

8-21-2014

Demand for Green Buildings: Office Tenants' Willingness to Pay for Green Features

Robert A. Simons
Cleveland State University, r.simons@csuohio.edu

Eunkyu Lee

Spenser Robinson

Andrew Kern

How does access to this work benefit you? Let us know!

Follow this and additional works at: https://engagedscholarship.csuohio.edu/urban_facpub

 Part of the [Urban Studies and Planning Commons](#)

Repository Citation

Simons, Robert A.; Lee, Eunkyu; Robinson, Spenser; and Kern, Andrew, "Demand for Green Buildings: Office Tenants' Willingness to Pay for Green Features" (2014). *Urban Publications*. 0 1 2 3 1247.
https://engagedscholarship.csuohio.edu/urban_facpub/1247

This Presentation is brought to you for free and open access by the Maxine Goodman Levin College of Urban Affairs at EngagedScholarship@CSU. It has been accepted for inclusion in Urban Publications by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.

Demand for Green Buildings: Office Tenants' Willingness to Pay for Green Features

Robert Simons and Eunkyu Lee (CSU)

Spenser Robinson and Andrew Kern (CMU)

Aug 21th, 2014

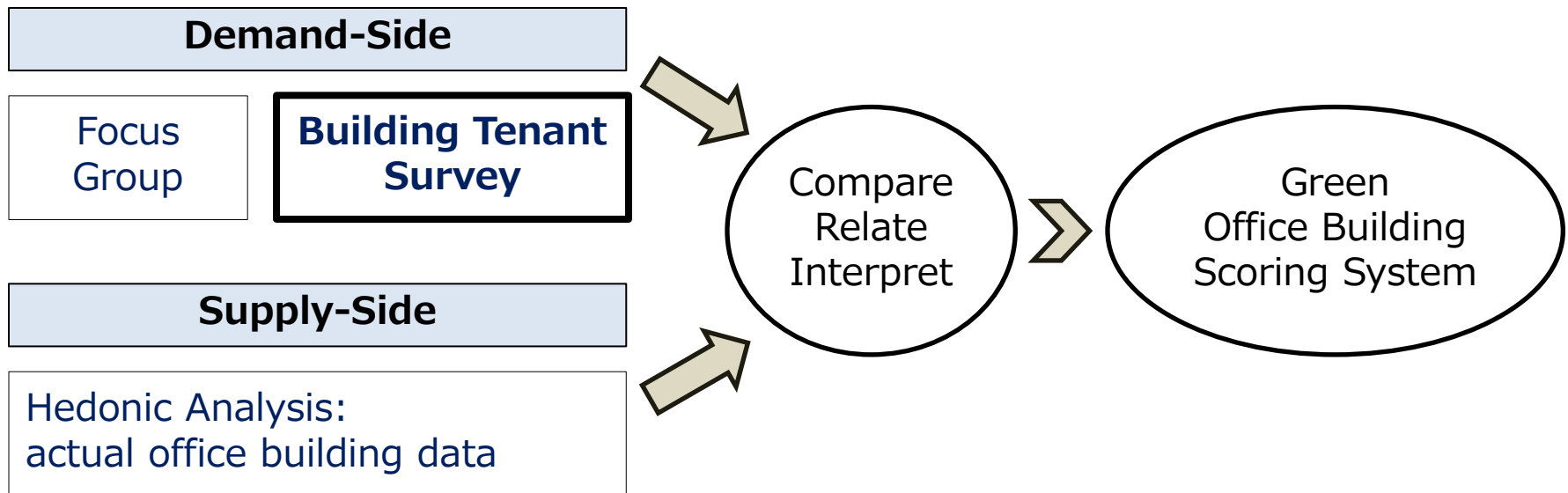
This project was funded by the CBRE Green Research Challenge.

Overview

- 1 CBRE Green Building Research Project - Context
- 2 Background: Green Building by Numbers
- 3 Research Process: Focus Group and Survey
- 4 Analysis & Discussions
- 5 Q & A

Green Office Building Project - Context

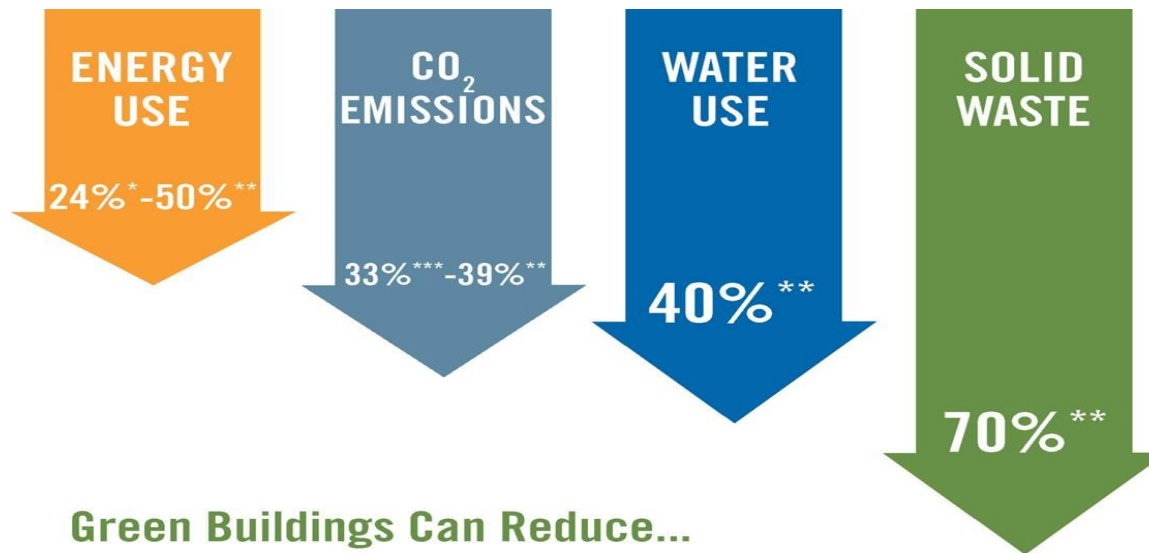
- CBRE “Green Research Challenge” program
- Create a green office building scoring system (e.g. FICO credit score)
- Mix of demand and supply-side green office building measures



Background - Buildings by numbers

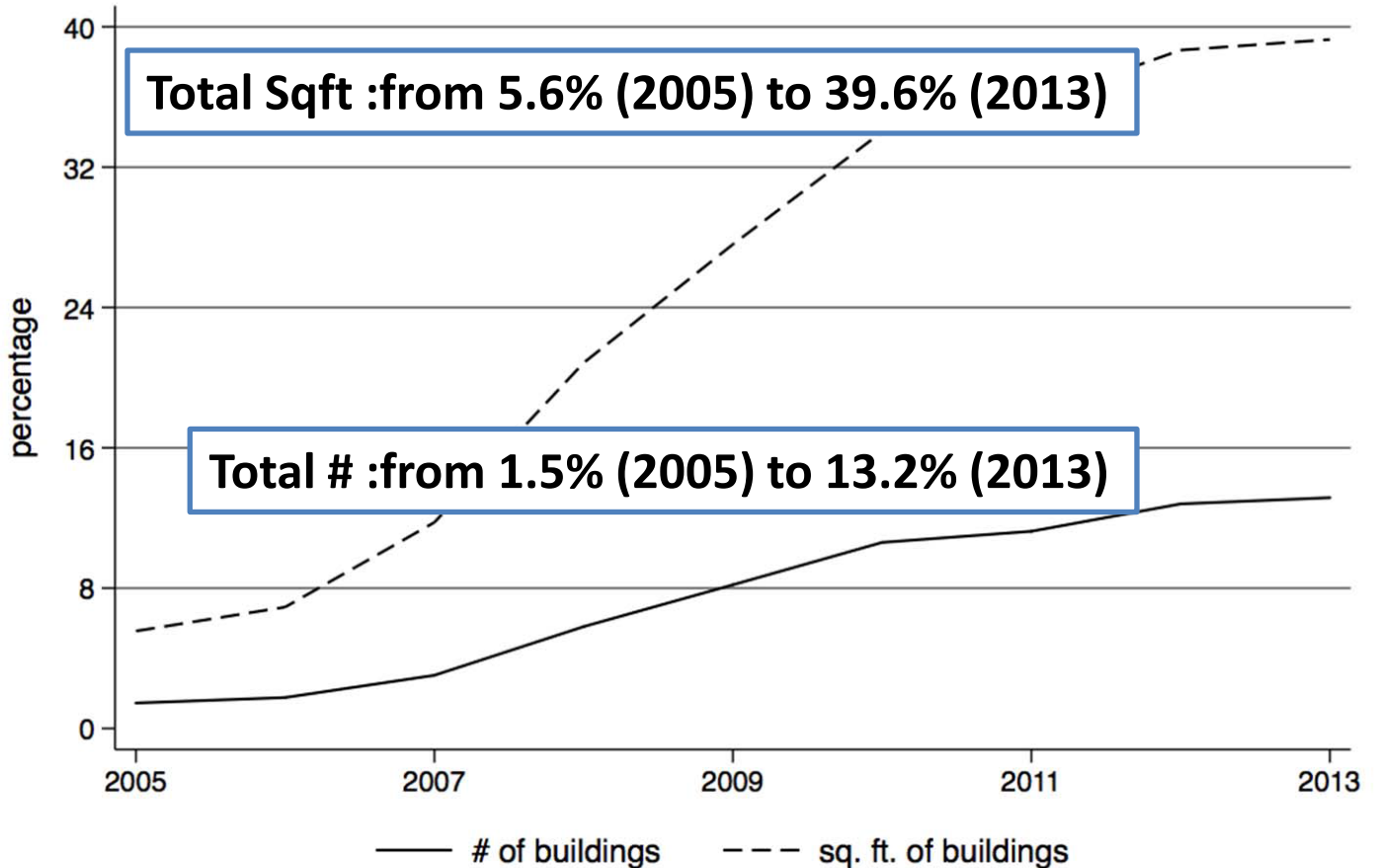


- 41% U.S. energy use (EPA, 2012)
- 72% electricity consumption (EIA, 2008)
- 40% of CO₂ emissions (DOE, 2012)
- 14% water consumption (US Geological Survey, 2000)



Turner and Frankel (2008); Kats (2003); GSA Public Building Service (2008); and USGBC

Diffusion of Green Office Building



**Rank 1st: Minneapolis, 77% of office space is green-certified
(supported by financial incentive programs)**

Source: CBRE (2014)

Literature Review & Research Gaps

EPA's **Definition** of Green Building:

- Maximizing the efficiency of buildings' resources (e.g. energy, water)
- Minimizing buildings' impacts on the environment and human health

Market Premium

- 10% property value premium (Miller, Spivey, and Florance, 2008)
- 7-8% rental price premium (Kok, Miller, and Morris, 2012)

Employee Productivity (Miller, Pogue, Gough, and Davis, 2009)

Occupant Satisfaction (Paul and Taylor, 2007)

Impact of Public Policies on diffusion (Simons, Choi, and Simons, 2009)

Green Building and Regional Economy (Allen and Potiowsky, 2008)

***“What specific green building attributes are preferred by tenants?
Are tenants willing to pay for those attributes?”***

Research Process

Demand-side

Completed 7 focus groups (48 participants)
(Chicago, Denver, D.C., and San Francisco Bay area)



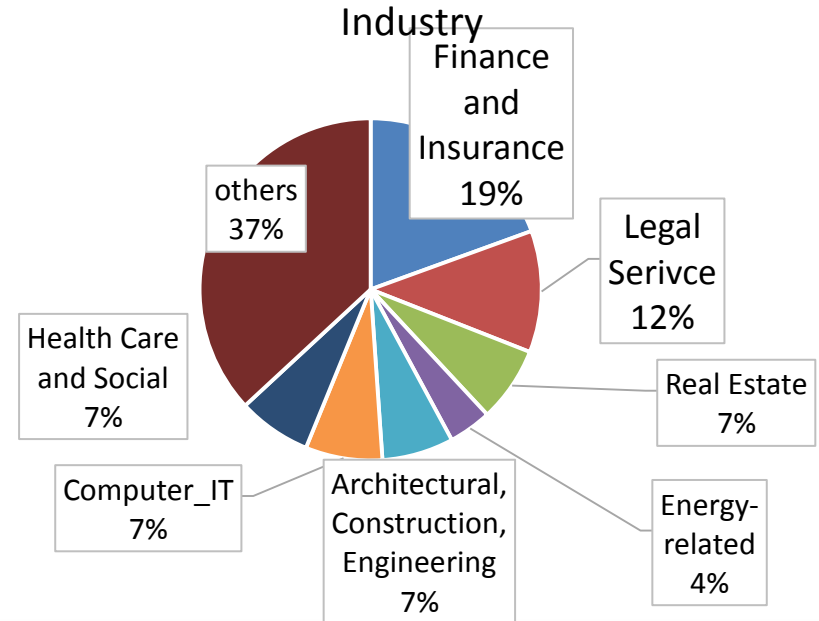
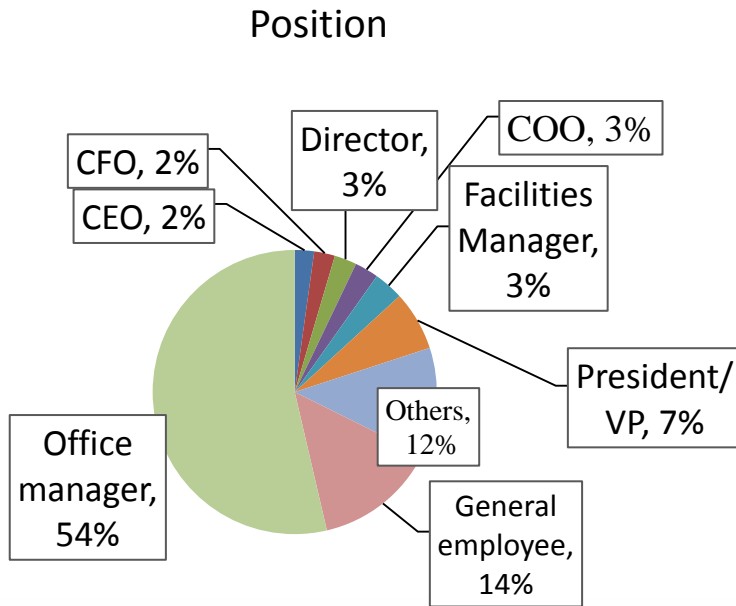
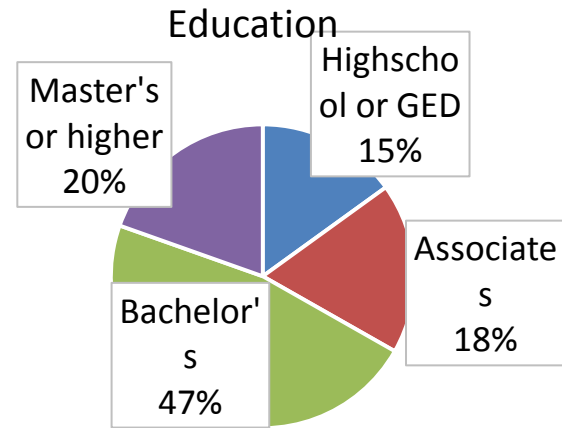
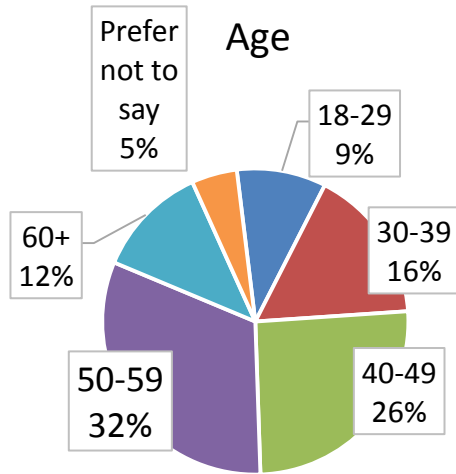
- Identified 18 specific green building attributes
- Developed an extensive (online) tenant survey



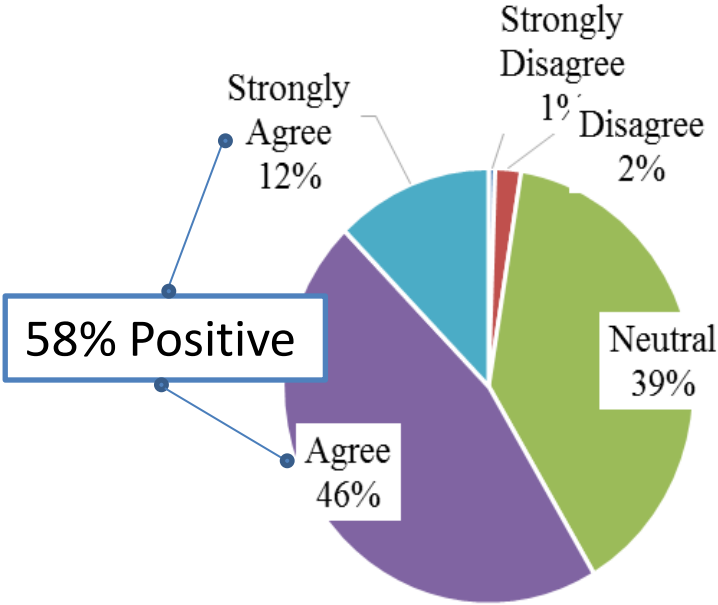
On-going; 620 responses (20% response rate as to today)
from 100+ cities

* Focus on the main findings of the survey

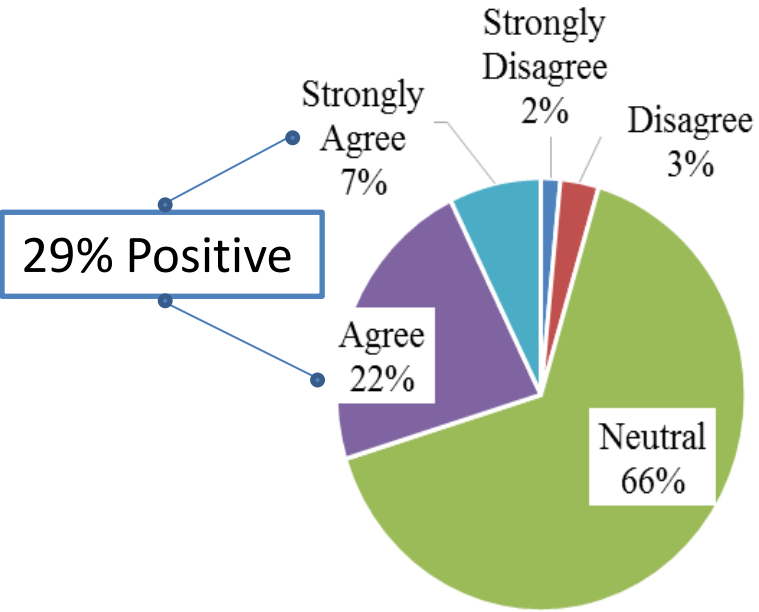
Profile of Respondents



The Tenant's Perception of Green Building Certifications



Perceived Value of the Energy Star-Certified Building Compared to the Non-Certified

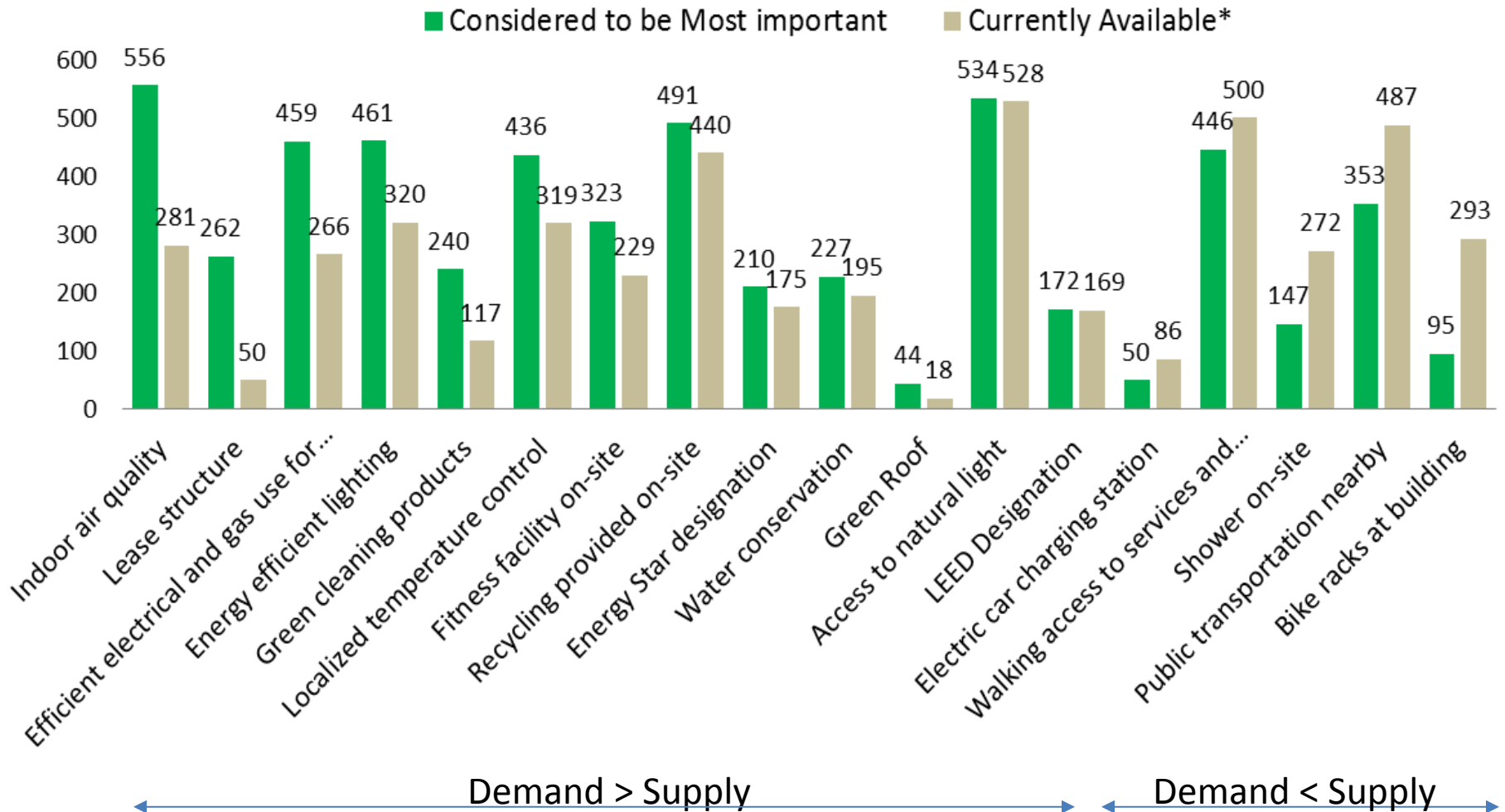


Perceived Value of the LEED Platinum Compared to the LEED Certified

Demand-Side

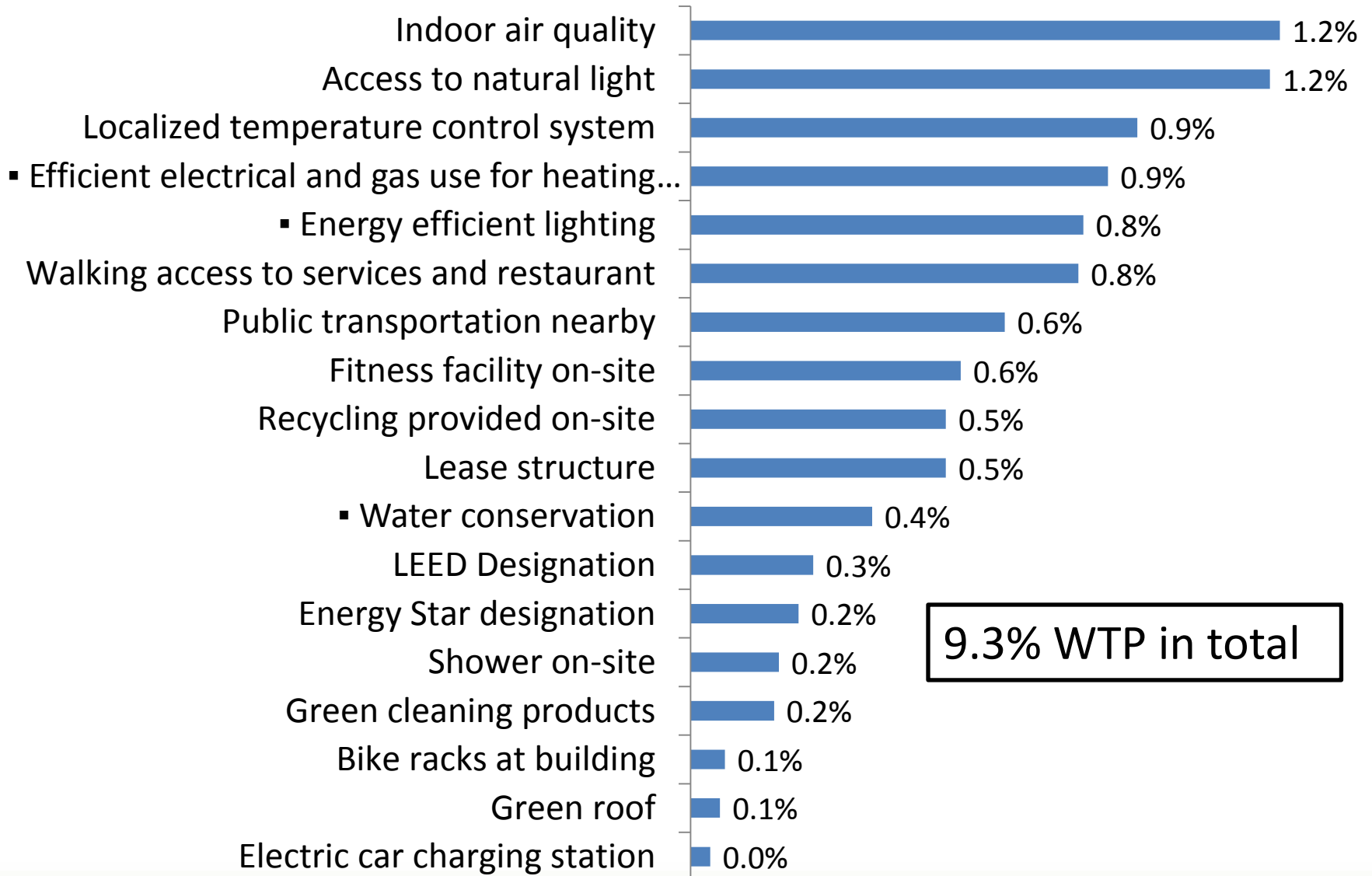
Rank	18 Green Building Features	N	% Total
1	Better indoor air quality	556	94%
2	Access to natural light	534	90%
3	Comfortable & localized temperature control	436	74%
4	Efficient electrical and gas use for HVAC	459	78%
5	Energy efficient lighting	461	78%
6	Recycling provided on-site	491	83%
7	Walking access to services and restaurant	446	75%
8	Public transportation nearby	353	60%
9	Fitness facility on-site	323	55%
10	Lease structure	262	44%
11	Green cleaning products	240	41%
12	Energy Star designation	210	36%
13	Water conservation	227	38%
14	LEED designation	172	29%
15	Shower on-site	147	25%
16	Bike racks at building	95	16%
17	Electric car charging station	50	8%
18	Green roof	44	7%

Demand vs. Supply

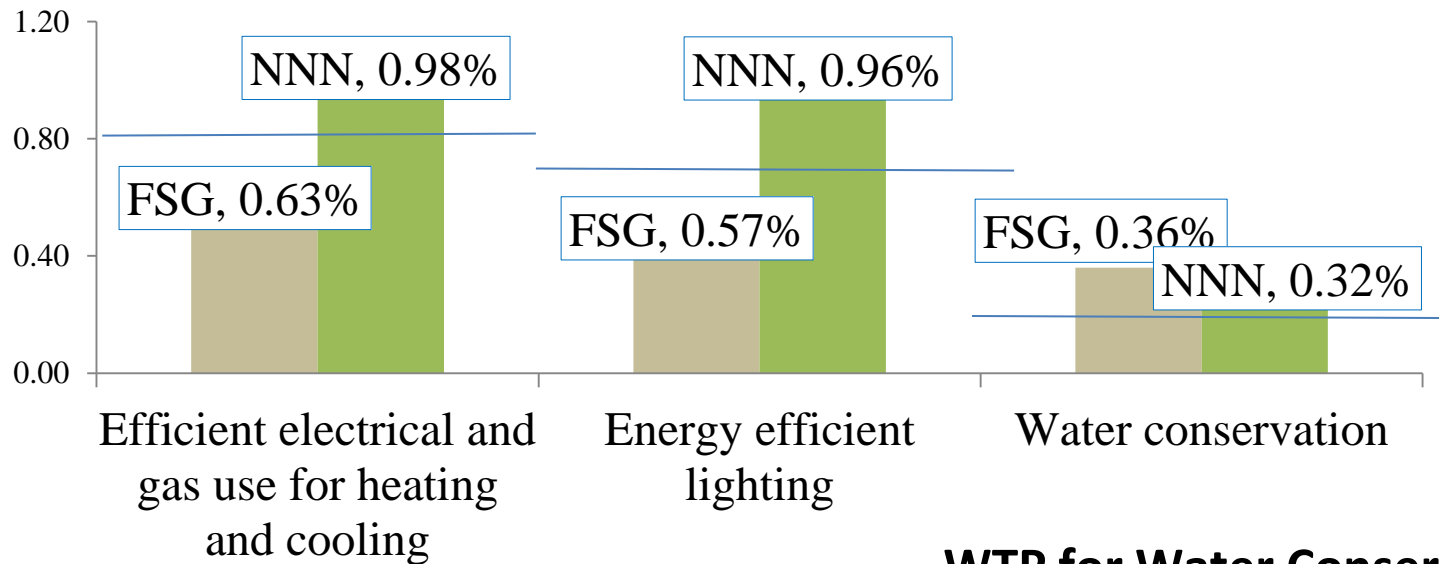


Willingness to Pay for Green Buildings

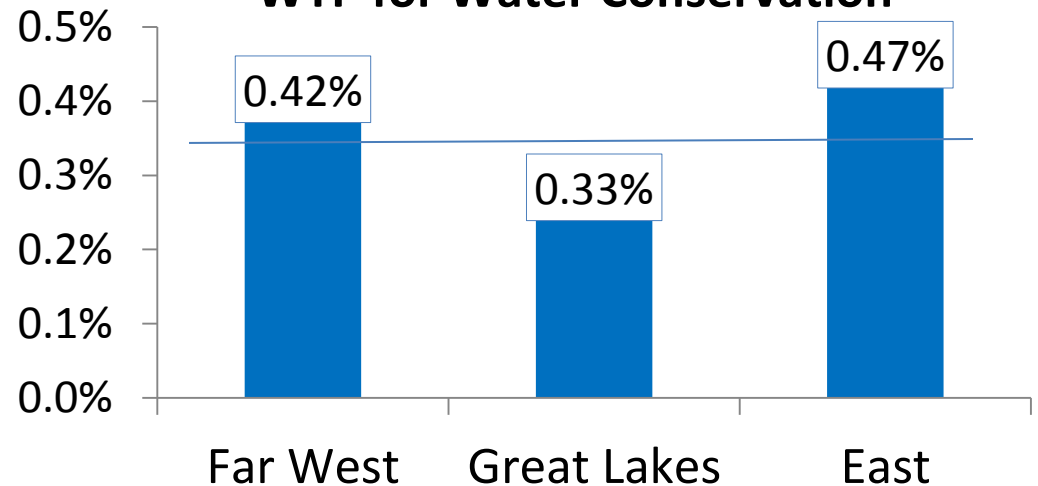
“How much more do you feel your company would pay for each attribute?”



WTP by Lease Structure and Region



WTP for Water Conservation



Logistic Regression

- Intent is to profile tenant respondents/office managers “green-positive” activities
- Use same data base of 620 complete responses
- Green-positive activities include:
 - Willingness to pay for a green office location
 - Willingness to bid a high premium for specific green features
 - Self-reported “high” knowledge of green industry
 - Practice sustainable operations with green suppliers, etc.

Four Logistic Models

- Model 1: Willingness-to-pay for green buildings
- Model 2: “High” WTP (>2%)
- Model 3: The tenant’s knowledge of Green Buildings
- Model 4: The tenant company’s active promotion of sustainability
- $Y_i = \beta_{0i} + \beta_1 \text{Region}_i + \beta_2 \text{Industry}_i + \beta_3 \text{Demographics} + \beta_4 \text{Company Characteristics}_i + \beta_5 \text{Lease}_i + \beta_6 \text{Floor-plan}_i + \beta_7 \text{Location Decision}_i + \varepsilon_i$
- Model pseudo R-squared values 0.14-0.32

Summary of Outputs

(statistically significant variables only)

Model 1 (Willingness to pay)	Model 2 (High WTP)	Model 3 (Knowledge)	Model 4 (Sustainability)
Young age (less 50)	Energy-related industry	Male	Architecture/ Construction industry
Higher Edu (<MA)	Government	Real estate-related industry	Large company (sqft and rental price)
Sustainable partners (e.g.) suppliers	Sustainable initiative	Sustainable partners (e.g.) suppliers	Publicly traded stock
Professional Service	South East regions (FL, GA)		Location Decision-Green Buildings Features
East regions (-) (NY, MD)	East regions (-) (NY, MD)		

Discussion

- A slightly higher “**stated valued (9.3% WTP)**” of green buildings compared to the “**revealed value (7-8% rental premium)**” from prior literature
- Difference in WTP for green buildings by specific green feature, industry, region, and lease structure
- The highest willingness to pay for improved indoor air quality and access to natural light
- Low pseudo R square issue (0.14 – 0.32) tells a different story?

Future Research Plans

- Integrate the current survey results with more specific building characteristics and off-site information (e.g. local weather, air quality, energy price)
- Next studies will focus on:
 - the relationship between green buildings and employee productivity
 - the relationship between green building practices and the triple bottom line of sustainability (Profit-tenant, Profit-landlord, Planet, People)

Q & A