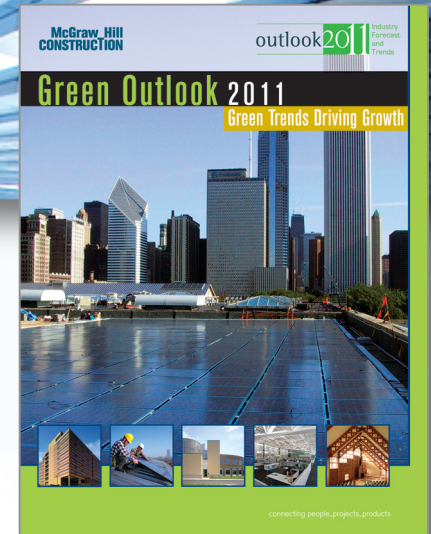


The Green Outlook 2011: Green Trends Driving Growth through 2015

Harvey M. Bernstein, F.ASCE, LEED AP

Vice President, Global Thought Leadership &
Business Development



Green Making News

October 14, 2010

THE WALL STREET JOURNAL.

Sustainability Identified as Key Competitive Differentiator

March 31, 2010

SUSTAINABLE Business.com

U.S. Firms to Double Sustainability Spending to \$100 Billion by 2015

September 2, 2010

The Economist

U.S. Wind Power Capacity Vaults to Top Spot due to Rapid Growth

October 5, 2010

The New York Times

White House to Green Push

September 7, 2010

FINANCIAL TIMES

Green vision: the search for the ideal eco-city

September 17, 2010

Chicago Tribune

Green building growth continues

October 11, 2010

Newsweek

One Nation Under Green

October 6, 2010

GreenBiz.com
Business Voice of the Green Economy

DEMAND FOR GREEN PRODUCTS PERSISTS DESPITE ECONOMIC DOWNTURN

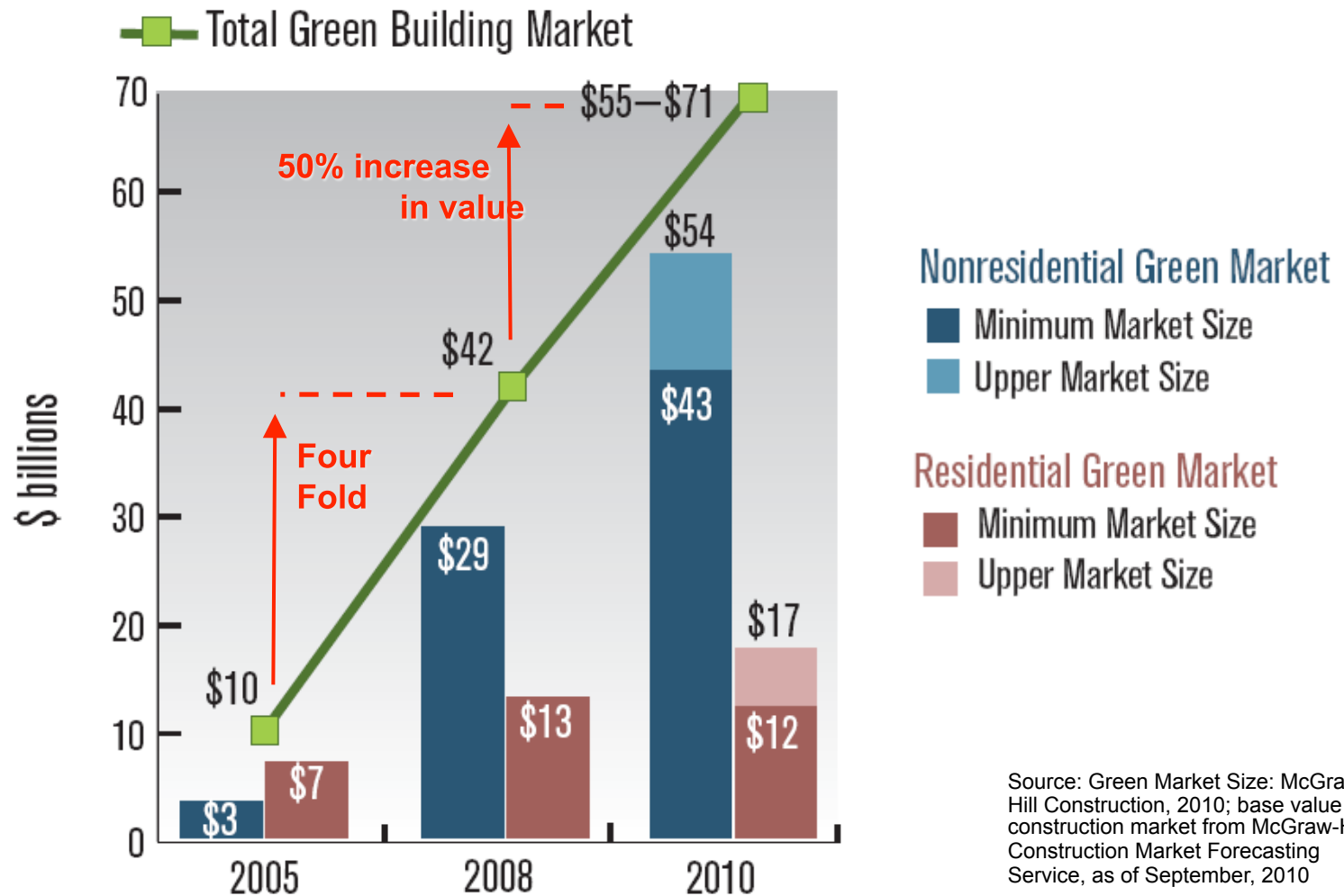
Agenda

- **Dramatic Green Market Growth, 2005-2015**
- **Business Benefits Driving Green Building**
- **The Increased Specification of Green**
- **Trends in Green Building**

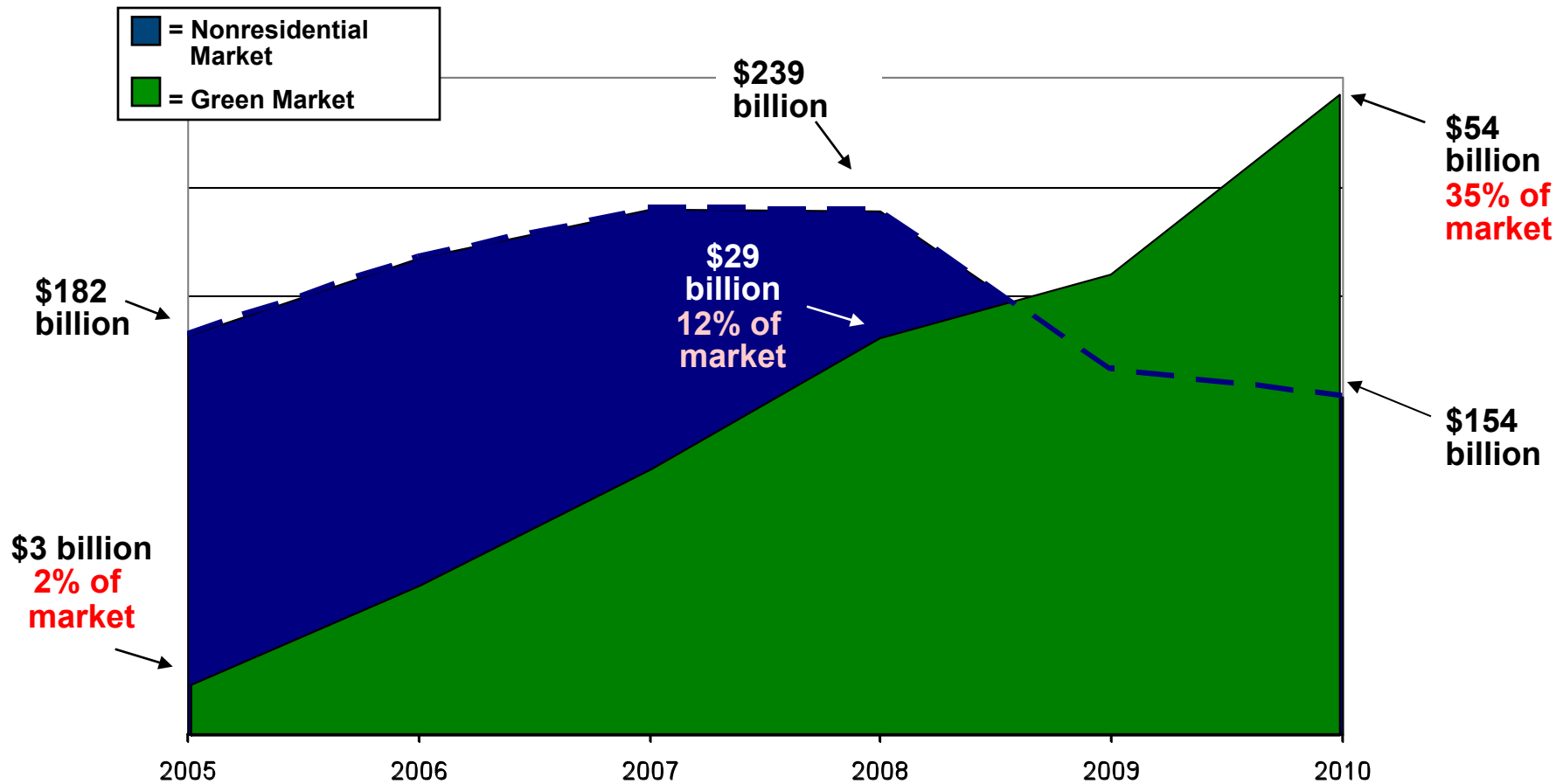


Dramatic Green Market Growth from 2005–2015

In 5 Years, New Green Building Market Has Grown Six Fold

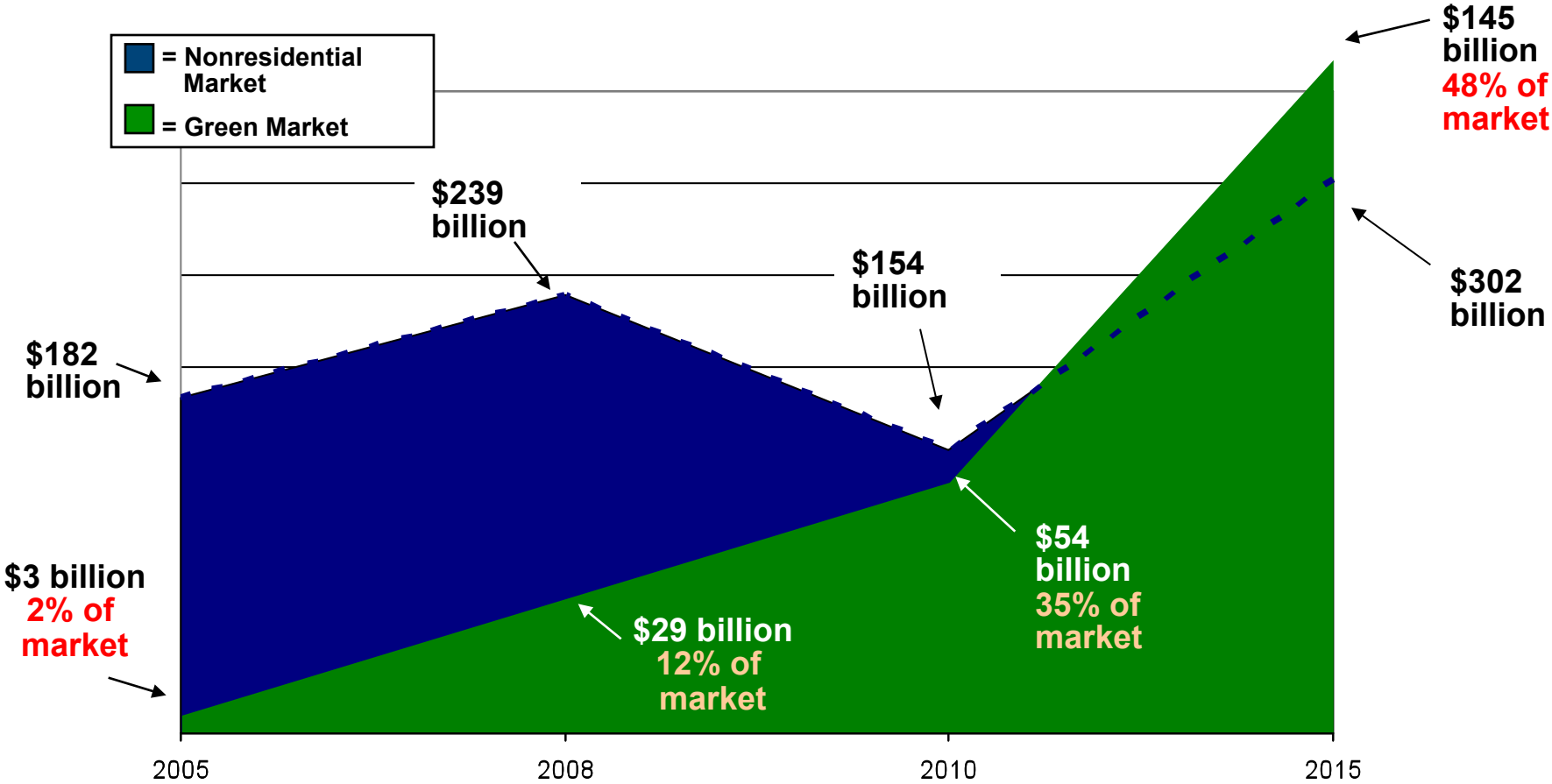


Green Share of New Nonresidential Building Construction is Growing Rapidly



Source: Green Market Size: McGraw-Hill Construction, 2010; base value of construction market from McGraw-Hill Construction Market Forecasting Service, as of September, 2010

2015 Offers Even More Opportunity in New Nonresidential Construction

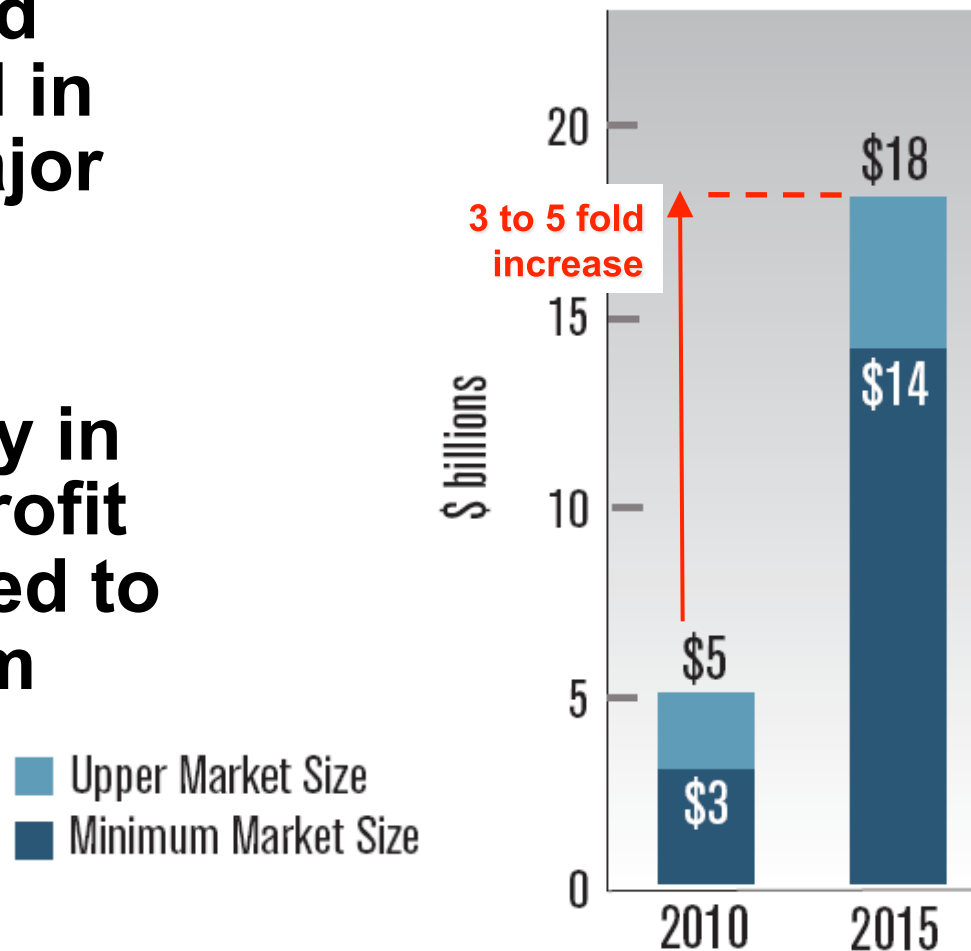


Source: Green Market Size: McGraw-Hill Construction, 2010; base value of construction market from McGraw-Hill Construction Market Forecasting Service, as of September, 2010

Green Share of Renovation/Retrofit Market Growing

- Three to Five fold growth expected in five years for major green retrofit projects
- Energy efficiency in two-thirds of retrofit projects, expected to become the norm

Projected Retrofit/Renovation Green Building Market Size

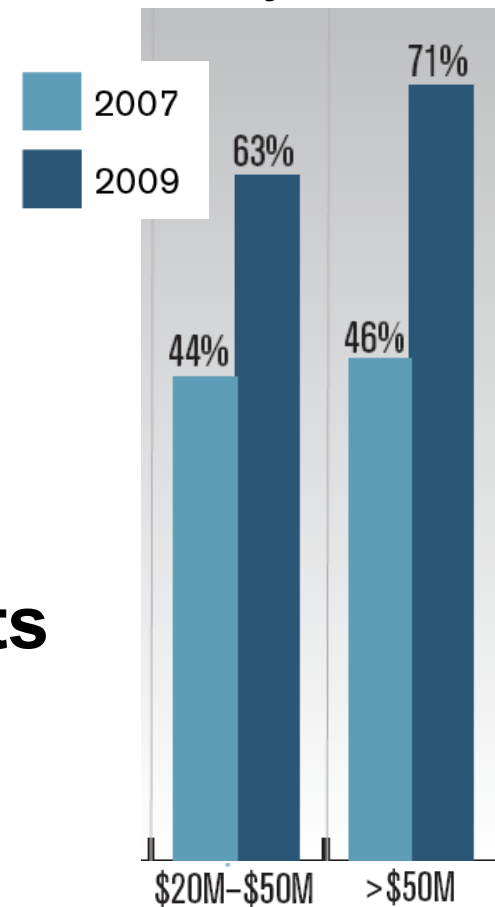


Source: McGraw-Hill Construction, 2010

Trends Driving Nonresidential Green Building Growth

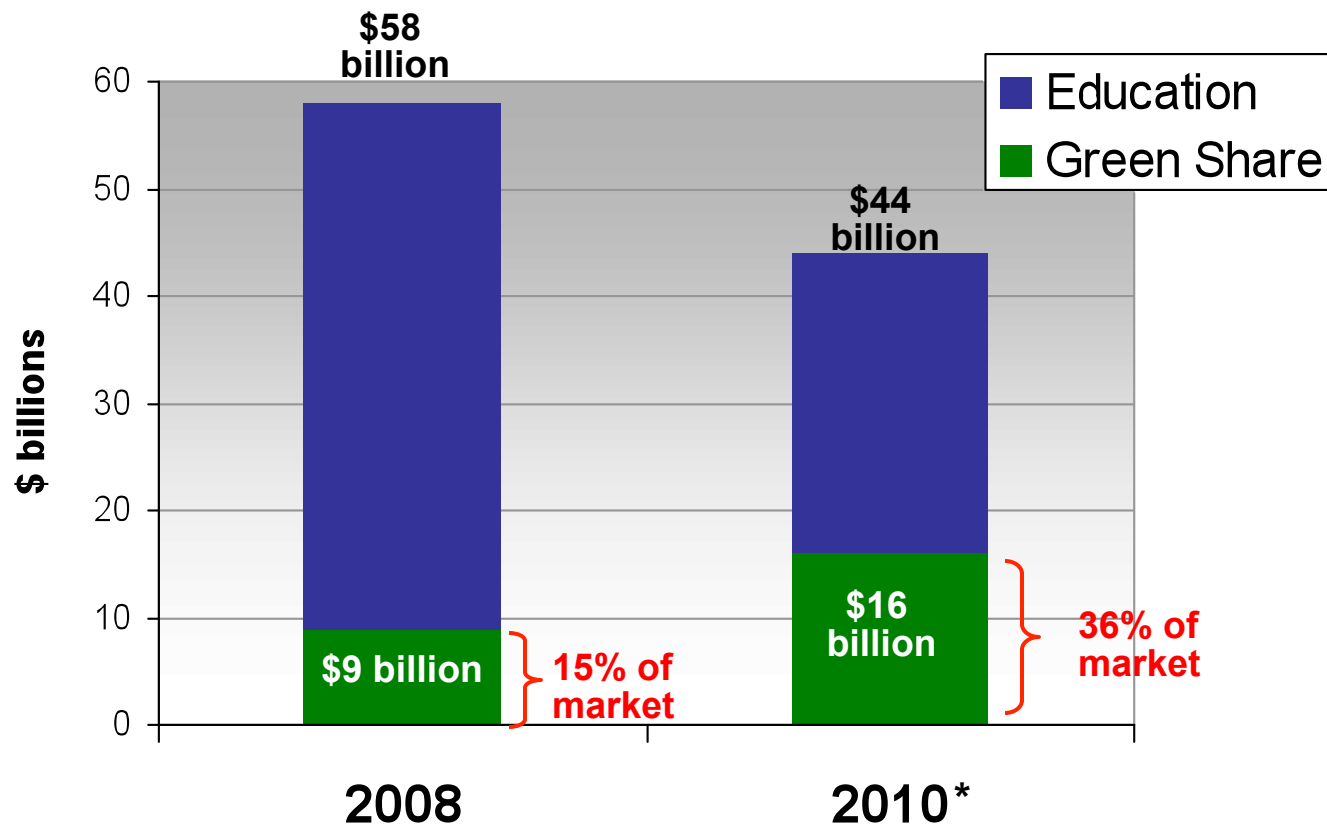
- **Bigger projects are going green**
- **Government mandates and policies influencing markets** (education, public buildings)
- **Higher awareness and experience with green projects = more understanding of business benefits**

LEED in Project Specifications by Value



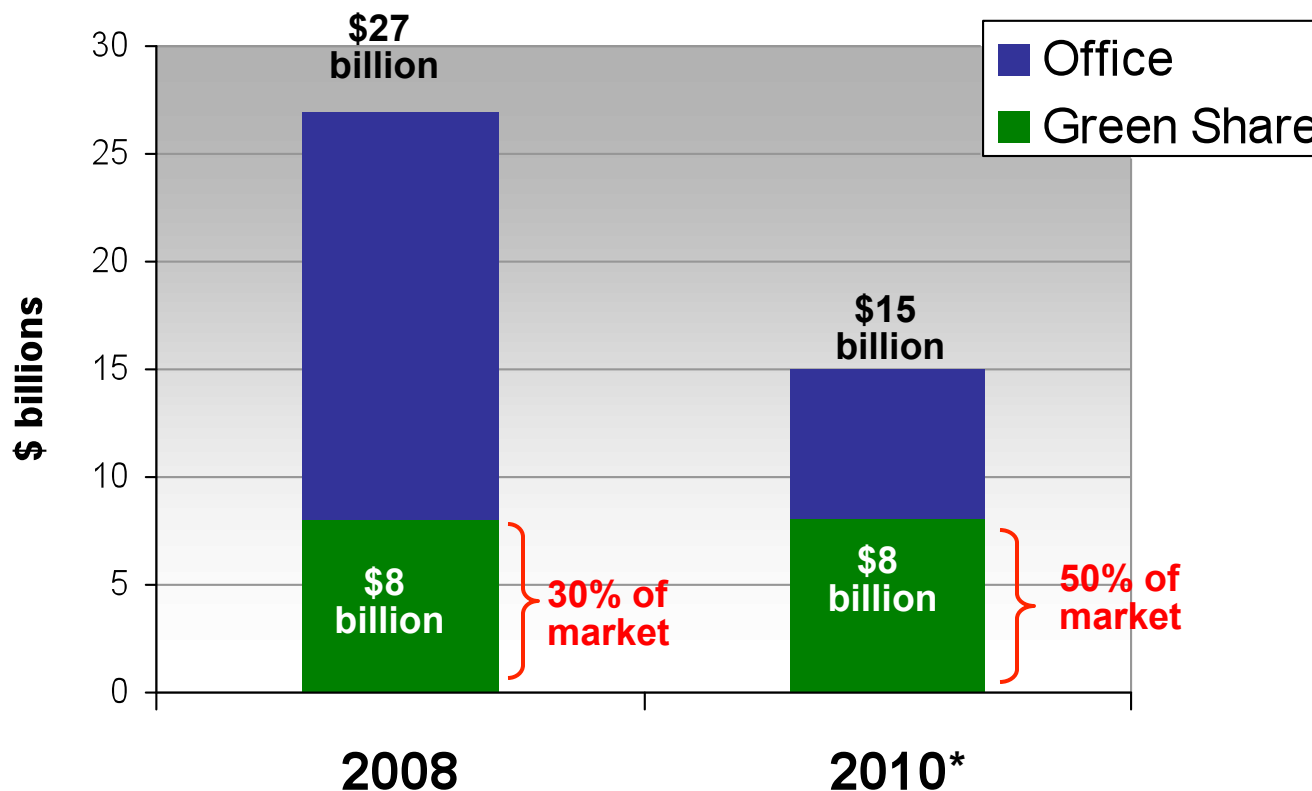
Source: McGraw-Hill Construction Analytics, SpecShare, 2007 and 2009.

Education Construction Largest Green Market in Value—Steady Growth



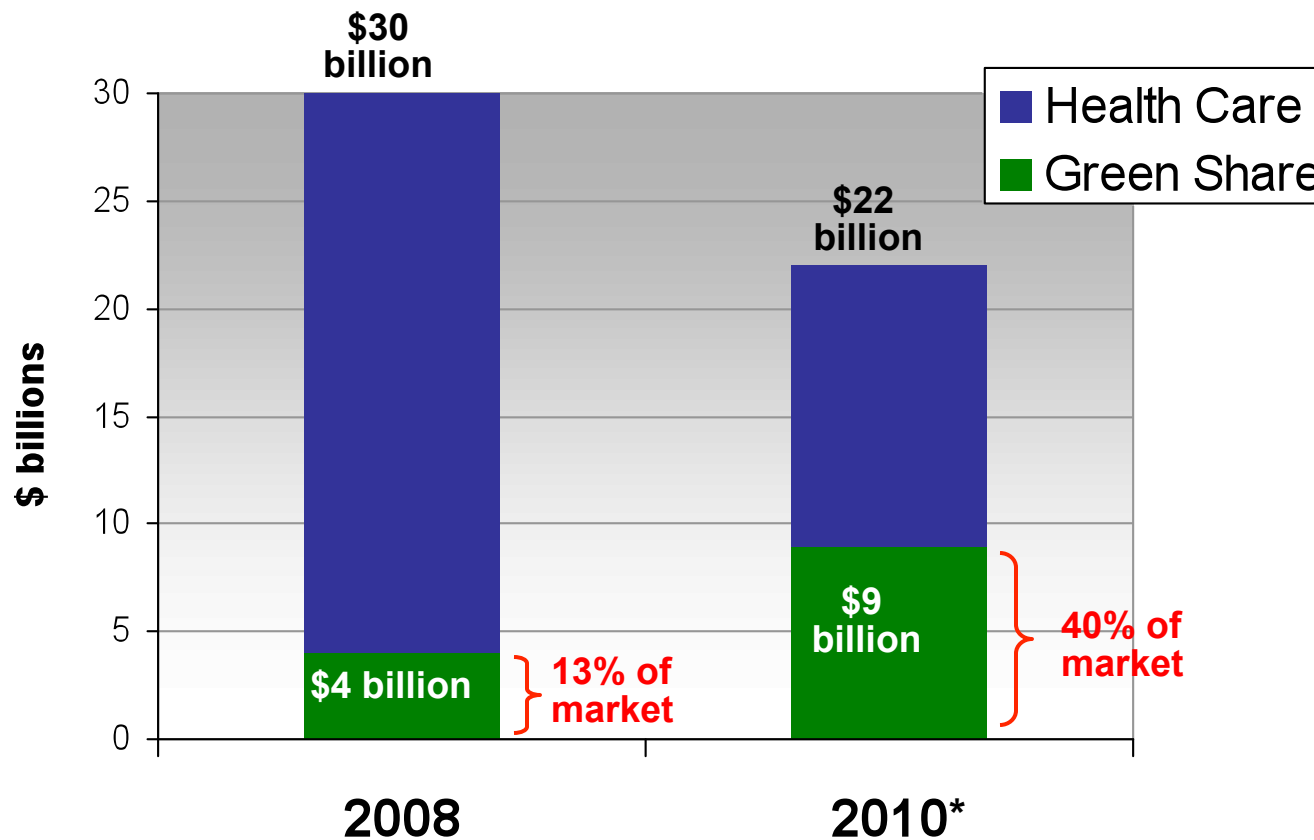
* Value of overall education construction market from McGraw-Hill Construction Market Forecasting Service, as of September, 2010

Office Construction Remains Strong Green Market Despite Overall Downturn



* Value of overall office construction market from McGraw-Hill Construction Market Forecasting Service, as of September, 2010

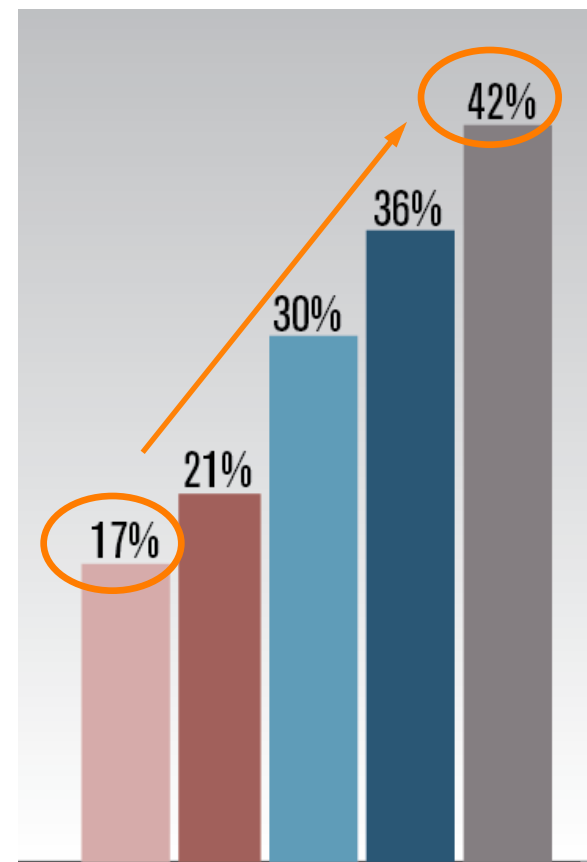
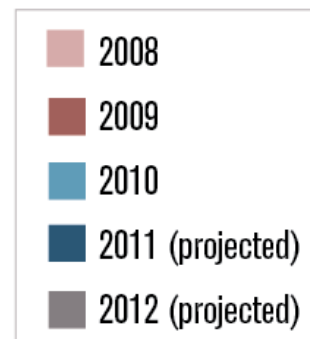
Health Care Construction Strongest Growth in Green Market Share



* Value of overall health care construction market from McGraw-Hill Construction Market Forecasting Service, as of September, 2010

Growth in Corporate Green Building

Company Involvement in Green Building Over Time (2008–2012)



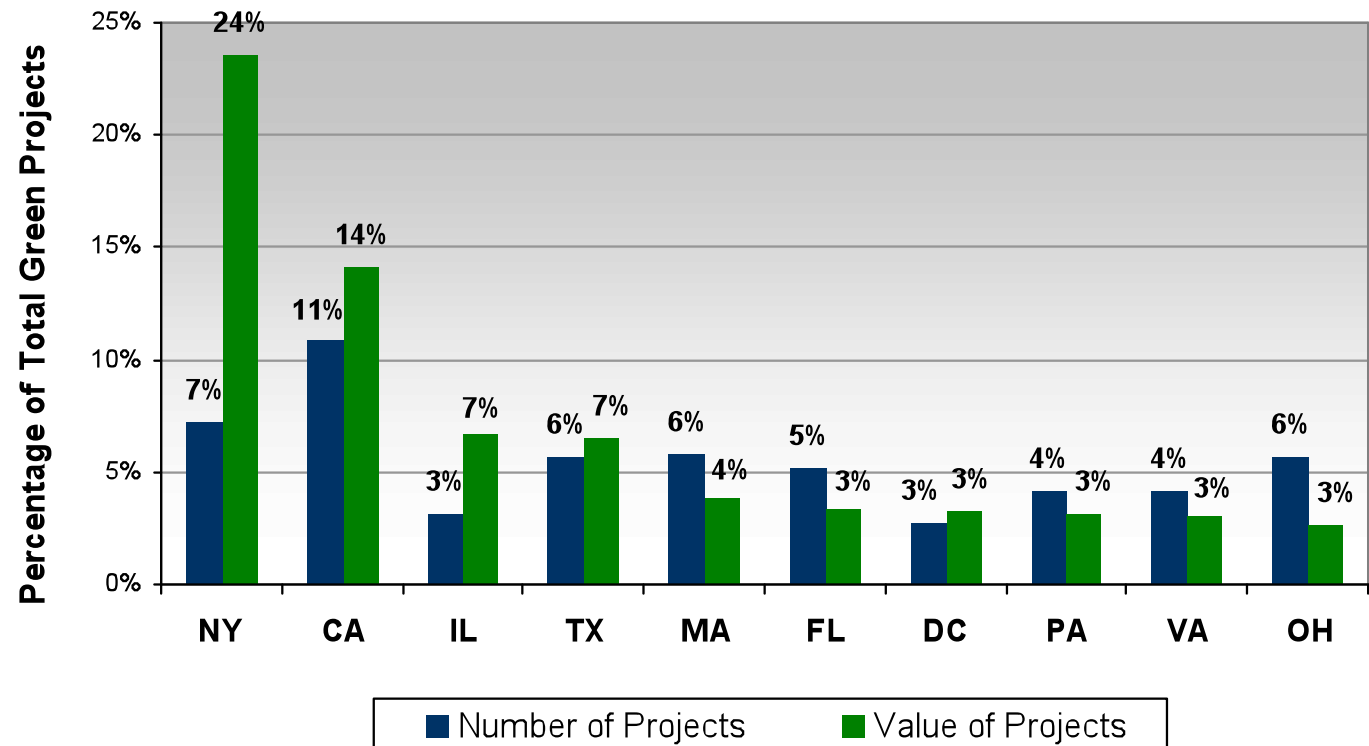
Largely/ Fully Dedicated
(60%+ of Buildings in Portfolio)

Source: 2009 Greening of Corporate America Report, Siemens/McGraw-Hill Construction, 2009

Architectural Firms in California Are Doing the Most Green Projects, but New York Firms Are Getting the Bigger Valued Jobs

- California firms doing **11%** of projects (largest)
- New York firms doing **24%** of all green projects by value

Top Ten Locations by State of **Architects** Doing Green Projects (by Number and Value of Projects)

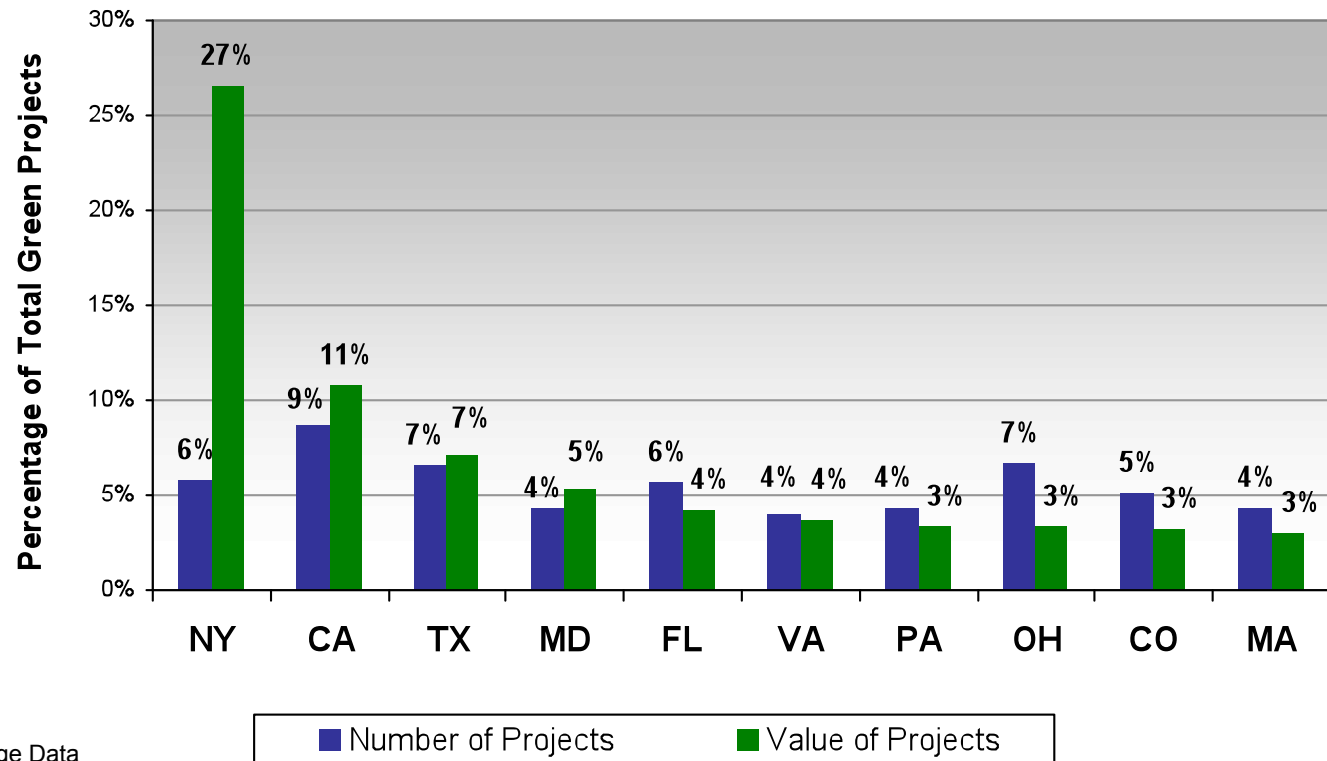


Source: McGraw-Hill Construction Dodge Data

Contractors in California Are Doing the Most Green Projects, but New York Firms Are Getting the Bigger Valued Projects

- California firms doing **9%** of projects (largest)
- New York firms doing **27%** of all green projects by value

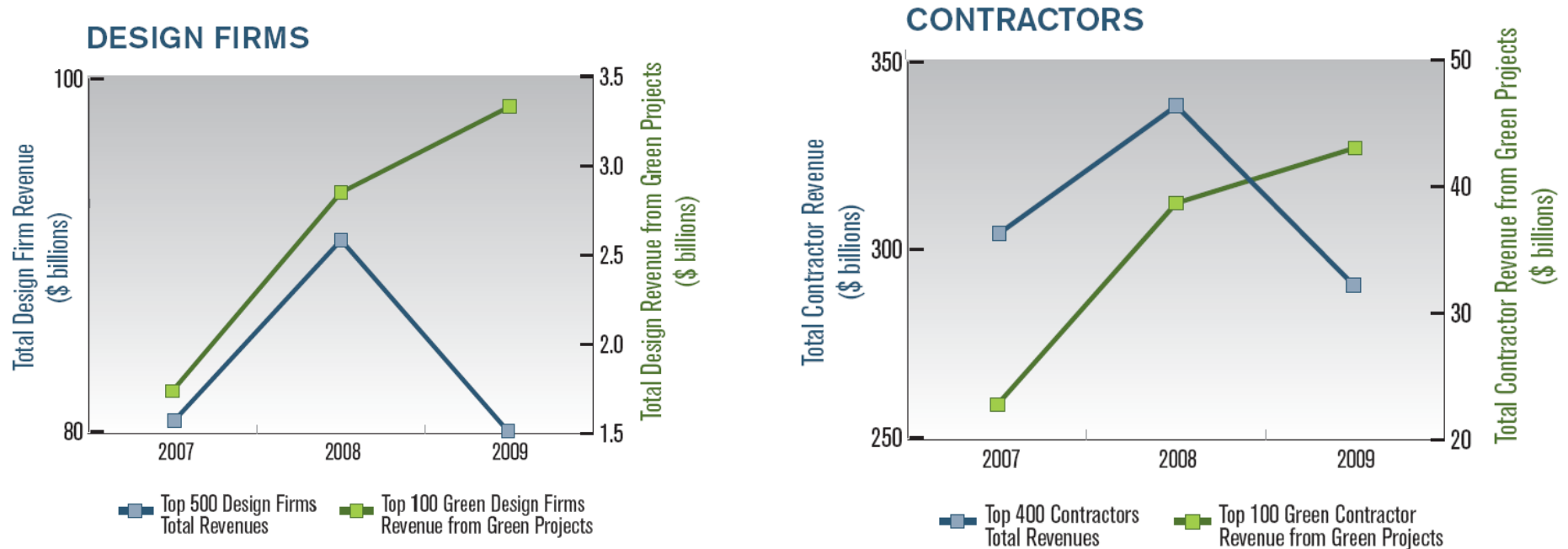
Top Ten Locations by State of **Contractors** Doing Green Projects (by Number and Value of Projects)



Source: McGraw-Hill Construction Dodge Data

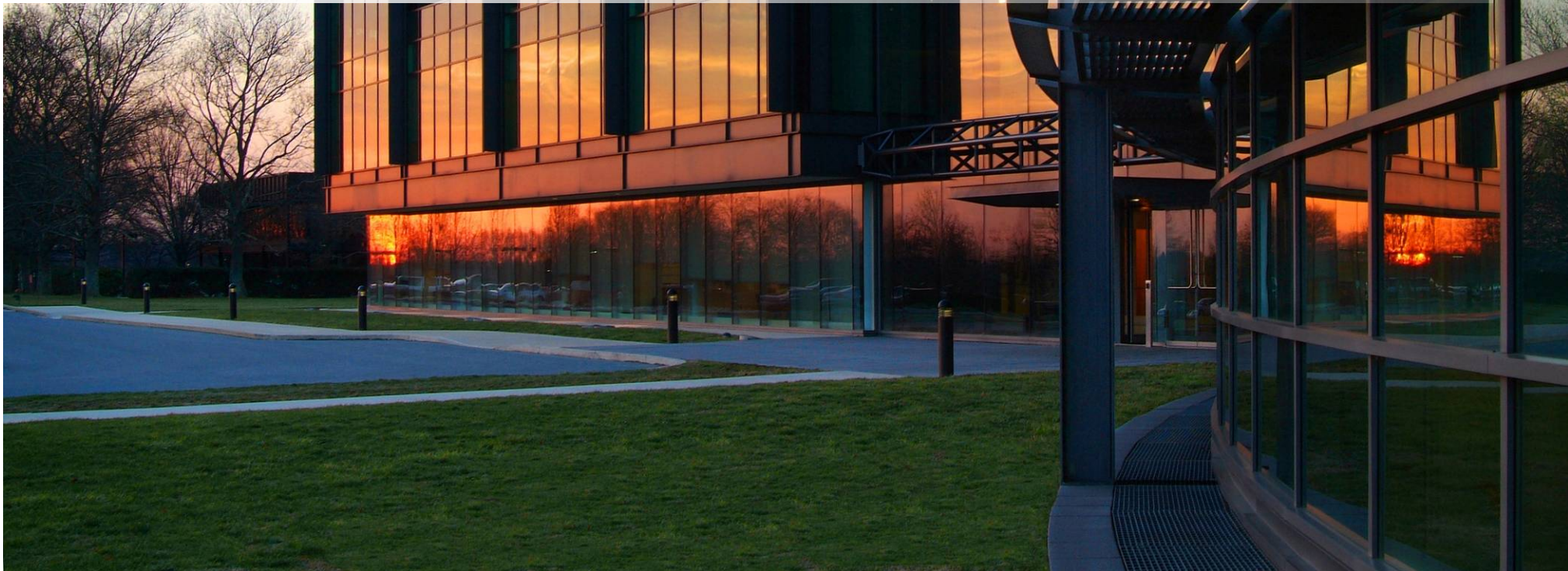
While Overall Revenues Decrease for Firms in 2009, \$\$ from Green Go Up

Revenues from Green Building Projects as Compared to Overall Revenues Earned from 2007 to 2009



Source: Top 100 Green Design Firms List, ENR Magazine, July 5, 2010; Top 100 Green Contractors List, ENR Magazine, September 13, 2010.

Business Benefits Driving Green Building Growth



Human Factors: Improved Productivity in Green Offices

- 40 hours of additional work output for sufferers of respiratory and stress-related conditions/year
- Australia law firm after green renovation:
 - Increase in billable hours: **7%**
 - Improved typing performance: **9%**
 - Fewer average sick days/person: **39% reduction**
 - Lower monthly health care costs: **44% reduction, more for senior staff**



Human Factors: Improved Productivity in Green Offices (cont.)

→ CBRE LEED office buildings:

- Fewer sick days: **2.88 days on average** (45% of employees)
- Higher productivity: **42.5% of employees**

→ McGraw-Hill Education Dubuque, IA LEED certified building

- Employee engagement: **Increase of 15%**
- Fewer sick days: **1.8 days on average** (15% of employees)
- Higher productivity: **for 65% of employees** (none lower)



*The McGraw-Hill Companies
LEED Certified Building, Dubuque, Iowa*

Human Factors: Improved Health & Well-being in Schools & Hospitals

→ Access to natural light leads to benefits in hospitals:

- Higher levels of patient comfort
- 22% less pain medication use = 20% cost savings
- Earlier patient releases

→ Improved child health in green schools:

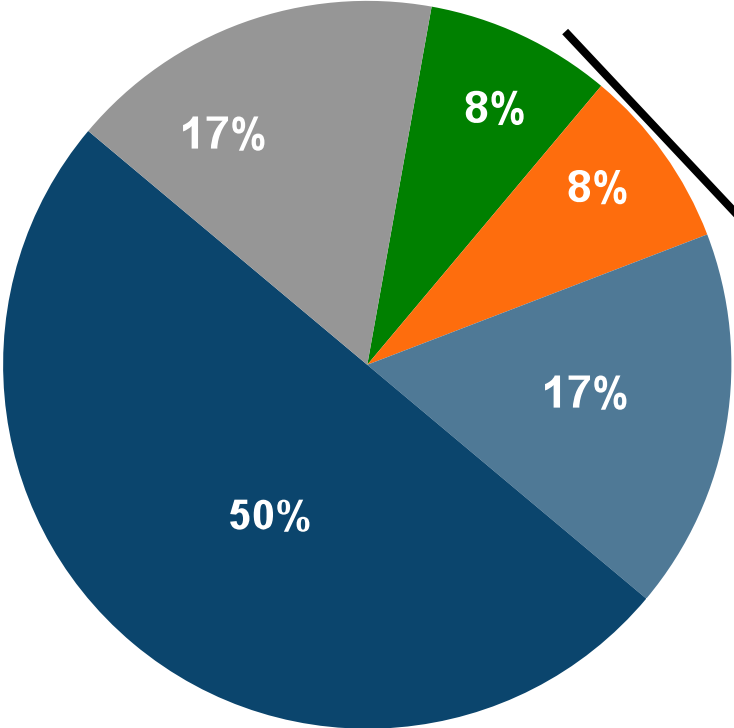
- Decrease asthma
- Improved test scores of 7%–18%



Above:
*Pittsburgh Children's Hospital, Pittsburgh, PA;
Sidwell Friends Middle School, Washington, DC*

Tenants Will Pay a Premium for Green Renovated/ Retrofitted Space

Tenant demand coming from human factor benefits provides a major opportunity for green retrofit market growth



One third are willing to pay a premium

- 10% or More
- 6-10%
- 1-5%
- Zero
- Don't Know

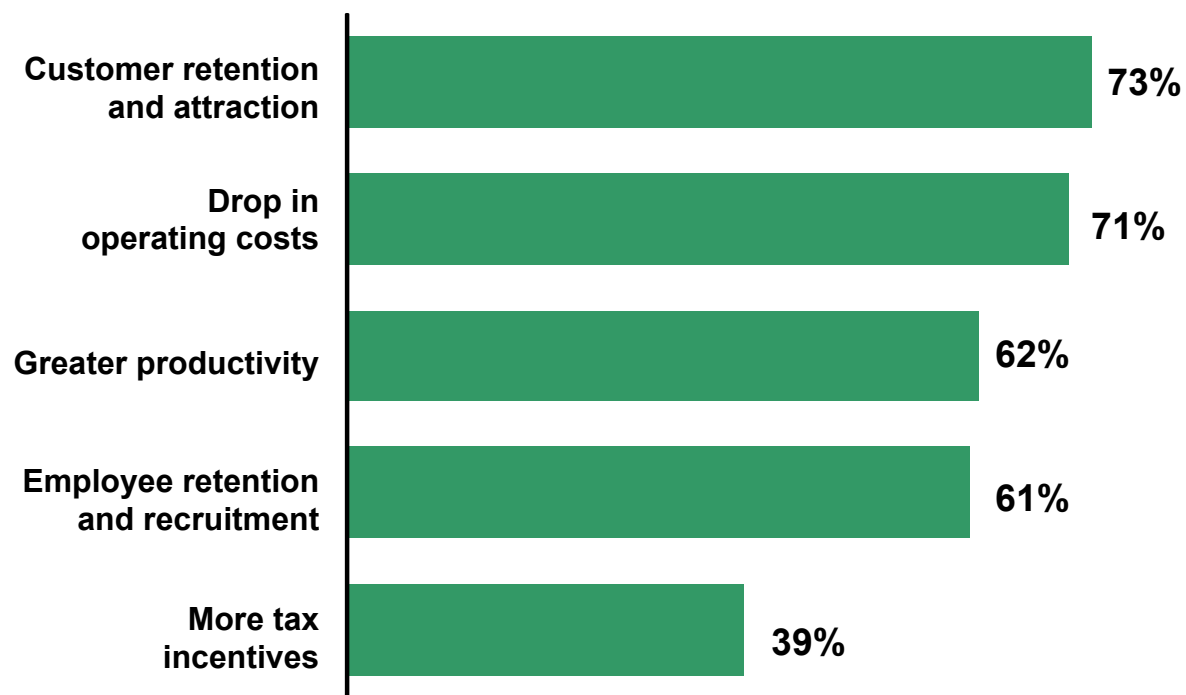


Source: Green Retrofit & Renovation SmartMarket Report, McGraw-Hill Construction, 2009

Strong Business Benefits Are Expected by Corporate America

→ Overwhelmingly, customers and lower operating costs are the biggest benefits

Expected Business Benefits from Sustainability Adoption

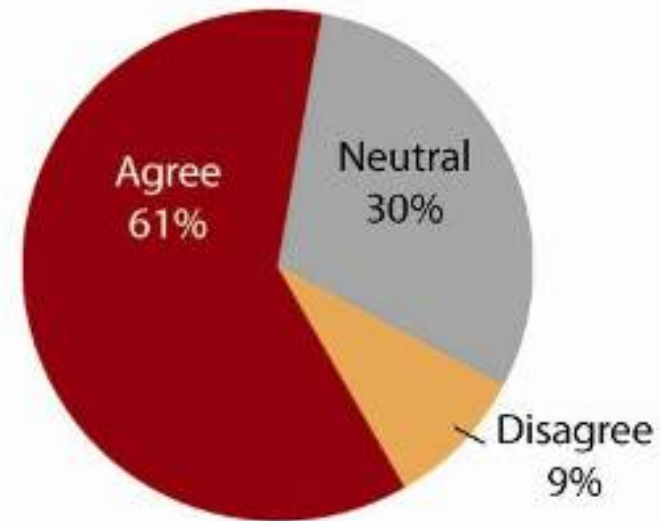


Source: 2009 Greening of Corporate America Report, Siemens/McGraw-Hill Construction, 2009

Corporate America Believe Sustainability Helps Drive Market Differentiation

→ Majority of executives believe sustainability will serve the financial performance of the company

Sustainability Leads to Market Differentiation and Helps Improve Financial Performance
(according to Corporate leaders)



Source: 2009 Greening of Corporate America Report, Siemens/McGraw-Hill Construction, 2009

Perceived Business Benefits of New Green Building Increasing

	New Green Buildings	Green Retrofits
	<u>2005</u>	<u>2009</u>
→ Decreased Operating Costs:	8-9%	8.5%
→ Increased Building Values:	7.5%	6.8%
→ Improvement in ROI:	6.6%	19.2%
→ Increased Occupancy:	3.5%	2.5%
→ Rent Rise:	3.0%	1%

Source: Green Retrofit & Renovation SmartMarket Report, McGraw-Hill Construction, 2009;
Commercial & Institutional Green Building SmartMarket Report, 2008

Water Efficiency Also Yielding Business Benefits

- Reduced Water Use:
- Decreased Energy Use:
- Reduced Operating Costs:

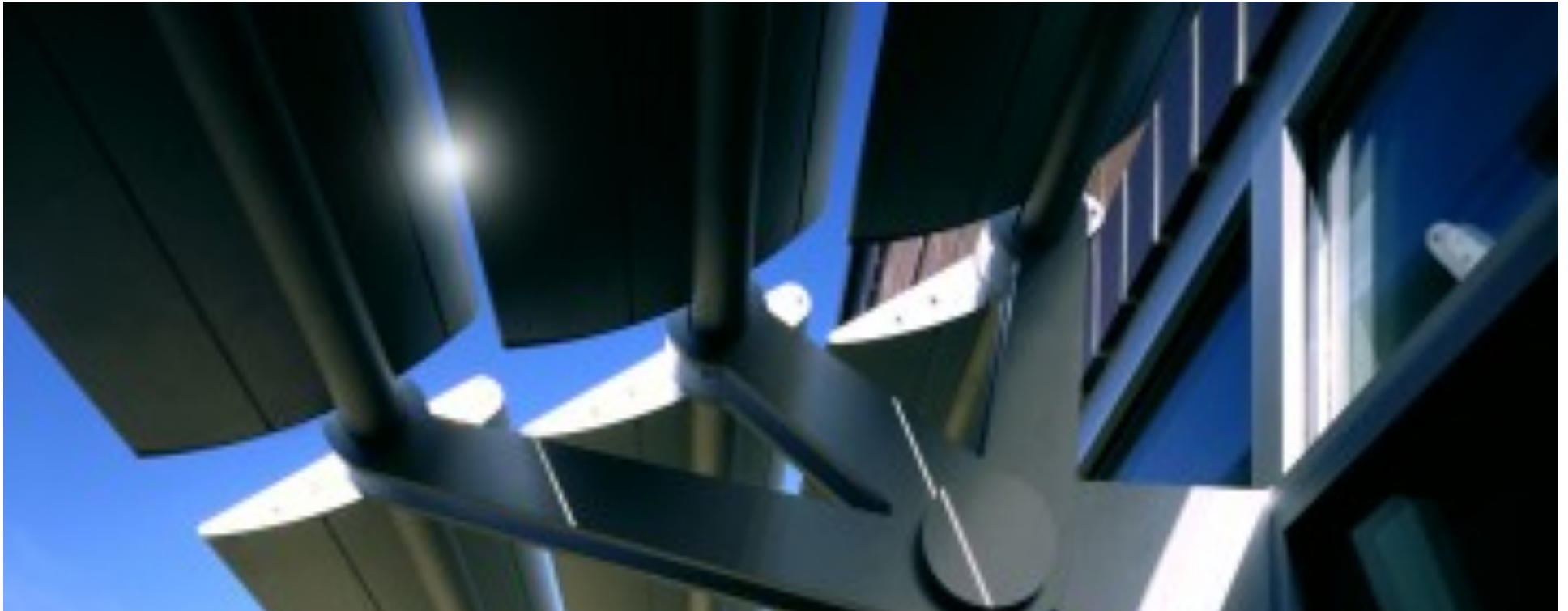
Currently

15%

10-11%

11-12%

Source: Water Use in Buildings SmartMarket Report, McGraw-Hill Construction, 2009



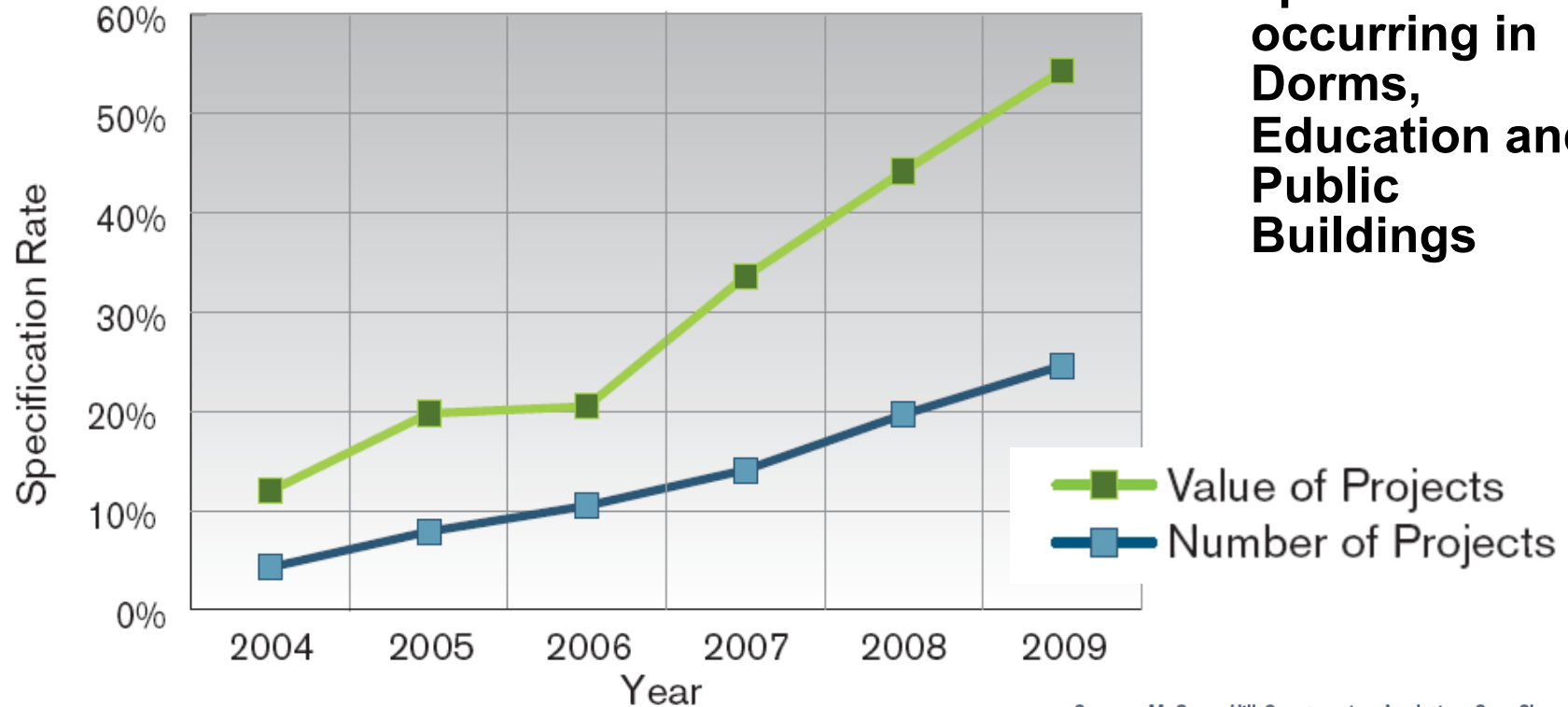
Increased Specification of Green



LEED May Impact Growth of Larger Commercial Green Building Market

Appearance of LEED in Project Specifications

Number of Projects versus Value of Projects from 2004–2009

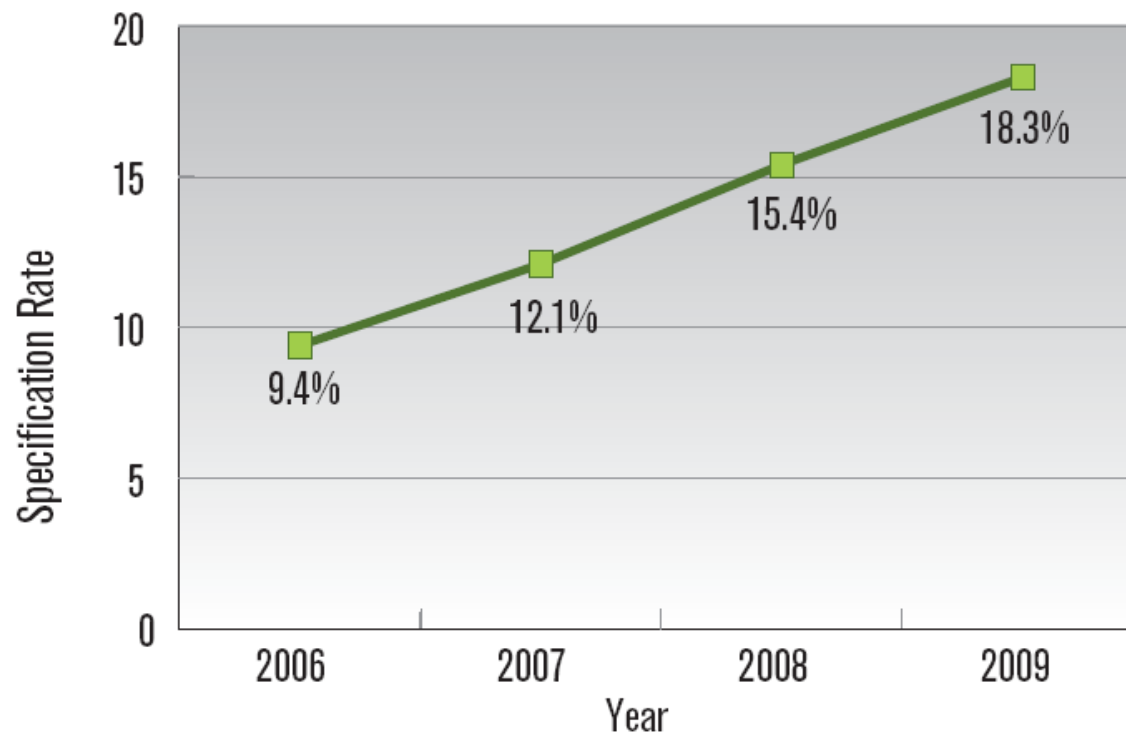


→ Highest specification occurring in Dorms, Education and Public Buildings

Source: McGraw-Hill Construction Analytics, SpecShare, 2004–2009.

Energy Star Specification Rate Nearly Doubled Between 2006-2009

Appearance of Energy Star in Project Specifications

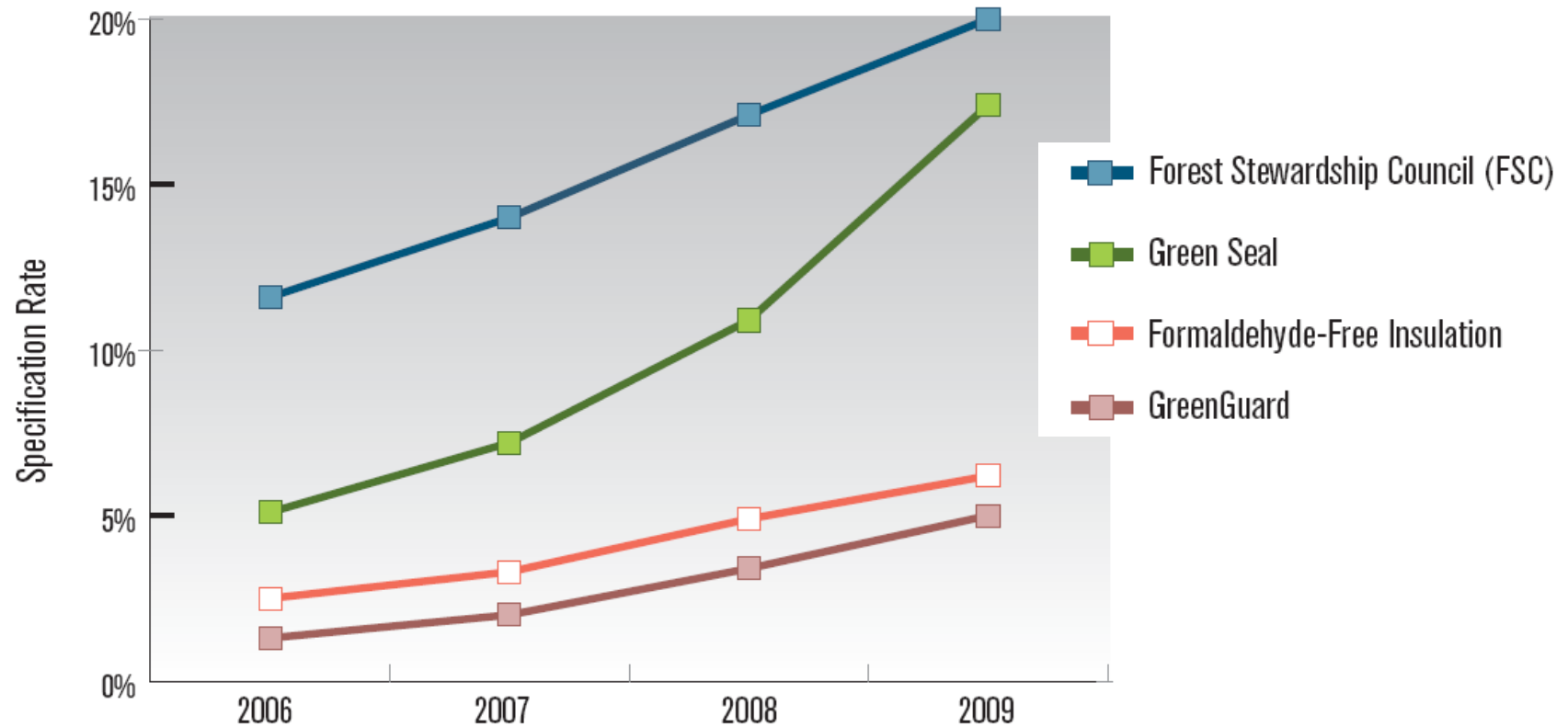


→ Highest specification occurring in Dorms and Education

Source: McGraw-Hill Construction Analytics, SpecShare, 2006-2009.

Green Product Label Specs on the Rise

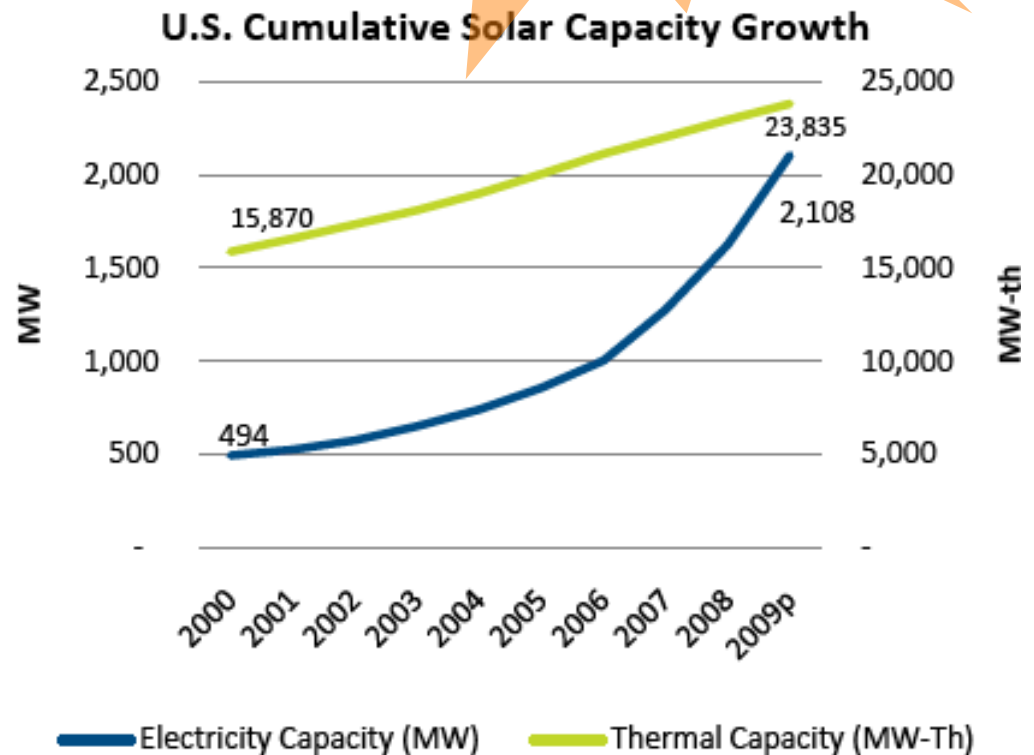
Specification Rates of Green Building Product Designations 2006-2009



Source: McGraw-Hill Construction Analytics, SpecShare, 2006-2009.

Solar

- Despite the weak economy in 2009, the U.S. solar energy industry grew—in new installations and employment
- Photovoltaic (PV) and concentrating solar power technologies climbed past 2000 MW

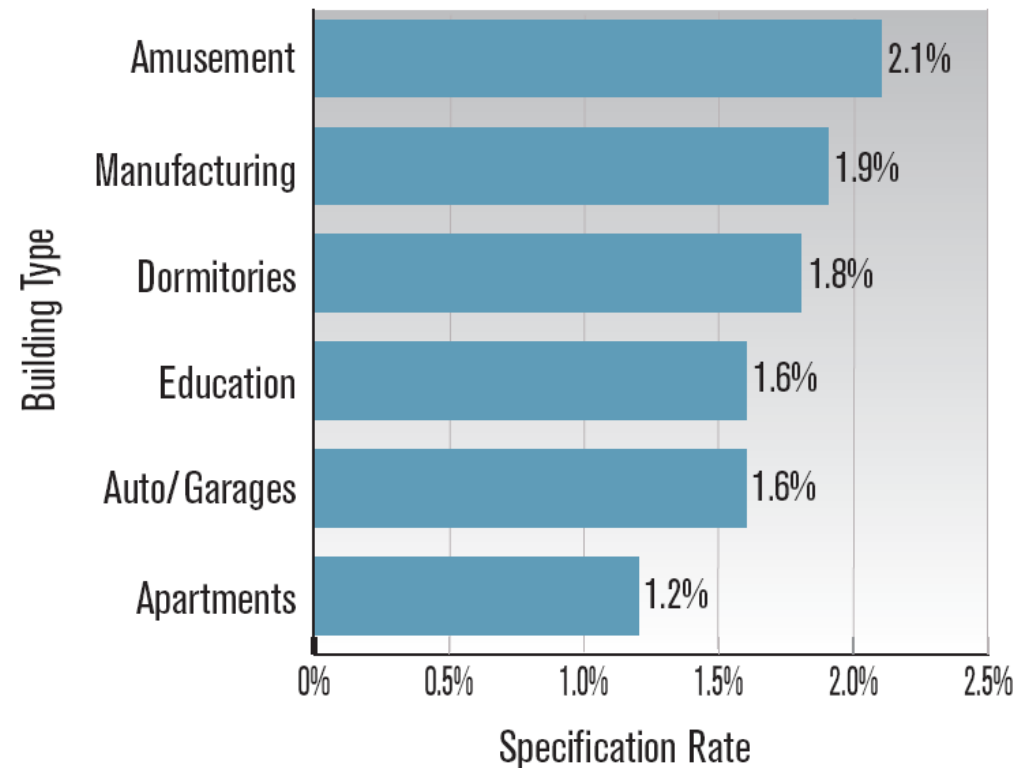


Source: Solar Energy Industries Association

Solar Specification on Buildings Starts to Emerge

Solar Panel Specification Rates

Building Types with Highest Specification Rates (October 2009–June 2010)

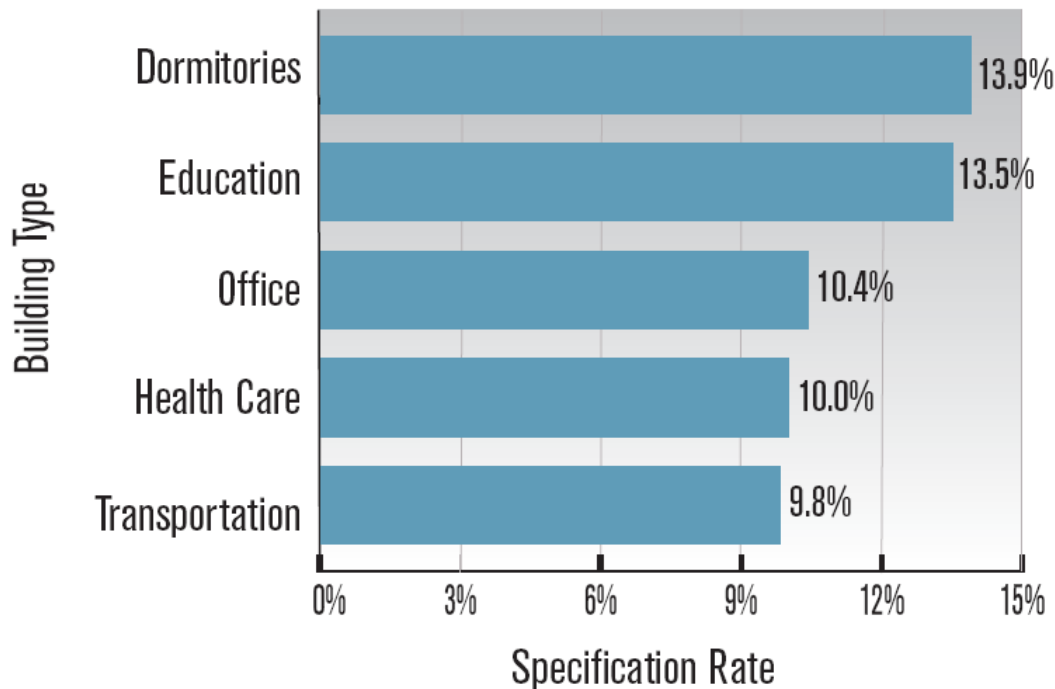


Source: McGraw-Hill Construction Analytics, SpecShare, October 2009–June 2010.

Explosive Growth Expected in LED Lighting in the Next Ten Years

LED Specification Rates

Building Types with Highest Specification Rates (January–March 2010)



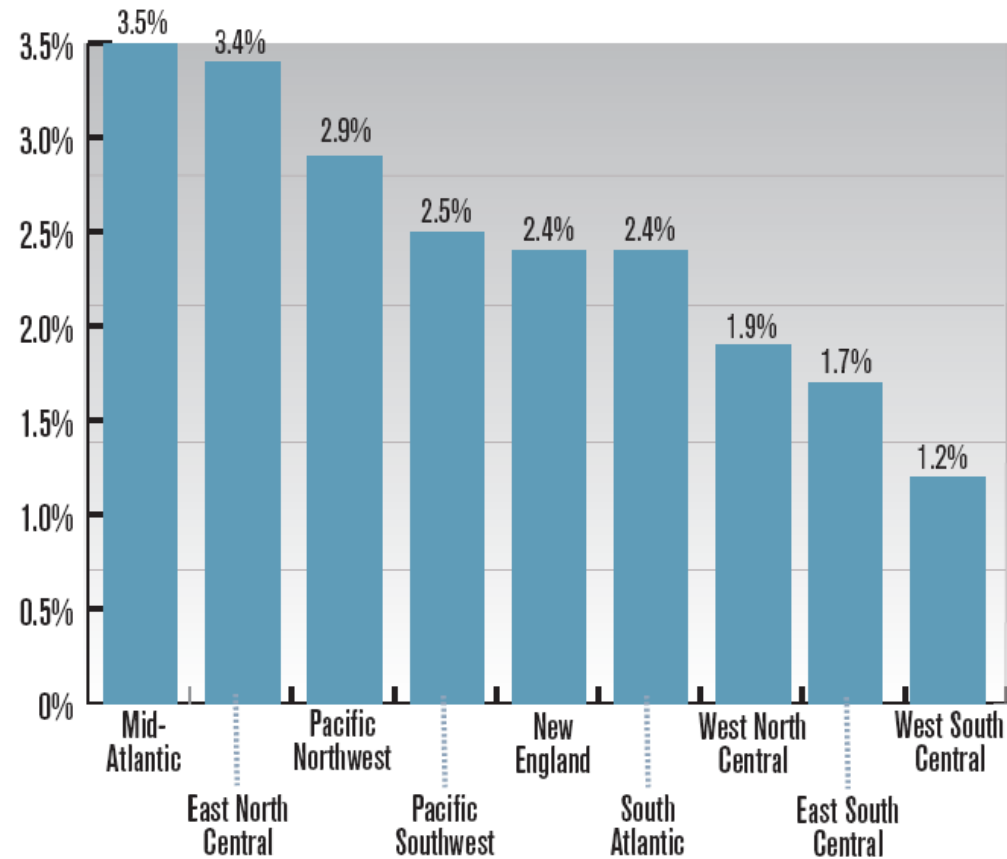
→ By 2020, LEDs expected to cover 46% of the \$4.4 billion U.S. market for lamps in the commercial, industrial and outdoor stationary sectors

Source: McGraw-Hill Construction Analytics, SpecShare, January–March 2010.

Green Roofs

Green Roof Specification Rates
By Region (January–December 2009)

- **Green Roof use grew by 16.1% in 2009**
- **Specification tracks with policy and incentives**



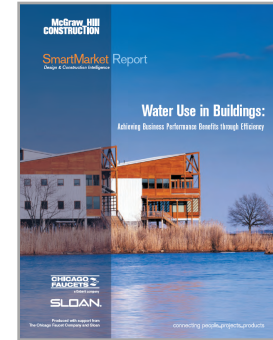
Source: McGraw-Hill Construction Analytics, SpecShare, January–December, 2009.



Trends in Green Building

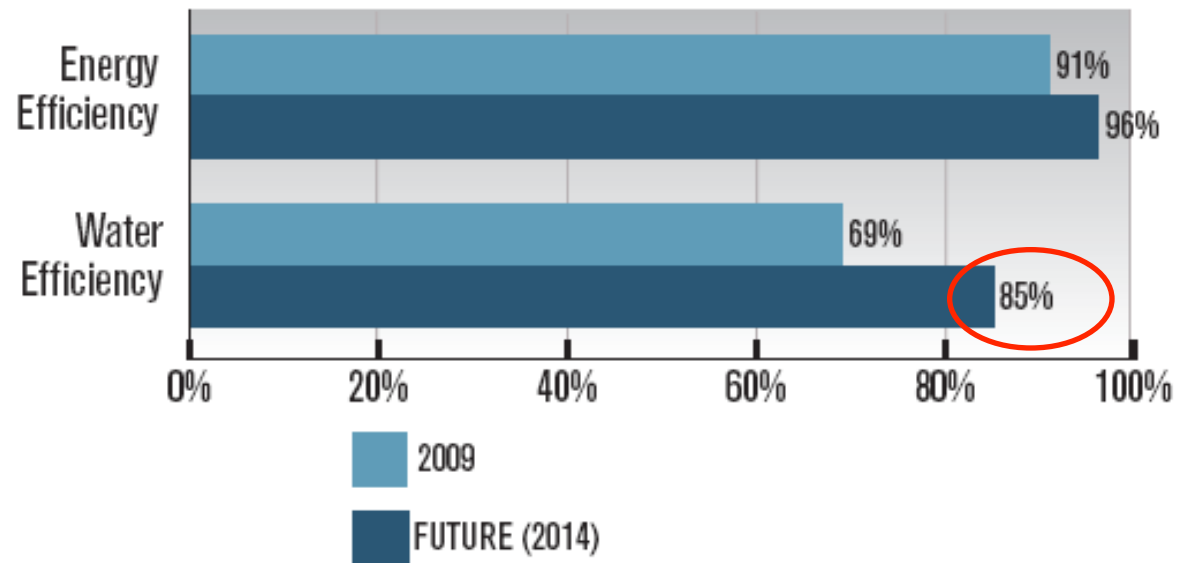


Water Efficiency Rapidly Growing in Importance



→ Becoming one of the most important aspects of a green building

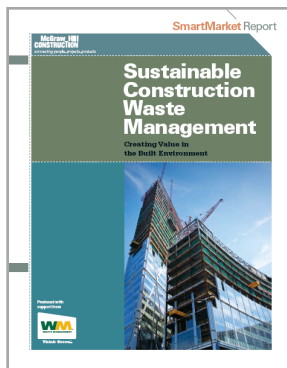
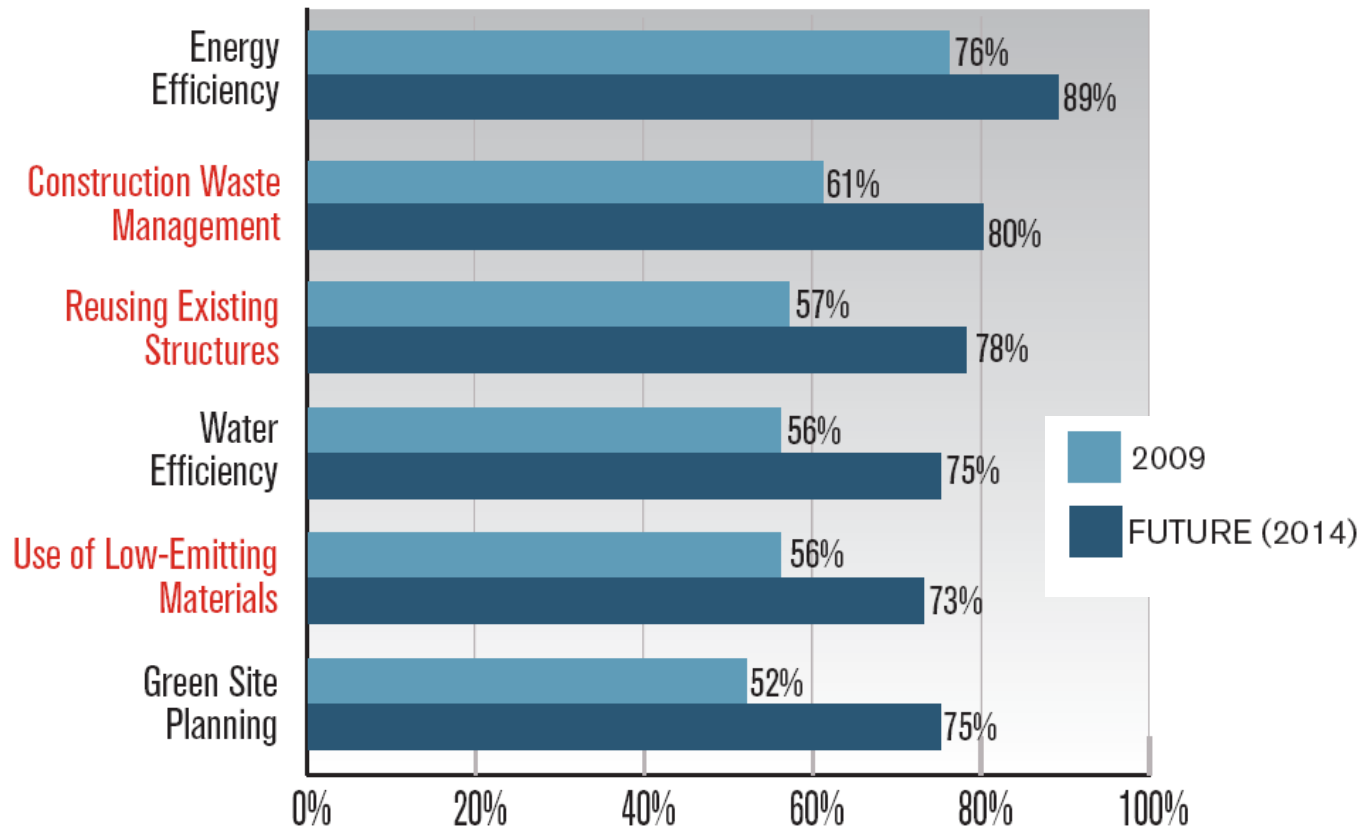
→ Correlation between saving water and saving energy



Source: Water Use in Buildings SmartMarket Report, McGraw-Hill Construction, 2009

Importance of Waste Management in Green Building to Contractors

Relative Importance of Green Building Practices Over Time
(according to Contractors)



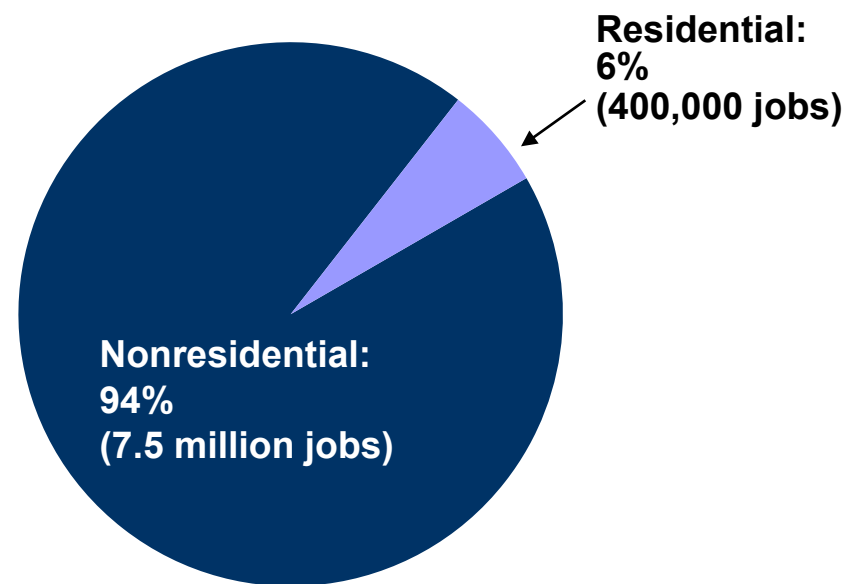
Source: Sustainable Construction Waste Management SmartMarket Report, McGraw-Hill Construction, 2009

Growth in Green Jobs: Boost for U.S. Economy

→ From 2009–2013, green building is expected to:

- Support 7.9 million U.S. jobs
(3x more than created from 2000–2008)
- Generate an additional \$554 billion in GDP
- Provide \$396 billion in labor earnings

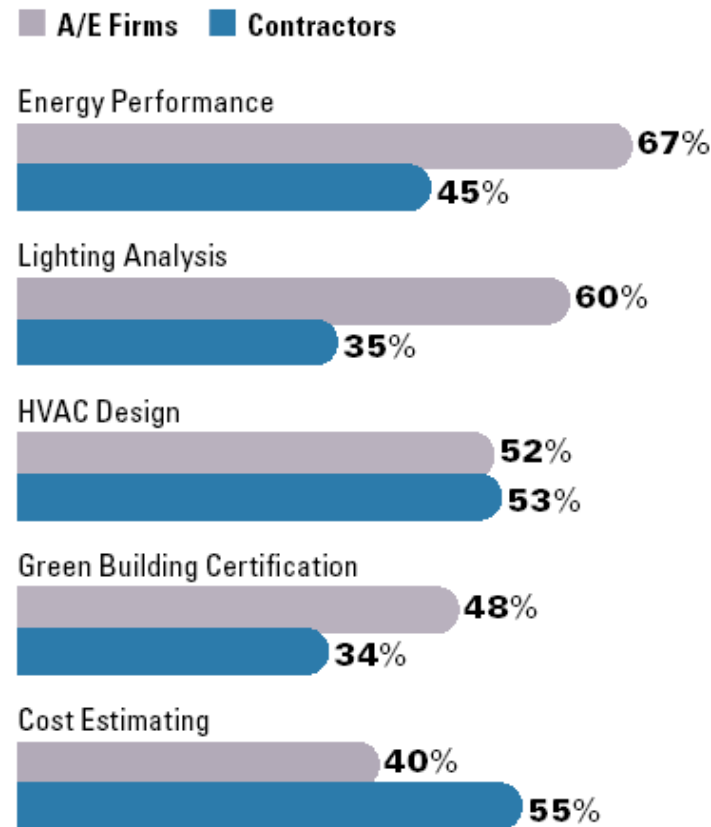
Breakdown of New Green Jobs



Source: Booz Allen Hamilton, U.S. Green Building Council Green Jobs Study, November 11, 2009

Firms Currently Using BIM for Energy-Related Aspects of Green

Top Green Design/Construction Activities with BIM (according to firms using BIM in green projects)



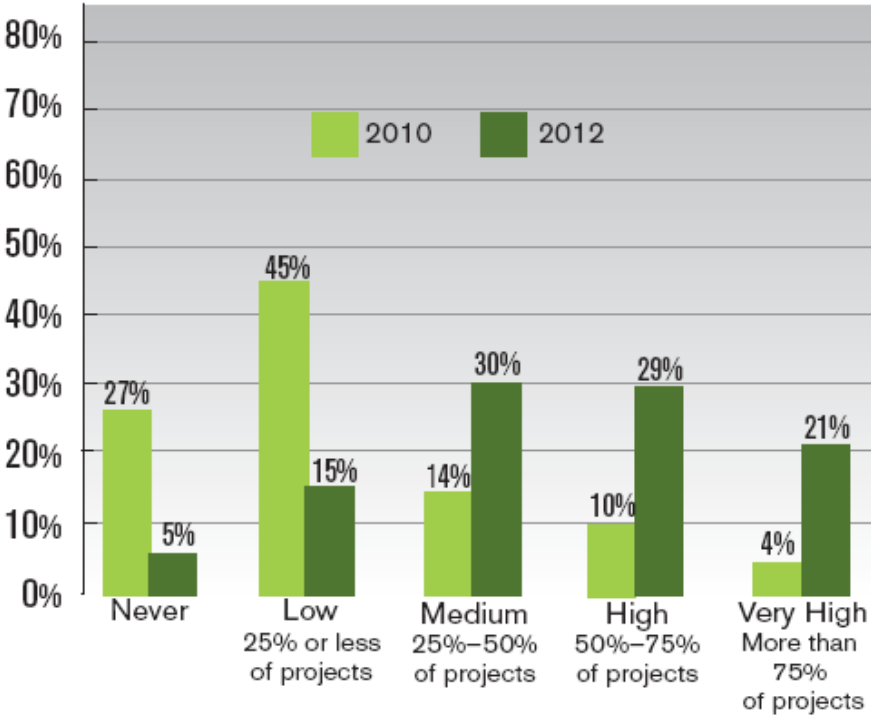
Source: Green BIM SmartMarket Report, McGraw-Hill Construction, 2010



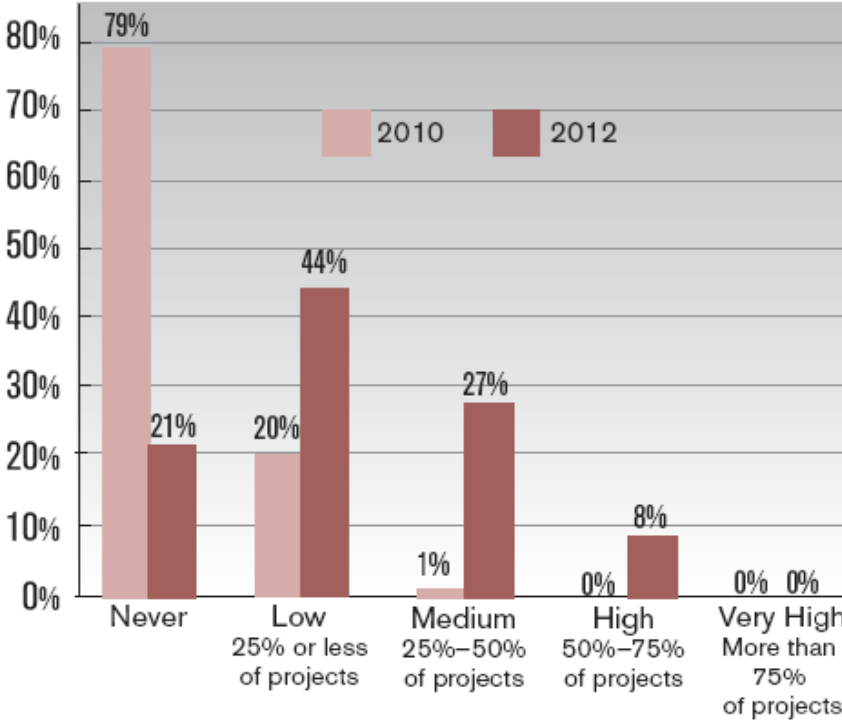
Strong Growth Expected in Use of BIM to Simulate Energy Performance

Current/Future Use of BIM to Simulate Energy Performance (according to Architects, Engineers and Contractors)

Green BIM Practitioners



Non-Green BIM Companies



Source: Green BIM SmartMarket Report, McGraw-Hill Construction, 2010

Product Innovations Providing Solutions

→ Innovative Façade Systems:

— HelioTrace

(Partnership of SOM, Permasteelisa Group & Adaptive Buildings Initiative)

- **Kinetic shade system**
- **Increases daylighting; reduces solar heat gain**

— Electrochromic glazing (e.g. SageGlass)

- **Reduce overall cooling loads and lighting costs**

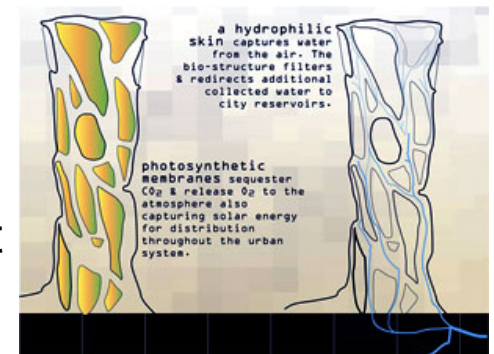
→ Biomimicry: Buildings that Breathe

(HOK partnership with the Biomimicry Guild)

- Designed “skin cells” for buildings, which absorb sunlight, water and CO₂ to produce oxygen and collect water.



Above: © SOM



Innovations in Reuse through Prefabrication/Modularization

→ SG Blocks Example

- Code-engineered cargo shipping containers and site-ready modularized blocks
- **New Applications:** “Home in a Box” & Hurricane-resistant temporary structures
- **Reuse = Sustainability**



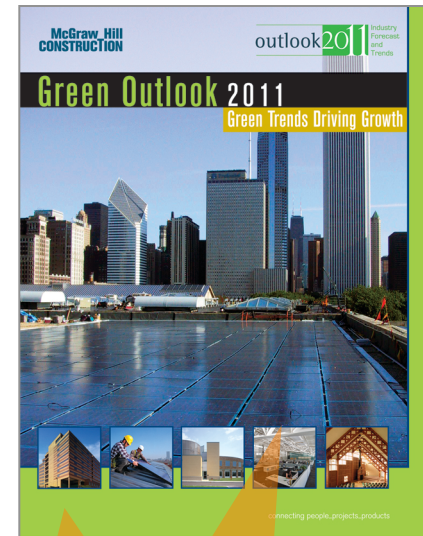
Closing Comments

- **Total residential and nonresidential new green building market in 2010: \$55–71 billion**
 - **Nonresidential New Construction:**
expected to triple to \$120–145 billion by 2015
 - **Nonresidential Major Retrofit:**
expected to grow four-fold to \$14–18 billion by 2015
- **Healthcare: Dramatic increase to **40% of market****
- **Education and Office remain strong markets**
- **LEED is mentioned in the specifications for 71% of projects valued at over \$50 million and 55% for all projects by value**

Thank You!

MHC Resource Websites:

- construction.com
- analytics.construction.com
- greensource.construction.com
- archrecord.com
- enr.com



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