


**LEED Post-Occupancy Evaluation:
Taking Responsibility for the Occupants**




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CENTER FOR THE BUILT ENVIRONMENT, UC BERKELEY

Center for the Built Environment (CBE)

Our Mission: To improve the design, operation, and environmental quality of buildings by providing timely, unbiased information on building technologies and design techniques



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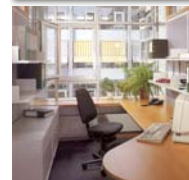
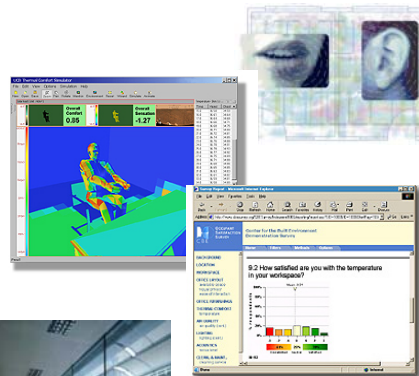
 Trane
 U.S. Department of Energy (DOE)*
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CBE research programs

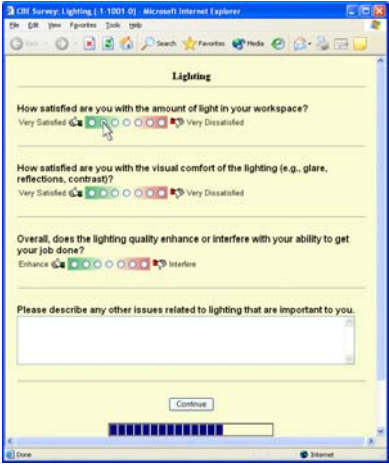
- Indoor Environmental Quality
- Envelope and Façade Systems
- Workplace Design
- Underfloor Air Distribution (UFAD)
- Building Information Technology



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CBE IEQ Survey

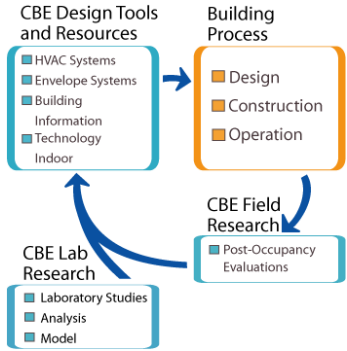
- Encourage the use of occupant feedback to improve building design and operation
- Web-based occupant IEQ survey & reporting tool
 - Inexpensive and fast
 - Automatic reporting function
 - Standardized repository of survey responses



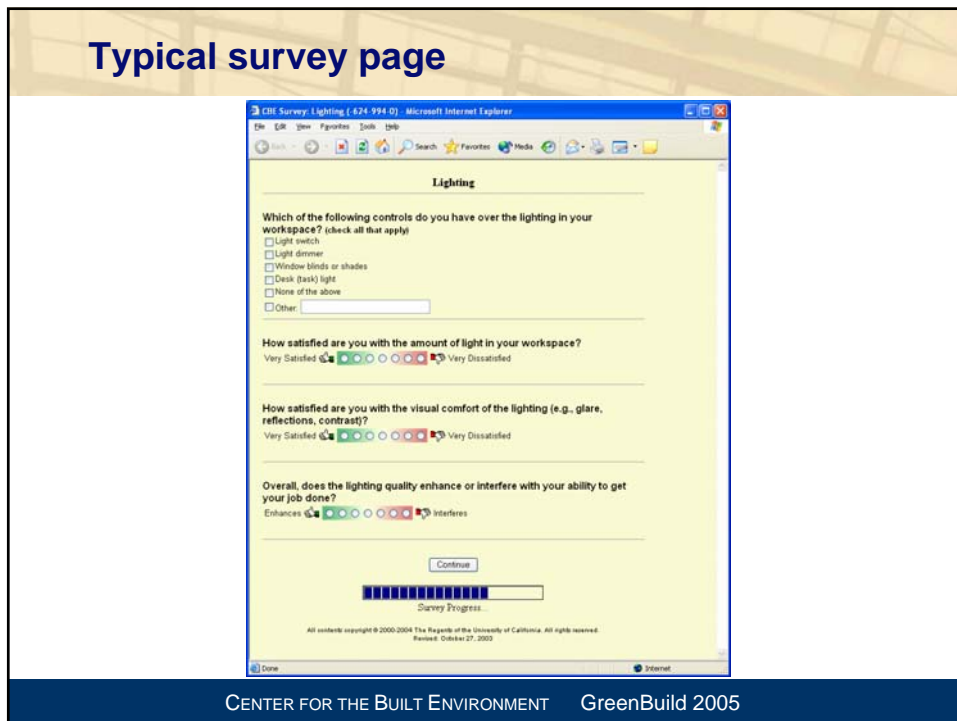
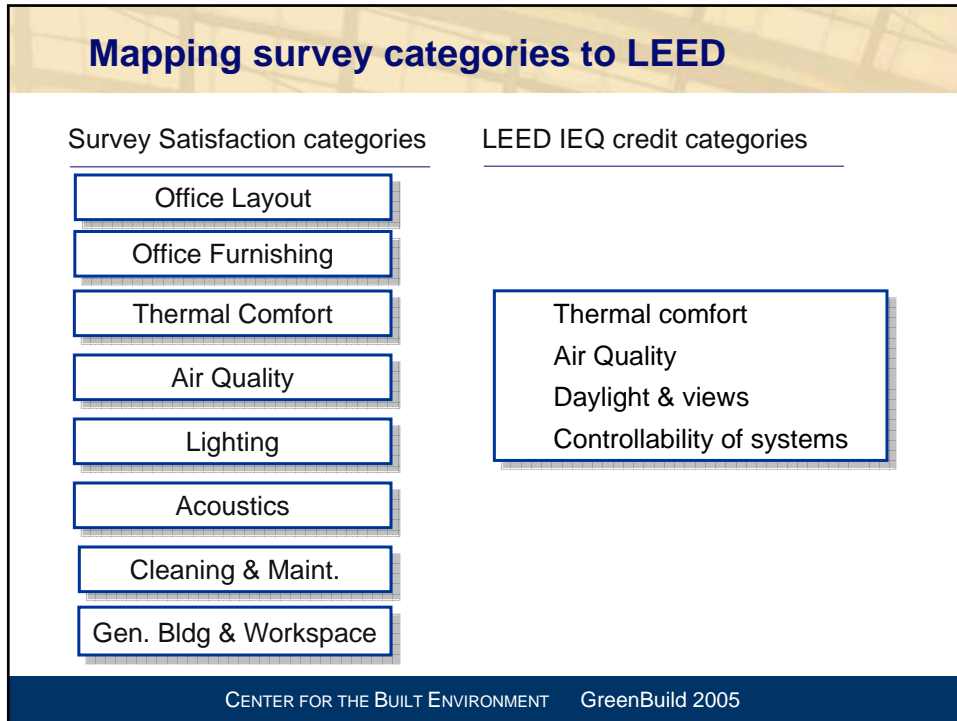
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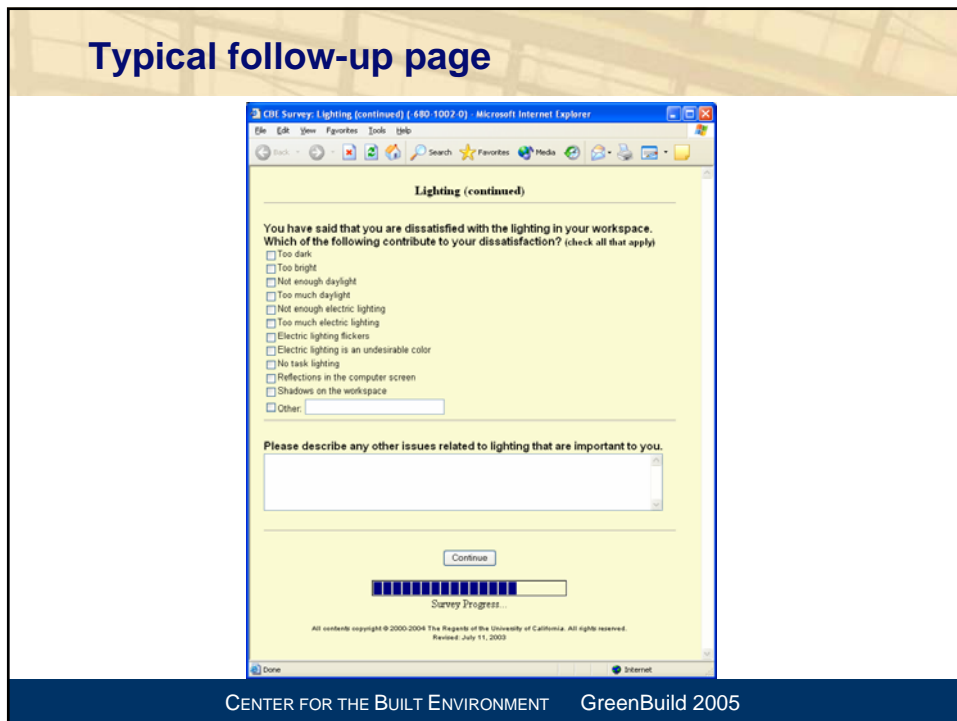
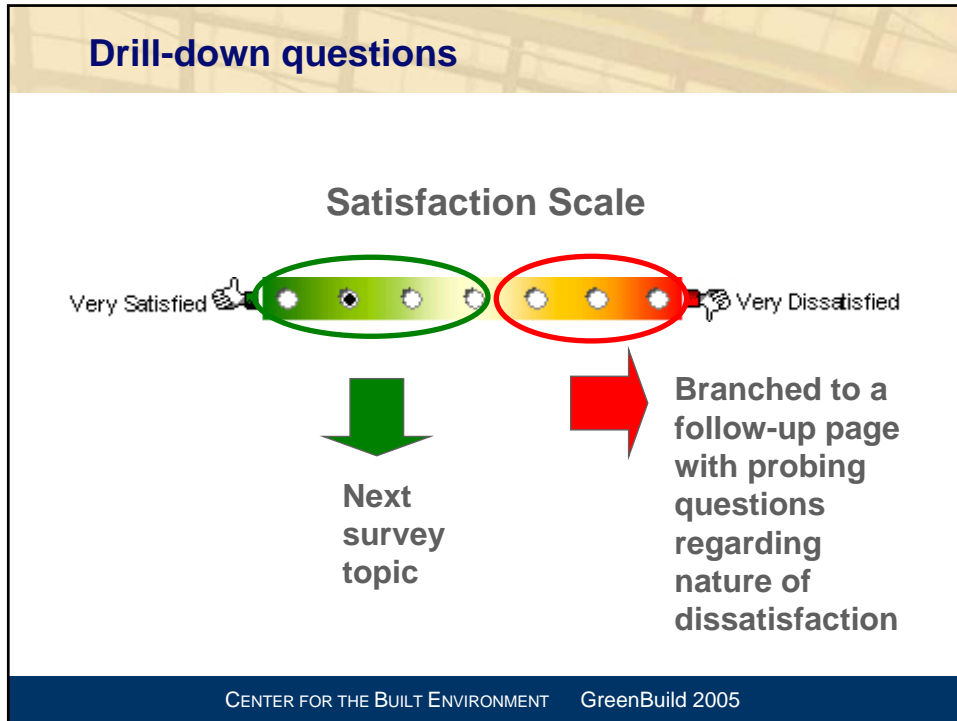
Feedback

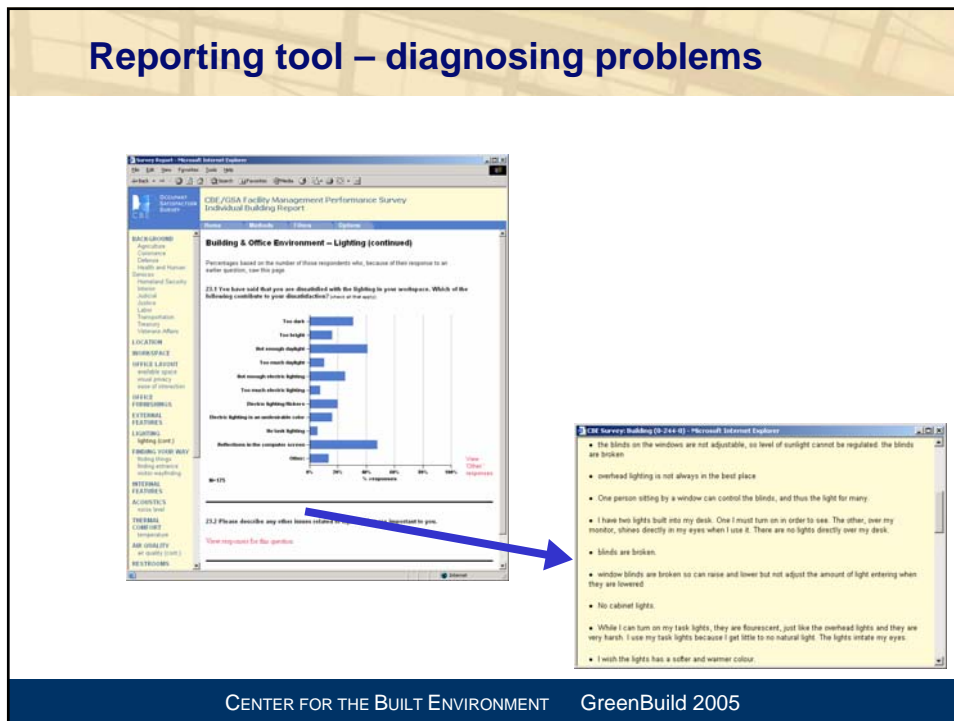
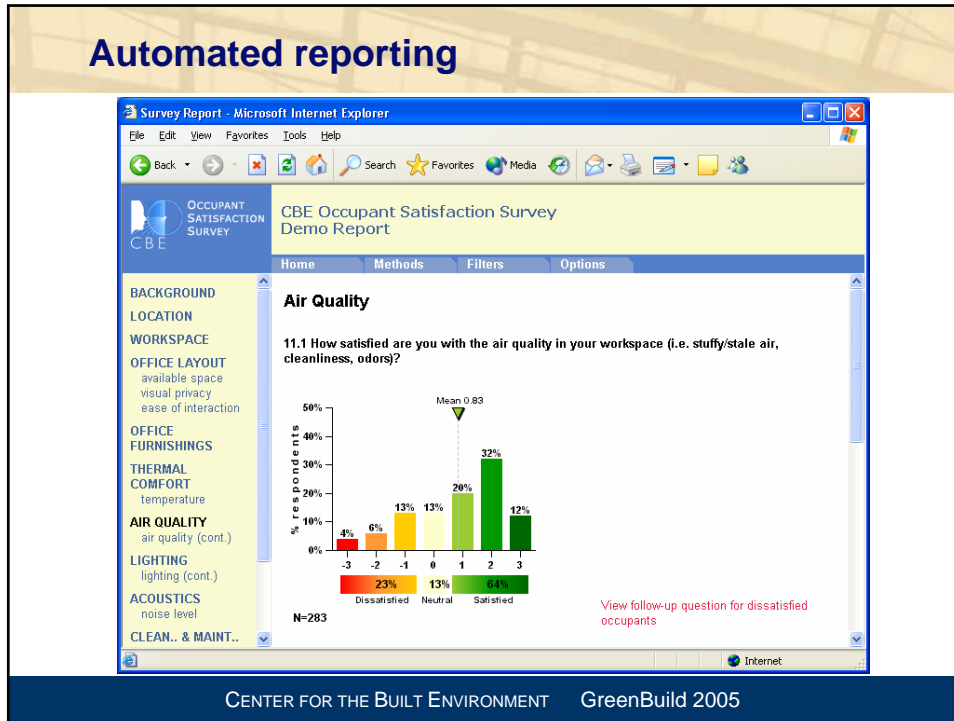
- Feedback from building users helps us understand how buildings truly perform in practice
 - Diagnostics
 - Benchmarking
 - Trend analysis
- Build on successes - Avoid repeating mistakes

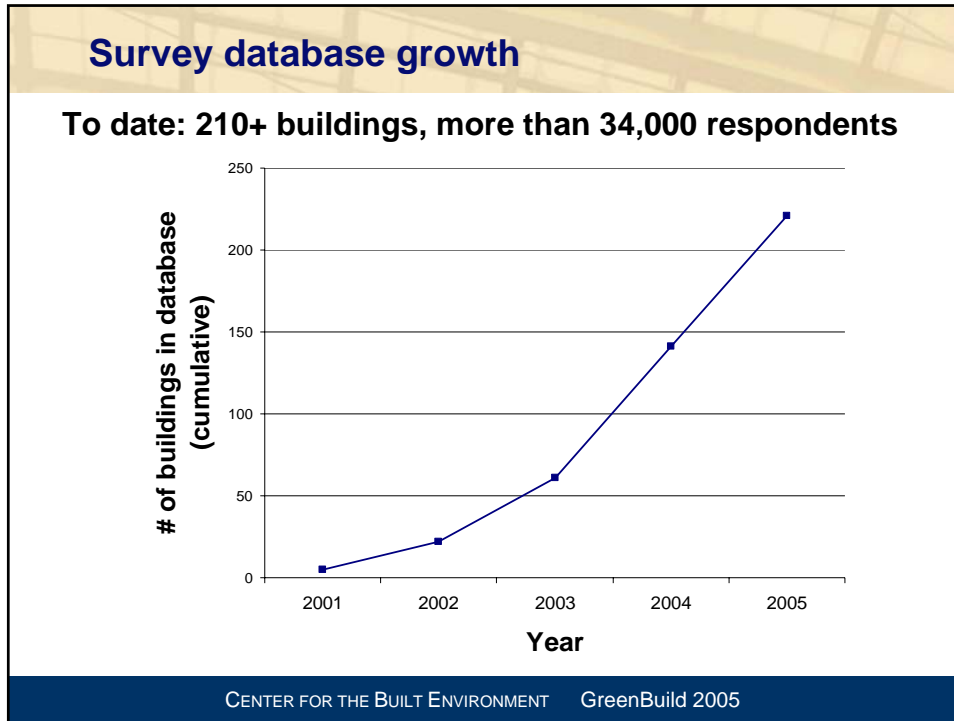


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LEED survey promotion

- Goal: assessing performance of green buildings from the occupants perspective
- Since October 2004, 16 LEED-certified and 9 “self-nominated” green buildings surveyed

Free Web-Based Occupant Survey Offer Available

For a limited time, the Center for the Built Environment (CBE) will implement its Occupant Survey in LEED™ certified buildings, free of charge. See details below.




Left: Chesapeake Bay Foundation, LEED™ Platinum © 2001 P. Patel
Right: Whitehead Biomedical Research Bldg, LEED™ Silver © 2004 HOK

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LEED buildings in database

- 16 LEED rated buildings surveyed
- Many LEED products and versions included in sample:


NC	1.0	Platinum	2
NC	2.0	Platinum	1
NC	2.0	Gold	2
NC	2.0	Silver	3
NC	2.0	Certified	1
NC	2.0	pending	1
NC	2.1	Gold	1
CI	Pilot	Platinum	1
CI	Pilot	Gold	1
CI	Pilot	pending	1
CI	2.0	Certified	1
EB	Pilot	Gold	1



Chesapeake Bay
Foundation



Chicago Center for
Green Technology



Johnson Diversey Global Headquarters

NC=New Construction; EB=Existing Buildings; CI=Commercial Interiors

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Self-nominated green buildings

- 9 buildings identified by building design team or owner:
 - 3 received national AIA Top 10 Green Building Awards
 - 2 received *Environmental Design & Construction* awards
 - 1 received Savings by Design award
 - 1 received local awards



Carnegie Center for
Global Ecology



National Wildlife
Federation



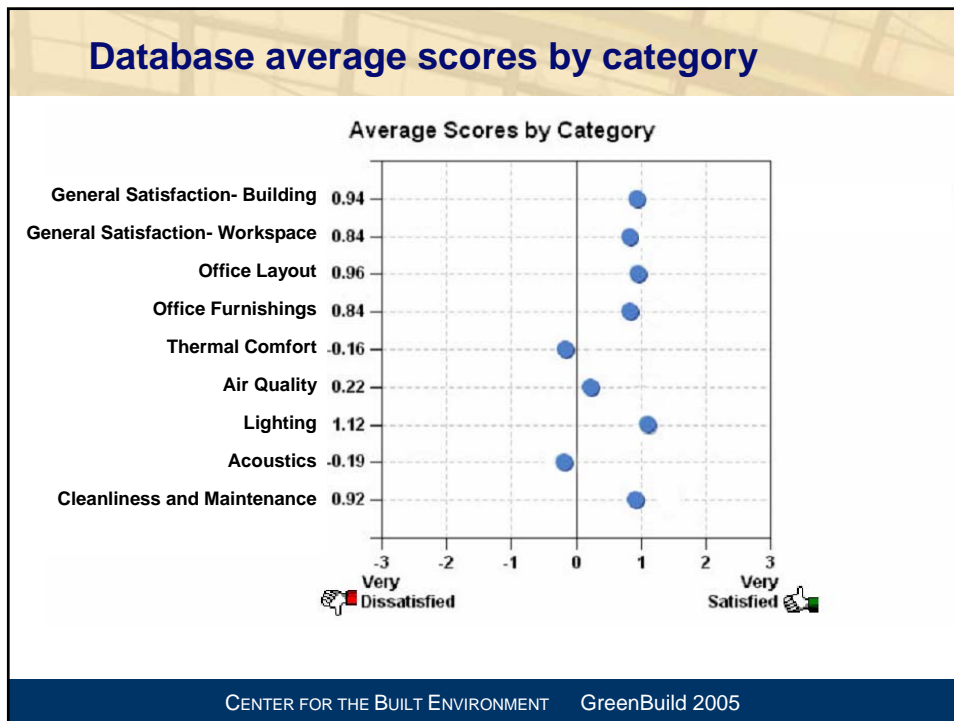
World Resources
Institute

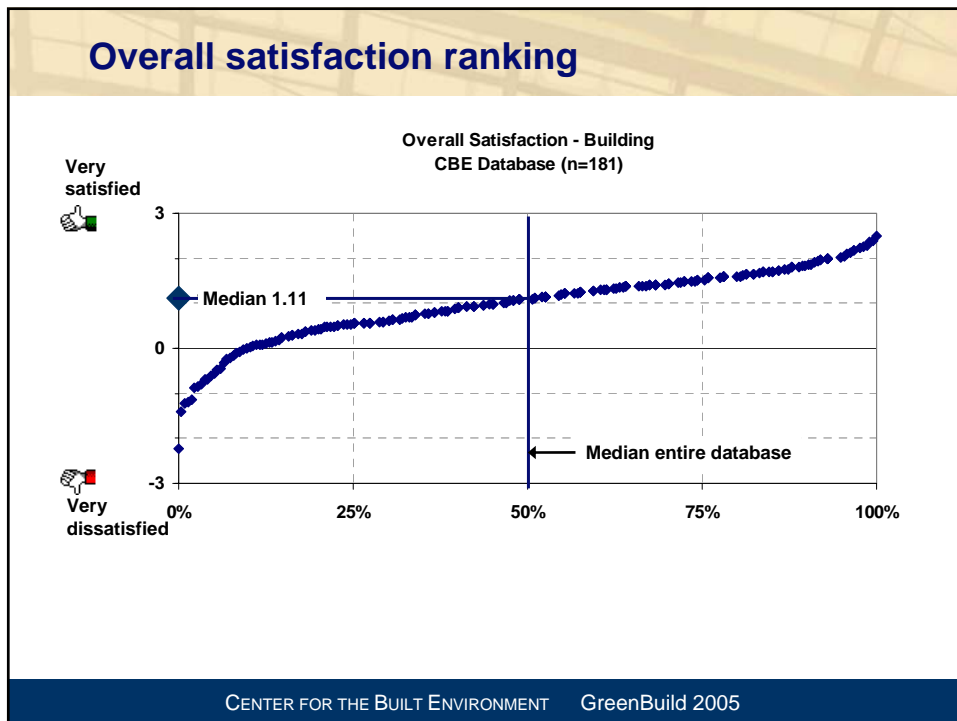
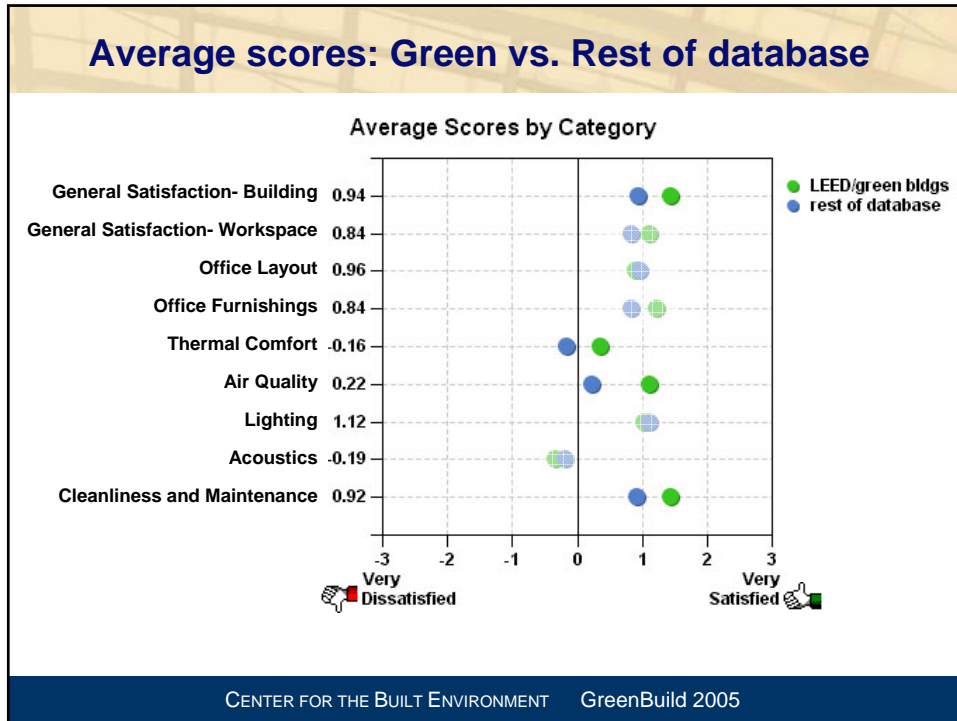
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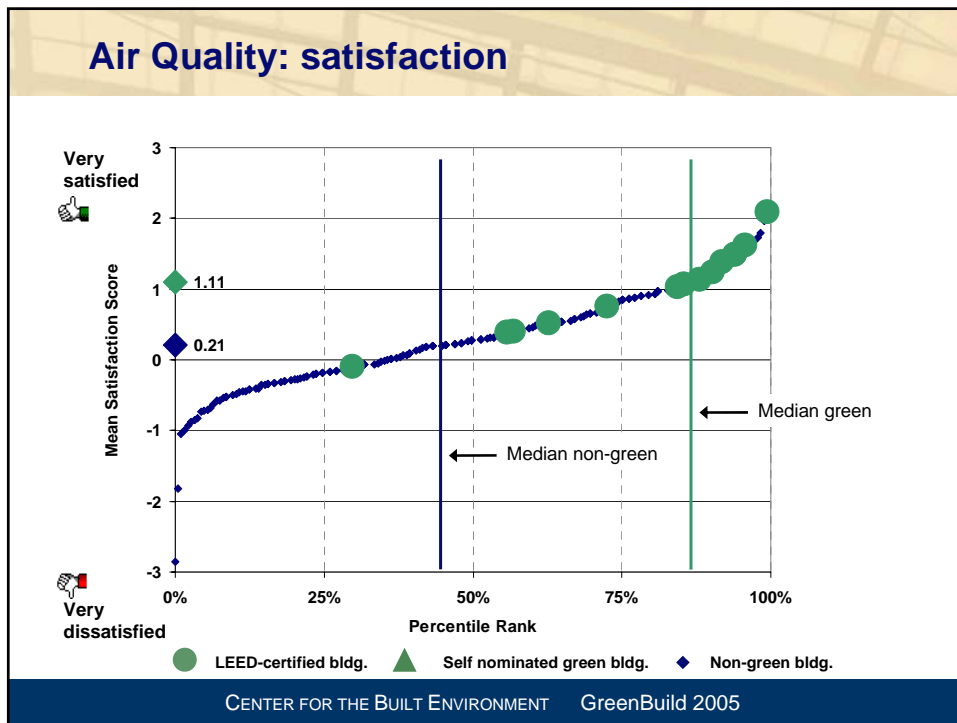
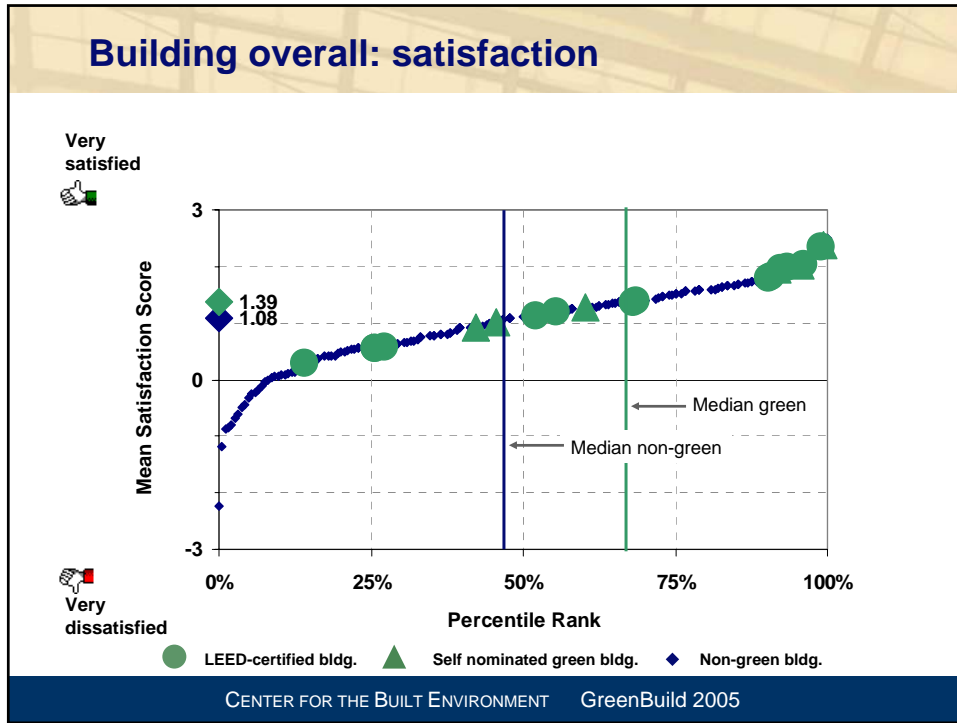
Categories in LEED – NC 2.1 & EB 2.0

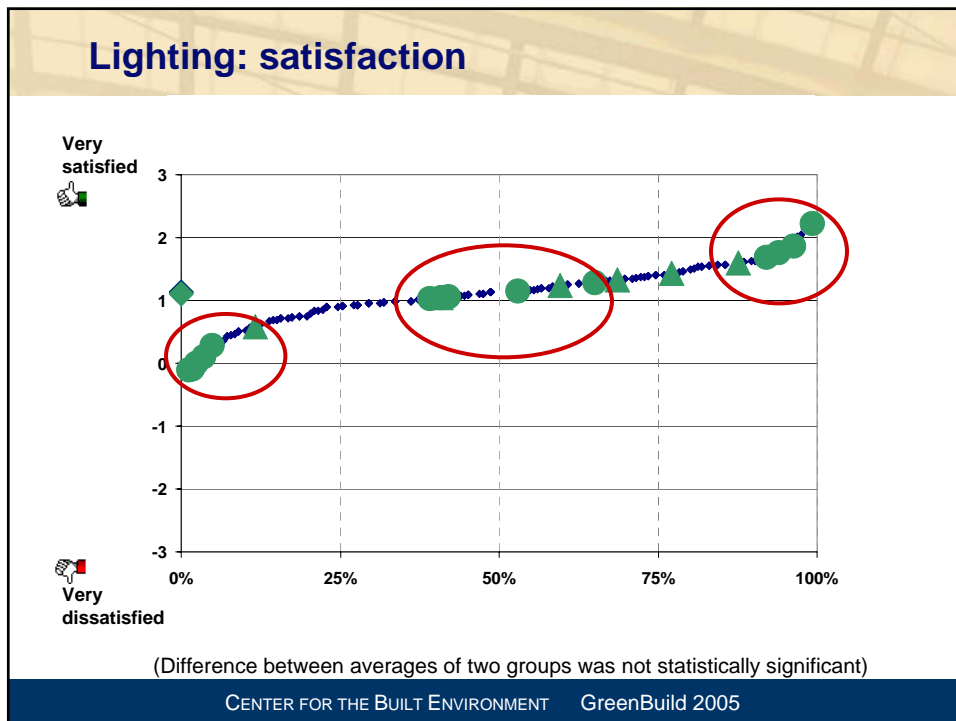
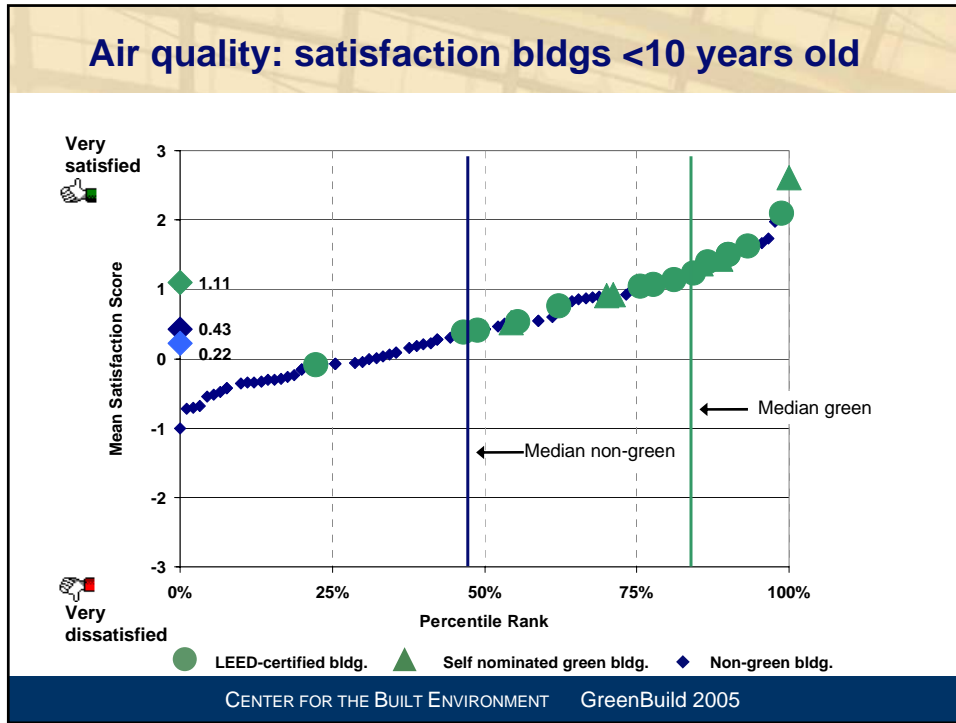
	LEED - NC	LEED - EB
Sustainable Sites	14	14
Water Efficiency	5	5
Energy & Atmosphere	17	23
Materials & Resources	13	16
Indoor Environmental Quality	15	22
Innovation & Design Process	5	5
Total	69	85
% of IEQ credit points	22%	26%

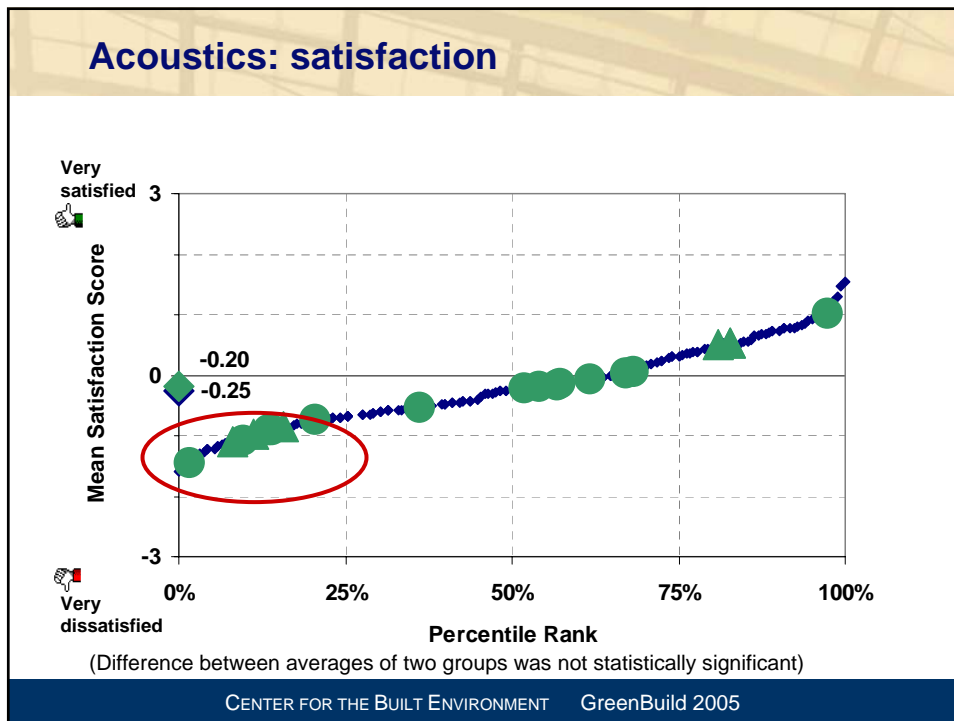
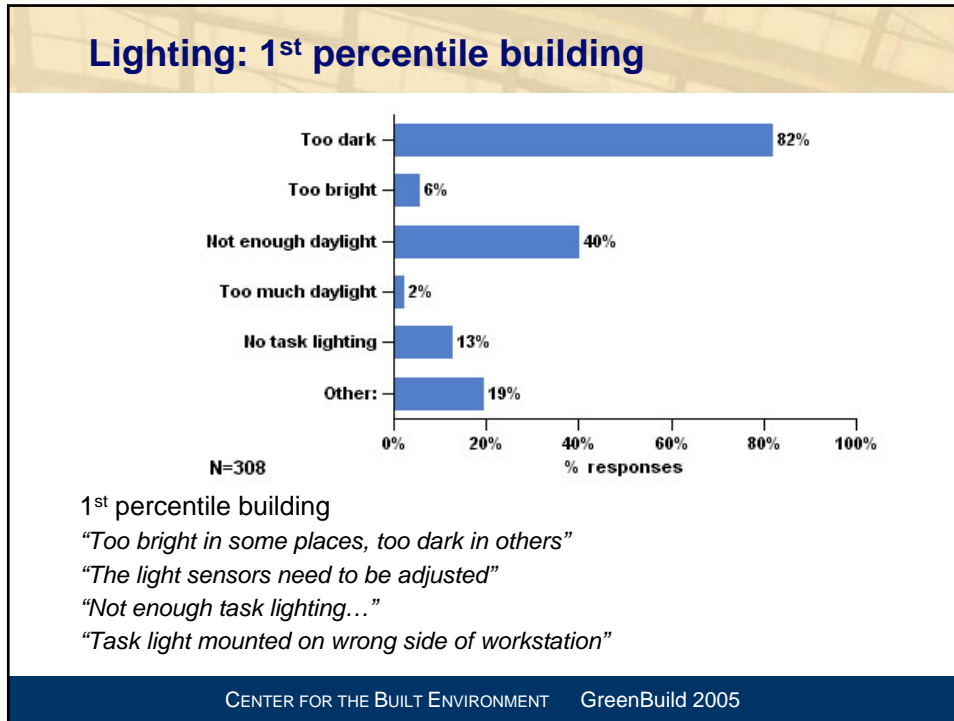
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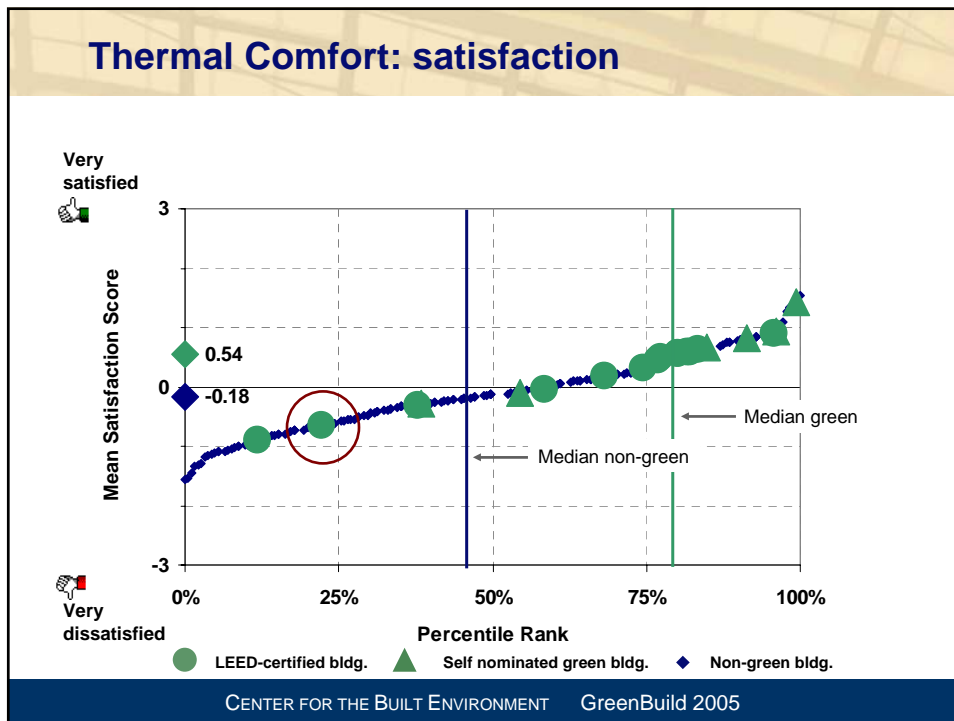
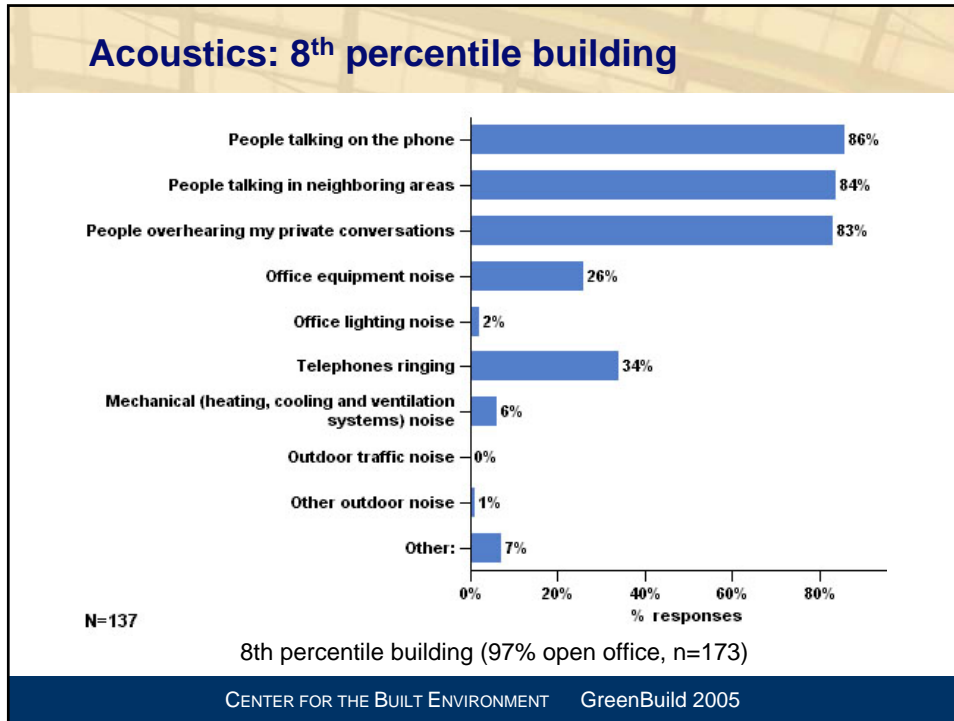


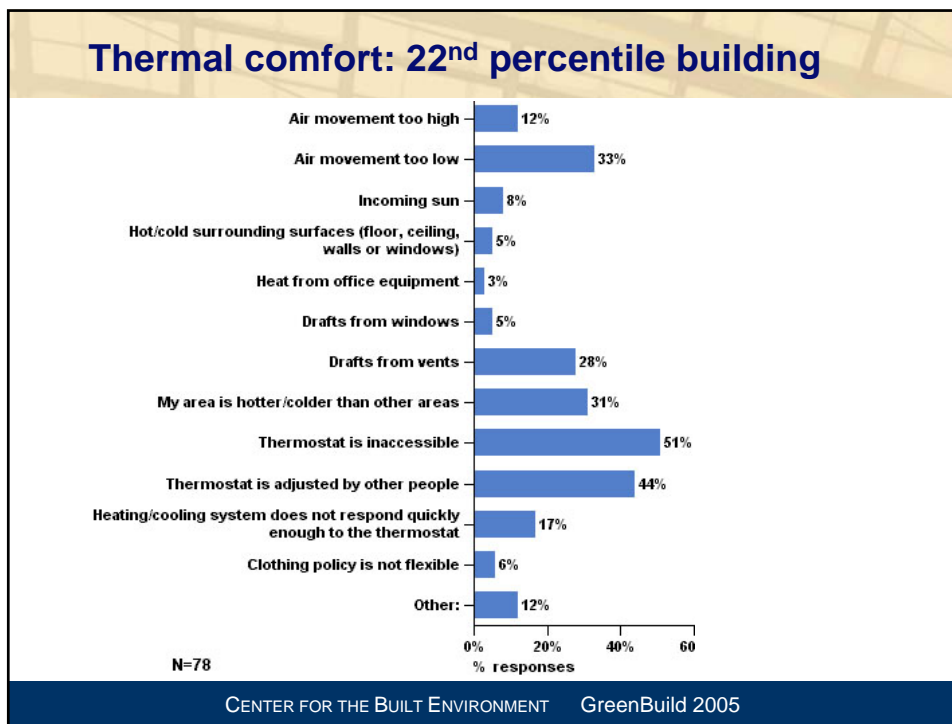












LEED NC IEQ Credit 7.1

- **7.1 – Compliance with ASHRAE Standard 55**
 - 80% occupant satisfaction with thermal environment
 - Specifies temperatures, humidity, etc. to achieve that
- **How are we doing?**
 - Non-LEED buildings: 10% of buildings meet the criteria of 80% or more occupants satisfied with thermal comfort
 - LEED buildings: 20% of buildings meet the criteria

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IEQ Credit 7.2

- **NC v2.1 IEQ Credit 7.2 – Permanent monitoring system**
 - Per ASHRAE Standard 55
 - Every workstation?
 - Measure temperature, MRT, air velocity, humidity?

- **NC v2.2 IEQ Credit 7.2 – Occupant survey**
 - 6-18 months after occupancy
 - Develop corrective action plan if less than 80% of occupants are satisfied

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Conclusion

- For buildings in the CBE database, LEED and self-nominated green buildings received statistically significant higher scores from occupants for:
 - **General building satisfaction**
 - **Indoor air quality**
 - **Thermal comfort**
- LEED and self-nominated green buildings did not perform better for:
 - **Lighting**
 - **Acoustics**
- No clear relationship found between LEED credit points and occupant satisfaction with IEQ
- LEED by itself does not *guarantee* better IEQ



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<http://www.cbe.berkeley.edu/>

Questions

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Survey demo:

www.cbesurvey.org



If you want to
know something,
just ask...

