2	Innovation in Operations	1
IPc1.3	Innovation in Operations	1
IPc1.4	Innovation in Operations	1
IPc2	LEED® Accredited Professional	1
IPc3	Documenting Sustainable Building Cost Impacts	2



It's a first: Bay Area businesses to pay CO2 fee

Air quality board adds to San Francisco's green image, though not all happy

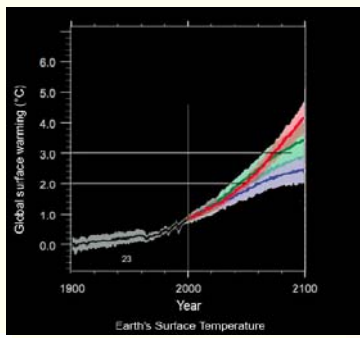


San Francisco Mayor Gavin Newsom, seen here May 14 testifying in Congress about climate-related building policies, is one of the driving forces behind efforts to reduce greenhouse gas emissions in the Bay Area.

Associated Press updated 2:16 p.m. PT, Wed., May 23, 2009
 SAN FRANCISCO - Air pollution regulators in the San Francisco Bay area voted overwhelmingly Wednesday to approve new rules that impose fees on businesses for emitting greenhouse gases.
 The Bay Area Air Quality Management District's board of directors voted 15-1 to charge companies 4.4 cents per ton of carbon dioxide.



Be part of the solution...



Green Broker

- Content geared to the needs of commercial brokers
- Valuable resources from a broad spectrum of sources
- Case studies
- Selected readings
- Learning exercises
- On-line exam
- Green Broker designation

"We see brokers as true 'agents for change' within the commercial real estate community."
 - Jean M. Lupinacci, Director, Commercial and Industrial Branch, Energy Star



Green Broker

Ten 3-hour Webinar Modules

1. What is Green Building?
2. The Business Case for Greening Commercial Buildings
3. Location, Location, Location
4. Greening the Process
5. Introduction to Energy
6. Introduction to Indoor Environmental Quality
7. Materials
8. Site and Water
9. Low Hanging Fruit
10. Virtual Building Tour

"When realtors enter the conversation on green building and make it work, you know things are going to move..."
 - Karen Cook, NAR Realtor



Q & A

Thank you!

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