

# *The Economics of Green*

Andy Florance, CEO, CoStar Group)

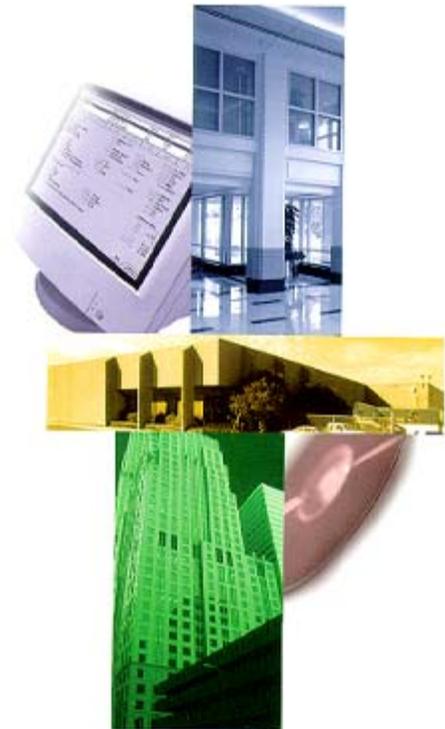
andy@costar.com

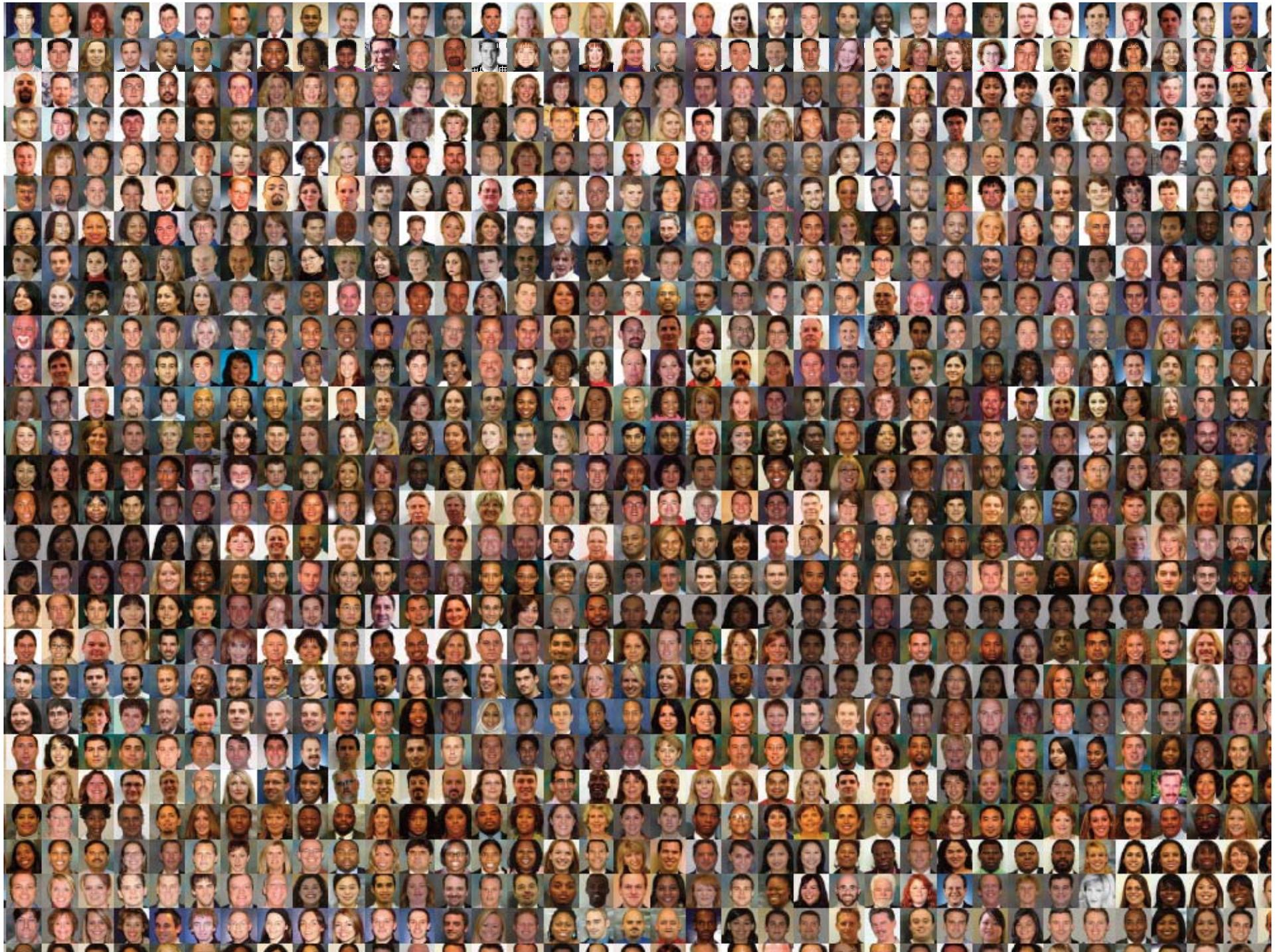


# CoStar is The Leading Commercial Real Estate Information Provider

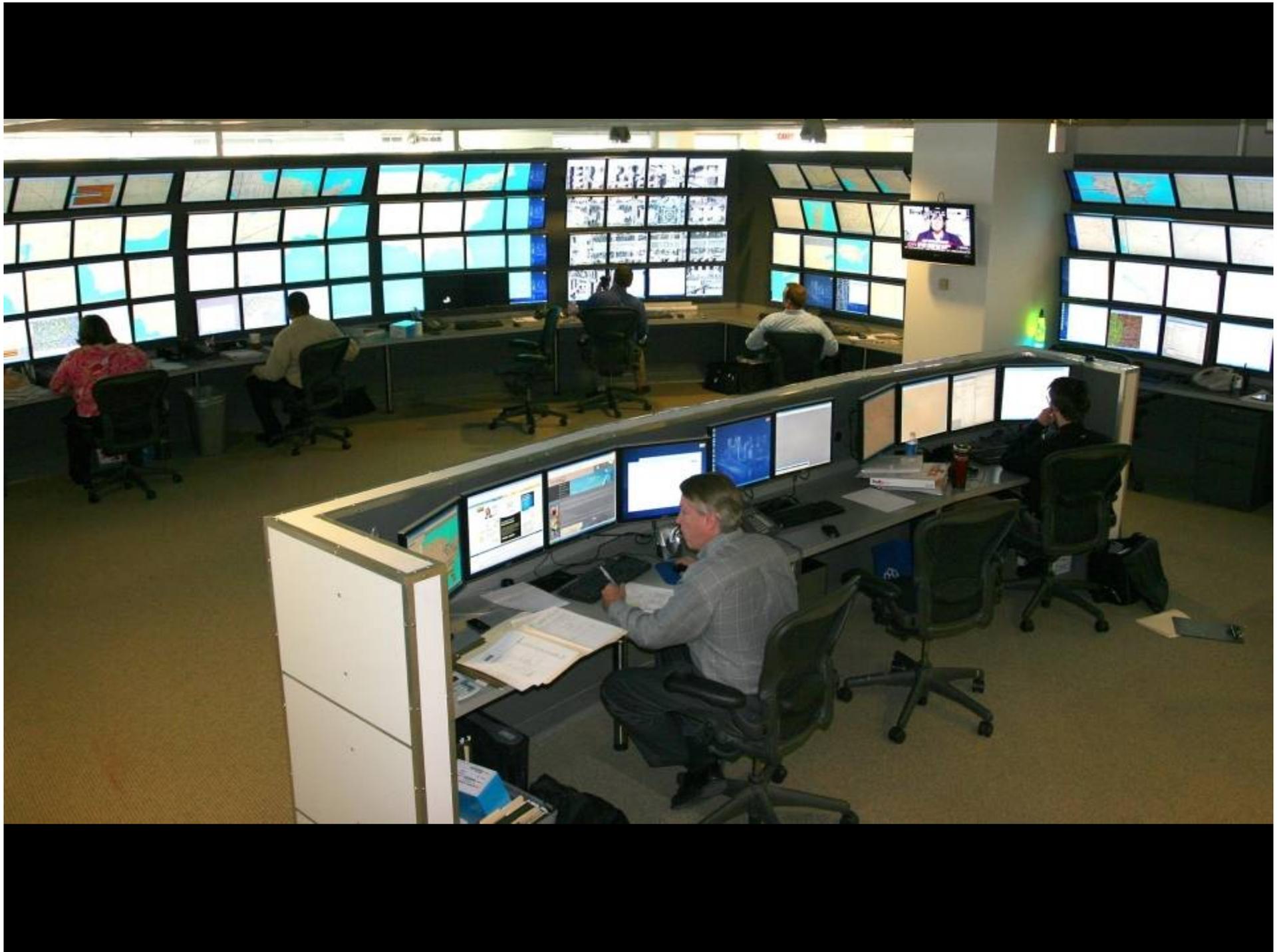


- We built and maintain the industry's most comprehensive commercial property database
- Over 15,000 strong client firms
- Publicly traded (CSGP)
- Operations; U.S., U.K., France
- \$120 million annual research budget
- \$1 Billion Spent on Research
- Over 1,500 employees & contractors











**Real-Net**  
Commercial Real Estate Database Services

**NMS**

**nrb**

The Chicago  
**RESOURCE**

**Exact Data/Exact Systems, Inc.**

**RealComp**

**LeaseTrend, Inc.**  
Real Estate Information

**PeerMark**  
Peer Market Research, Inc.  
Commercial Real Estate Market Research

**ARES**

**METROPOLIS**

**ARES**  
Investment Real Estate, LLC

**INSIDE PROSPECTS**

**COMPS**

**Commercial Broker's Network**

**Exact Data/Exact Systems, Inc.**

**The BACA GROUP**

**The BACA GROUP**

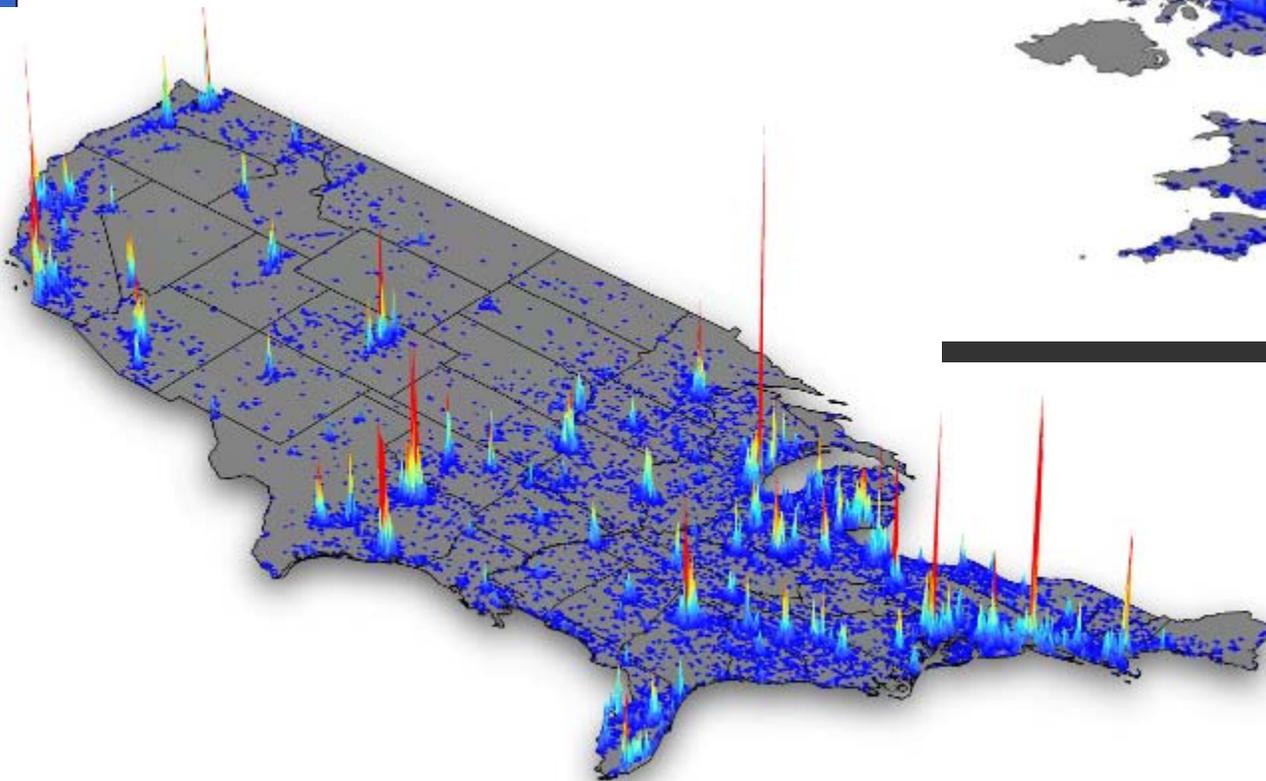
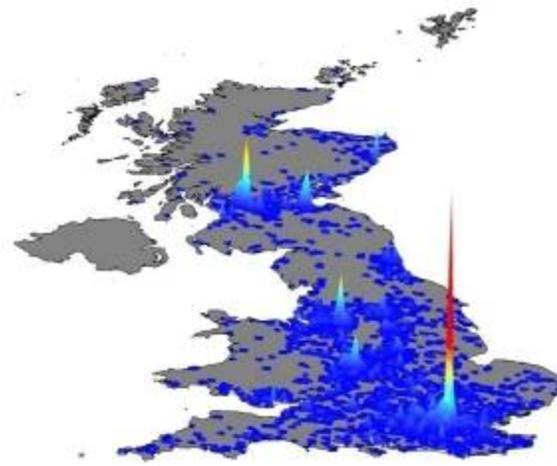


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# Over 10,000 Brokerage Firm and Owner Clients



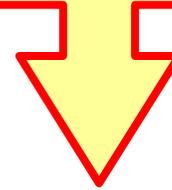
# Real Estate in the Climate Energy Era



# Scientists Call for 90% CO<sub>2</sub> Reduction in by 2050



President Elect Obama  
Is Calling for an  
80% CO<sub>2</sub>  
Reduction



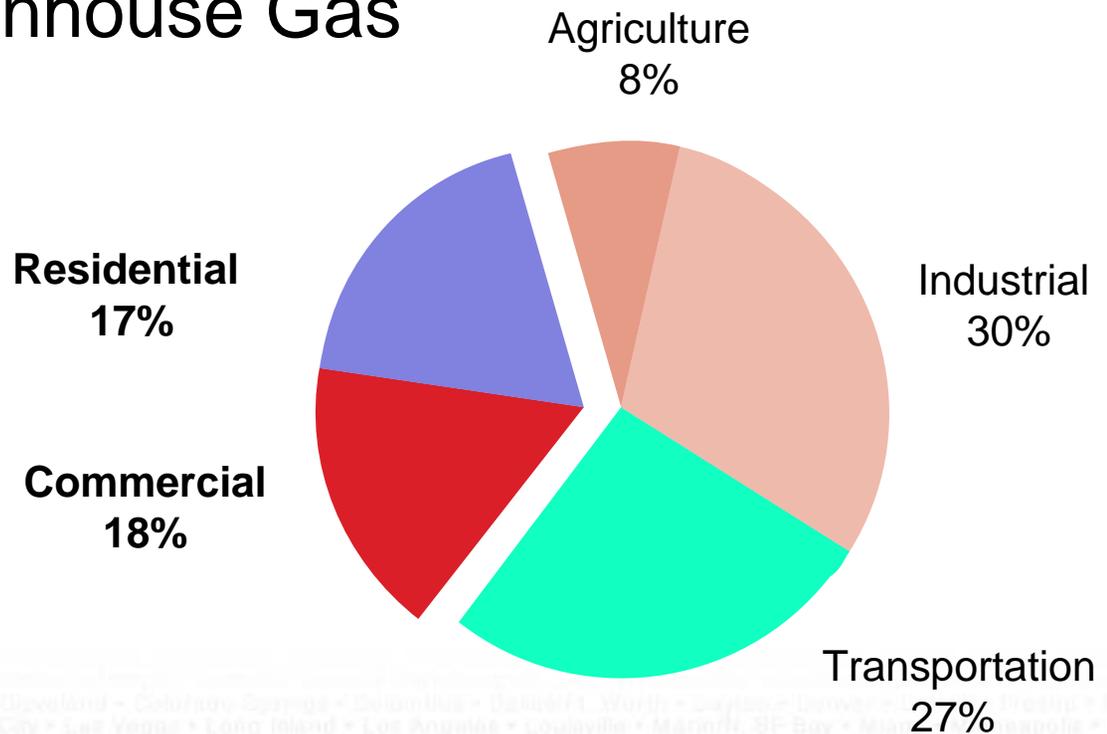
It is impossible to reach carbon reduction goals without addressing metrics & caps on real estate related CO<sub>2</sub> emissions



# Commercial Real Estate and the Environment



## Electricity Consumption in Commercial Buildings Accounts for 18% of U.S. Greenhouse Gas Emissions



(2002 Total = 6,888 MMTCO<sub>2</sub>E)



# Commercial Real Estate and the Environment



Buildings  
accounts for

**79%**

of all carbon  
dioxide  
emissions in  
**New York**

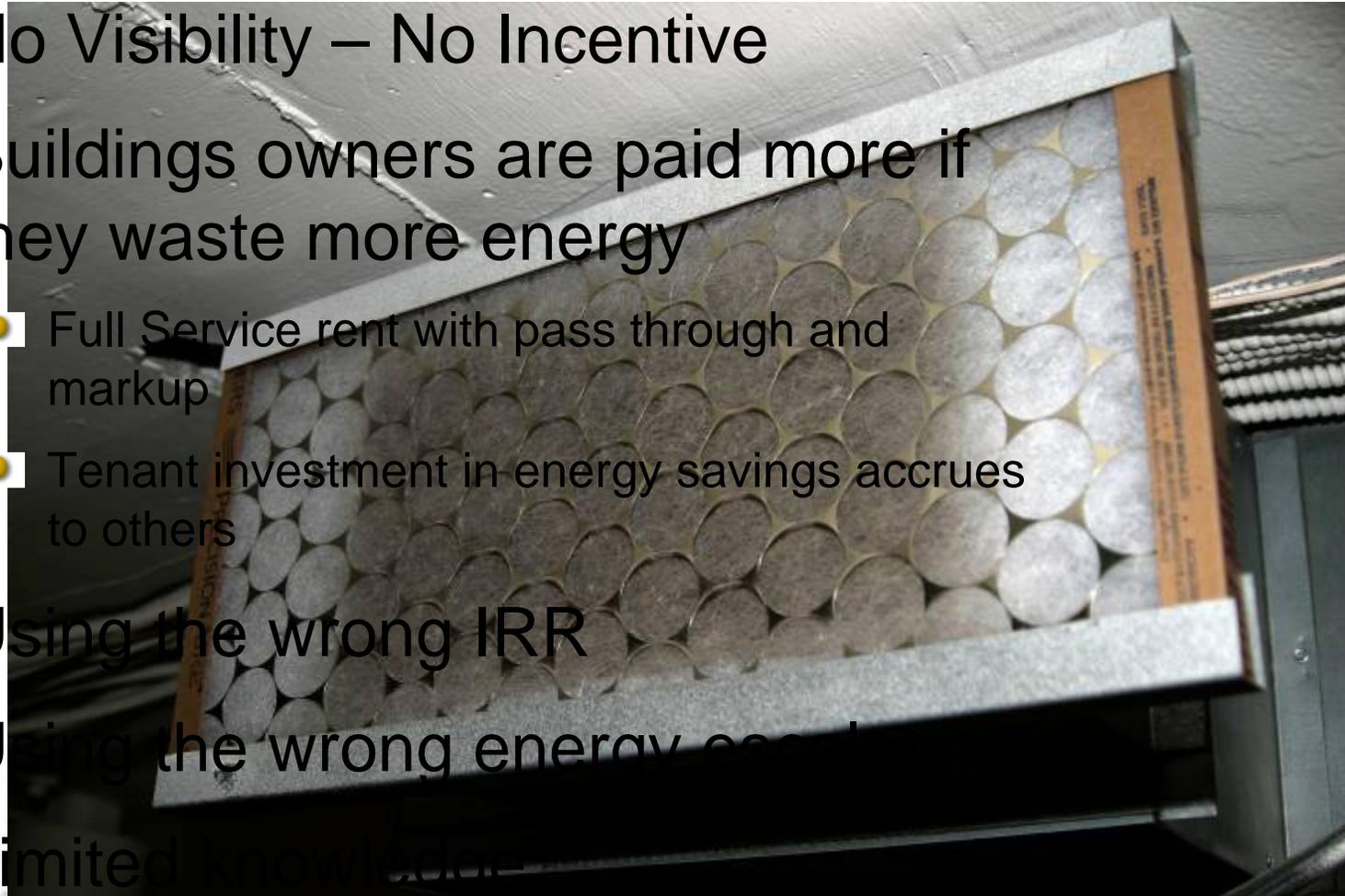




# An Engineer, a Clean Filter, CFLs, Insulation and Caulk



- No Visibility – No Incentive
- Buildings owners are paid more if they waste more energy
  - Full Service rent with pass through and markup
  - Tenant investment in energy savings accrues to others
- Using the wrong IRR
- Using the wrong energy cost
- Limited code



# CoStar Goes Green



- LEED information added to our database in 2006.
- Energy Star information added to our database in 2007.
- Searching and prominent placement of LEED and Energy Star buildings added to our products in 2007.



# CoStar's Green Database



Green Buildings	Buildings	Square Footage
Energy Star	973	284 Million
LEED	355	67 Million
<b>Totals</b>	<b>1,328</b>	<b>351 Million</b>

Energy Star Breakdown	Buildings	Square Footage
Office	859	271 Million
Industrial	16	5 Million
Retail	98	8 Million
<b>Totals</b>	<b>973</b>	<b>284 Million</b>





property search

- Step 1: Basic
- Step 2: Location
- Step 3: Detail
- Get Results

home page

- 1 basic
- 2 location
- 3 detail
- get results

show criteria

lookup property

property search

retail search

analytic search

open last survey

my surveys

help

suggestions

support

property criteria

Property Type:

Office  Shopping Ctr  
 Flex  Retail  
 Industrial  Multi-Family  
 Land

Status: Existing Under Constru Under Renovat Proposed

Class: A B C F

RBA (SF): to  
 Typical Floor Size (SF): to  
 Stories: to  
 Year Built/Renov: to

Fully Leased Buildings

Green Rat  LEED Certified  
 ENERGY STAR

for sale

For Sale Price: to  
 Price/SF: to

Include results where For Sale Price is not disclosed  
 Exclude results where For Sale Price is not disclosed

Include only  Condos

sold properties

Last Sold Price: to  
 Last Sold/SF: to  
 Sold (MM/DD/[YY]YY): to

space criteria

Available Space (SF): to

Contig In Building  
 Contig on 1 Floor  
 In One Suite

Excl if Not For Lease  
 Excl Div Spaces  
 Excl Pndg Leases  
 Executive Suite  
 Full Floors Only

Space Use: Office Retail Flex Warehse Medical

Space Type: New Direct Sublet

Asking Rent (\$/SF/yr): to

Include Negotiable Rent

Floor: to

Days on Market: to

Months to Delivery: to

Count Clear Criteria

Hold down the CTRL key and click to select multiple items

- Step 1: Basic
- Step 2: Location
- Step 3: Detail
- Get Results



**search results**  
157 properties / 566 spaces



Denver Club Building



★ See Our Ad

[home page](#)

**properties** | spaces | changes | demographics | map

◀ previous | next ▶ Page 1 of 8 [go](#)

- change criteria
- show criteria
- print reports
- tour order
- add properties
- edit results
- save survey
- lookup property
- property search
- retail search
- analytic search
- my surveys
- slide show
- export data
- google export
- help
- suggestions
- support

<input type="checkbox"/>	<input type="checkbox"/>	Address	Name	Type	Cls	Status	RBA/GLA	SF Avail	Rent/SF/yr	Submarket	Landlord Re
<input checked="" type="checkbox"/>	★	<a href="#">518 17th St</a>	Denver Club Bldg	Office	B	Existing	232,000	58,584	20.25	Central Business...	Corum Re
<input type="checkbox"/>	⊕ ★	<a href="#">999 18th St</a>	Denver Place	Office	A	Existing	829,625	331,299	27.04	Central Business...	Silverbrae
<input type="checkbox"/>	★	<a href="#">555 17th St</a>	555 17th Street	Office	A	Existing	683,220	165,180	25.64	Central Business...	Cushman &
<input type="checkbox"/>	★	<a href="#">717 17th St</a>	Manville Plaza	Office	A	Existing	675,400	69,582	25.78	Central Business...	Crescent F
<input type="checkbox"/>	★	<a href="#">1050 17th St</a>	Independence Plaza	Office	A	Existing	567,287	35,251	29.00	Central Business...	Cushman &
<input type="checkbox"/>	★	<a href="#">1125 17th St</a>	Bank One Building	Office	A	Existing	489,393	110,350	30.50	Central Business...	Fuller Real
<input type="checkbox"/>	★	<a href="#">1225 17th St</a>	17th Street Plaza	Office	A	Existing	666,653	89,515	25.01	Central Business...	Jones Lang
<input type="checkbox"/>	★	<a href="#">1331 17th St</a>	Guaranty Bank Bldg	Office	B	Existing	220,275	17,447	23.37	Central Business...	Frederick F
<input type="checkbox"/>	★	<a href="#">1999 Broadway</a>	1999 Broadway	Office	A	Existing	678,000	139,051	27.00	Central Business...	Cushman &
<input type="checkbox"/>	★	<a href="#">1700 Lincoln St</a>	Wells Fargo Center	Office	A	Existing	1,201,957	88,926	30.97	Central Business...	Maguire Pr
<input type="checkbox"/>		<a href="#">1031 13th St</a>		Office	C	Existing	3,854	0	-	Central Business...	
<input type="checkbox"/>		<a href="#">1101 13th St</a>	Tramway Bldg	Office	B	Existing	120,000	0	-	Central Business...	
<input type="checkbox"/>		<a href="#">331-335 14th St</a>	Independence Bldg	Office	B	Existing	24,700	4,500	13.11	Central Business...	Independe
<input type="checkbox"/>		<a href="#">931 14th St</a>	Bell System Bldg	Office	B	Existing	408,708	0	-	Central Business...	
<input type="checkbox"/>		<a href="#">1250 14th St</a>	CU Denver - Dravo Plaza	Office	B	Existing	143,000	0	-	Central Business...	
<input type="checkbox"/>		<a href="#">550 15th St</a>		Office	B	Existing	235,683	0	-	Central Business...	Public Ser
<input type="checkbox"/>		<a href="#">820-838 15th St</a>		Office	C	Existing	12,500	0	-	Central Business...	Fuller Real
<input type="checkbox"/>		<a href="#">910 15th St</a>	Denver Gas & Electric	Office	B	Existing	143,135	34,760	25.00	Central Business...	CB Richar
<input type="checkbox"/>		<a href="#">930 15th St</a>	Qwest	Office	B	Existing	229,587	0	-	Central Business...	
<input type="checkbox"/>		<a href="#">1020 15th St</a>	Brooks Tower	Office	B	Existing	15,357	0	-	Central Business...	Colliers Be

0 properties selected

[select all](#) | [unselect all](#) | [remove selected](#) | [remove unselected](#) | [modify table layout](#)

CoStar Property® - Microsoft Internet Explorer

Address: <http://property.costar.com/Property/Detail/Detail.aspx?t=1&id=393908>

Jay M. Spivey · CoStar Group, Inc. log out



### 999 18th St - Denver Place

NWC 18th St & Champa St/Denver Place  
 Denver, CO 80202 - Central Business District Submarket  
 331,299 SF Available for lease with Avg Rent of \$27.04/sf/yr  
 829,625 SF Class A Office Building Built in 1981

home page

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results table

print reports

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change criteria

show criteria

edit results

save survey

add properties

remove property

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property search

retail search

analytic search

my surveys

update data

suggestions

support

space overview	property	company	images	analytic	map
for sale	comps	tenant	my data	public record	demographics

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**building information**

Bldg Type: <b>Office</b>	Bldg Status: <b>Built 1981</b>	Tenancy: <b>Multi</b>
Class: <b>A</b>	% Leased: <b>66.9%</b>	Elevators: <b>22 with 2 frt</b>
Rent/SF/yr: <b>\$27.04</b>	Total Avail: <b>331,299 SF</b>	Core Factor: <b>16.5%</b>
RBA: <b>829,625 SF</b>	Bldg Vacant: <b>283,918 SF</b>	Zoning: <b>B-5, Denver</b>
Stories: <b>34</b>	Typical Floor Size: <b>14,300 SF</b>	Owner Occupied: <b>No</b>
Owner Type: -	Const Type: <b>Steel</b>	
Building FAR: <b>7.75</b>	Land Area: <b>2.46 AC</b>	
Property Mix:	<b>Office 783,996 SF (94.5%)</b>	
	<b>Retail 45,629 SF (5.5%)</b>	
Expenses: <b>2006 Est Ops @ \$9.01/sf</b>		
Parking: <b>929 Covered Spaces @ \$150.00/mo; Ratio of 1.12/1,000 SF</b>		
Amenities: <b>Banking, Conferencing Facility, Day Care, Dry Cleaner, Energy Star Labeled, Fitness Center, Hotel, LEED Certified - Gold, On Site Management, Property Manager on Site, Restaurant</b>		
For Sale Info: <b>Not for sale</b>		

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**location information**

Located: **NWC 18th St & Champa St**  
 Park Name: **Denver Place**  
 Metro Market: **Denver**  
 Submarket: **Central Business District/Central Business District**  
 County: **Denver**  
 CBSA: **Denver-Aurora, CO**  
 DMA: **Denver, CO-NE-WY-NV**

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**building notes**

Denver Place is the largest mixed-use project in Downtown Denver. It includes an office complex, retail mall, luxury hotel, and high-rise apartment. Building amenities include 24-hour security, conference room, athletic club, printing/copy center, and the Shops at Denver Place. Property is in close proximity to the Federal Courthouse, and is only two (2) blocks from 16th Street Mall.

In 2004, this building was awarded LEED certification at the Gold level by the U.S. Green Building Council. It is also an Energy Star building.

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**building representative**

<p><b>Silverbrae Holdings, Inc.</b></p> <p>999 18th St                  Suite 1201                  Denver, CO 80202                  (303) 312-3920</p>	<p><b>Garth Tait</b></p> <p>President                  (303) 312-3922 phone                  (303) 265-3643 fax</p>
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Trusted sites

# \$Motivation For Green Development

- EXPENSE

- Gold and Platinum LEED certified buildings have energy savings approaching 50%\*
- Energy Star reports 10-20% lower operating costs in Energy Star rated buildings<sup>1</sup>
- Most owners have no economic incentive to save on energy costs (triple net lease or pass through)
- Difficult to quantify financial benefits

- REVENUE:

- Does the demand for green properties exceed a limited supply and create compelling economic incentive to develop and operate green buildings?



\*New Buildings Institute <sup>1</sup>EPA

# Major Class A Office



# 3.1 Million Sq Ft Industrial Property



# 10,000 Square Foot Office Building



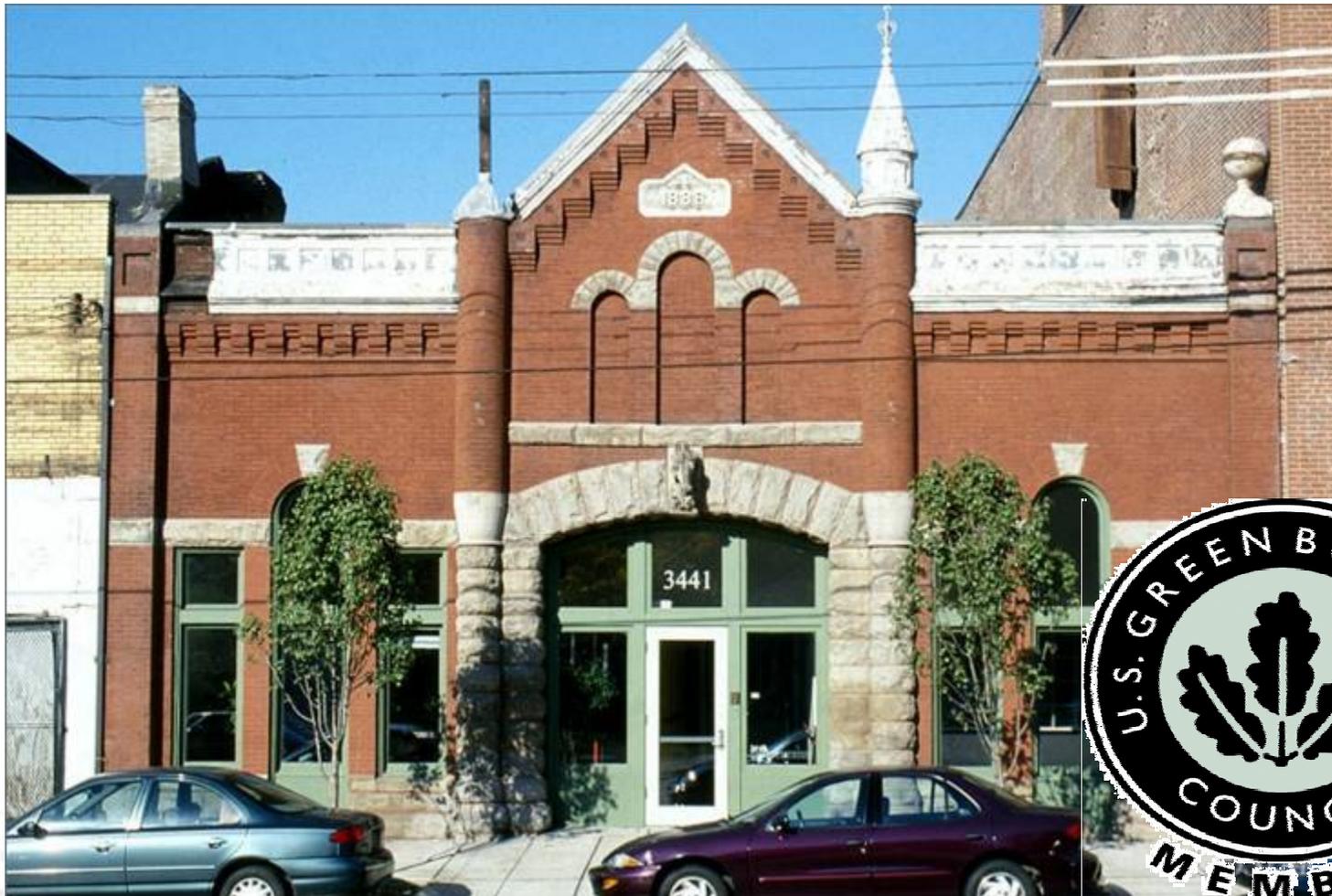
# An Office Building Built in 1927



# LEED Silver, Gold, & Platinum



# LEED Silver, Gold, & Platinum



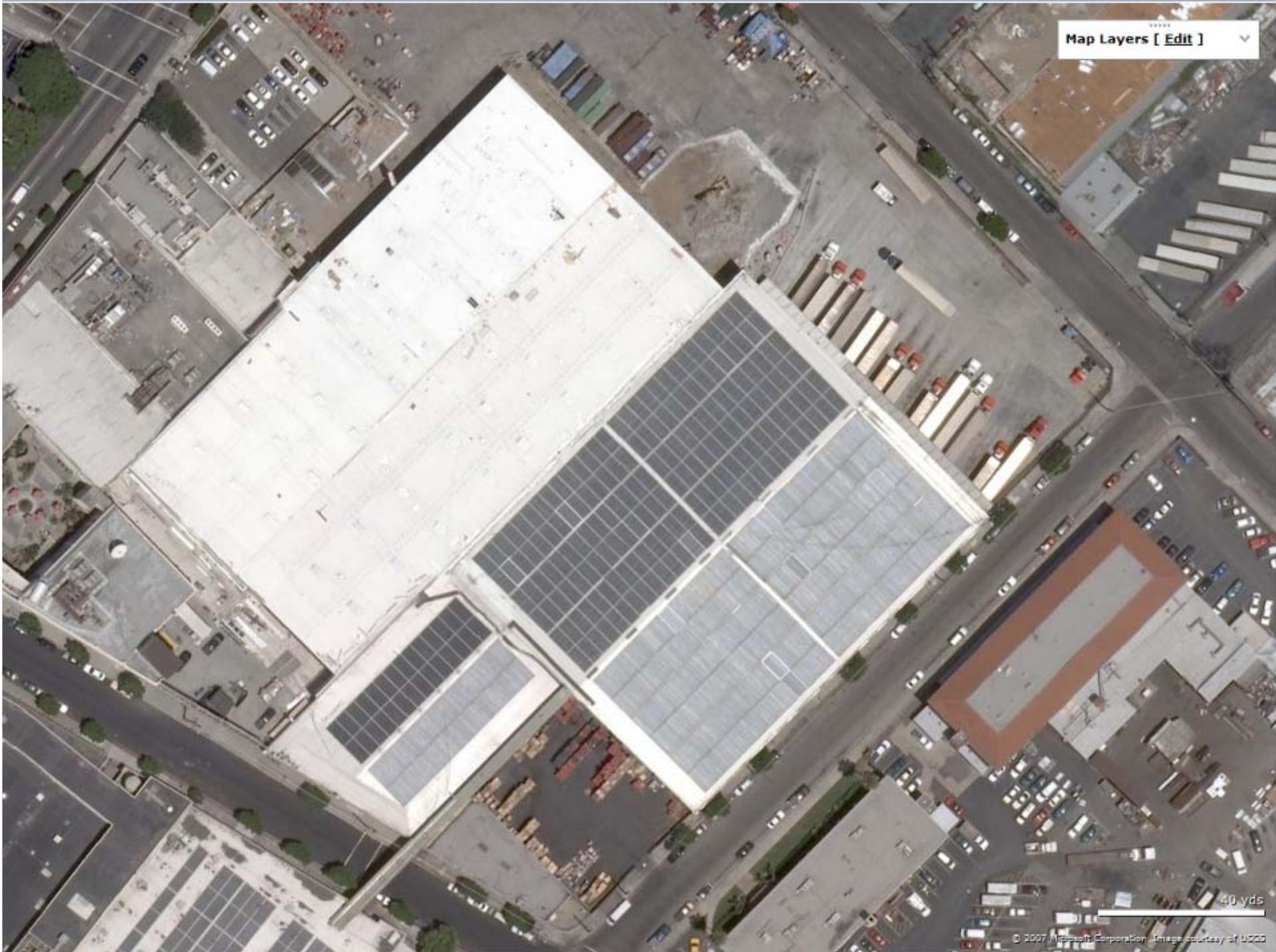
# Top 10 Metropolitan Areas for Green Buildings



	<b>Metro Area</b>	<b># Bldgs</b>	<b>Square Feet</b>	<b>% of Total</b>
1	Los Angeles	100	26,167,038	13.3%
2	Houston	46	21,101,378	10.8%
3	Washington DC	61	19,796,646	10.1%
4	New York City	11	12,328,784	6.3%
5	San Francisco	30	11,862,367	6.0%
6	Minneapolis/St Paul	20	11,381,738	5.8%
7	Denver	34	10,285,745	5.2%
8	Seattle/Puget Sound	16	7,616,710	3.9%
9	Chicago	13	6,326,489	3.2%
10	Dallas/Ft Worth	20	6,058,892	3.1%

Source: Costar

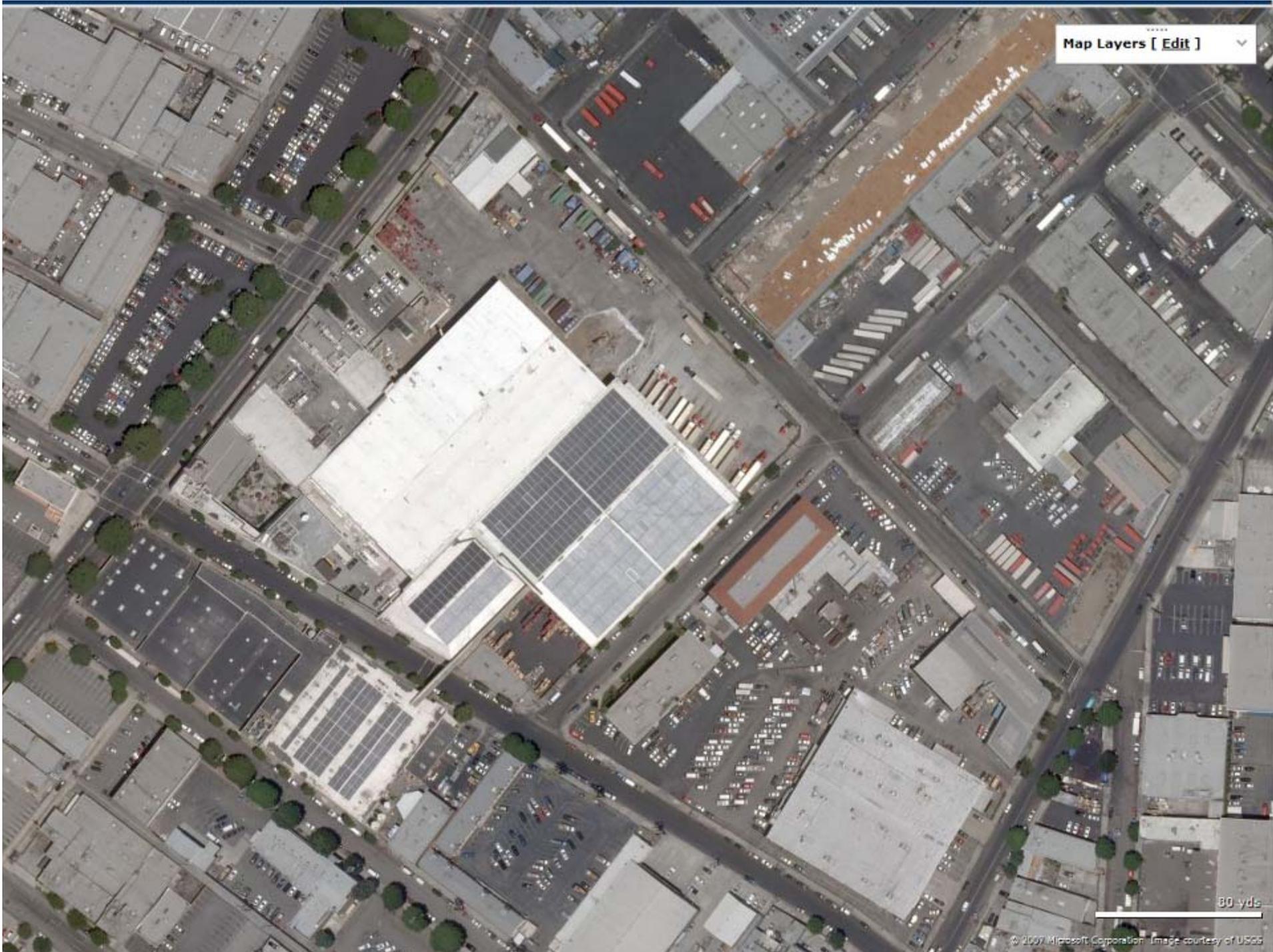




Map Layers [ [Edit](#) ]

40 yds

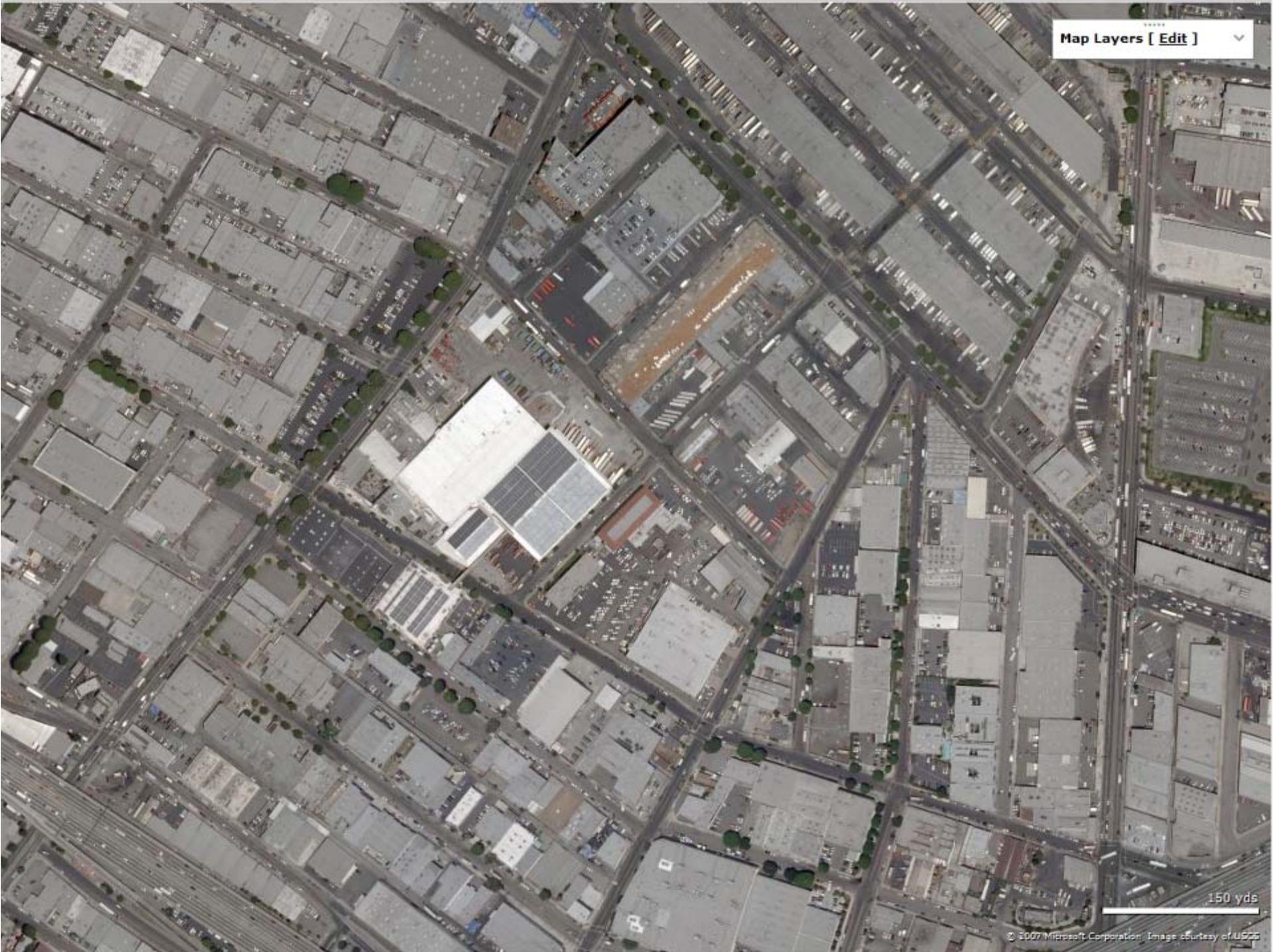
© 2007 Microsoft Corporation. Image courtesy of USGS



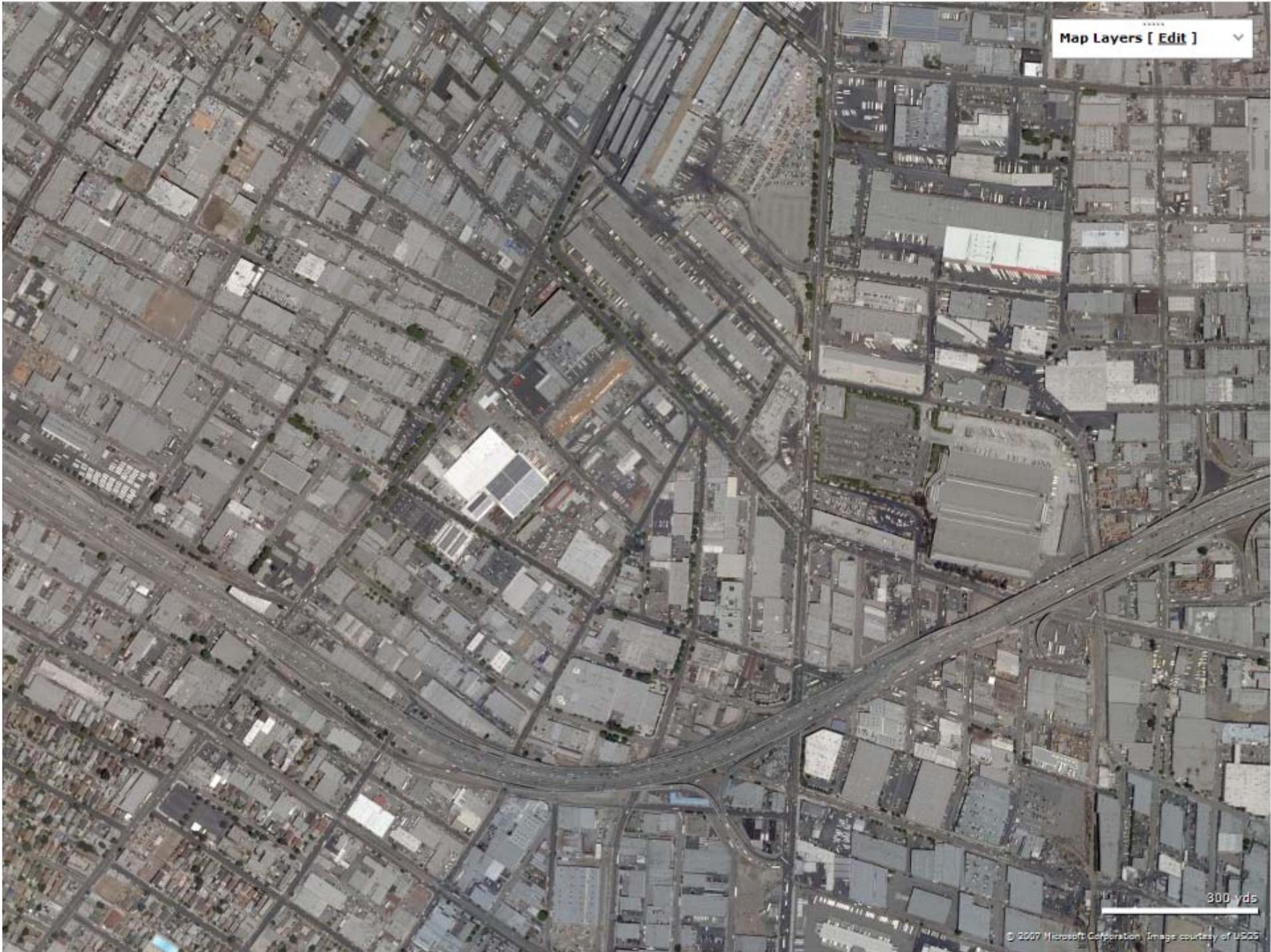
Map Layers [ Edit ]

80 yds

Map Layers [ Edit ]



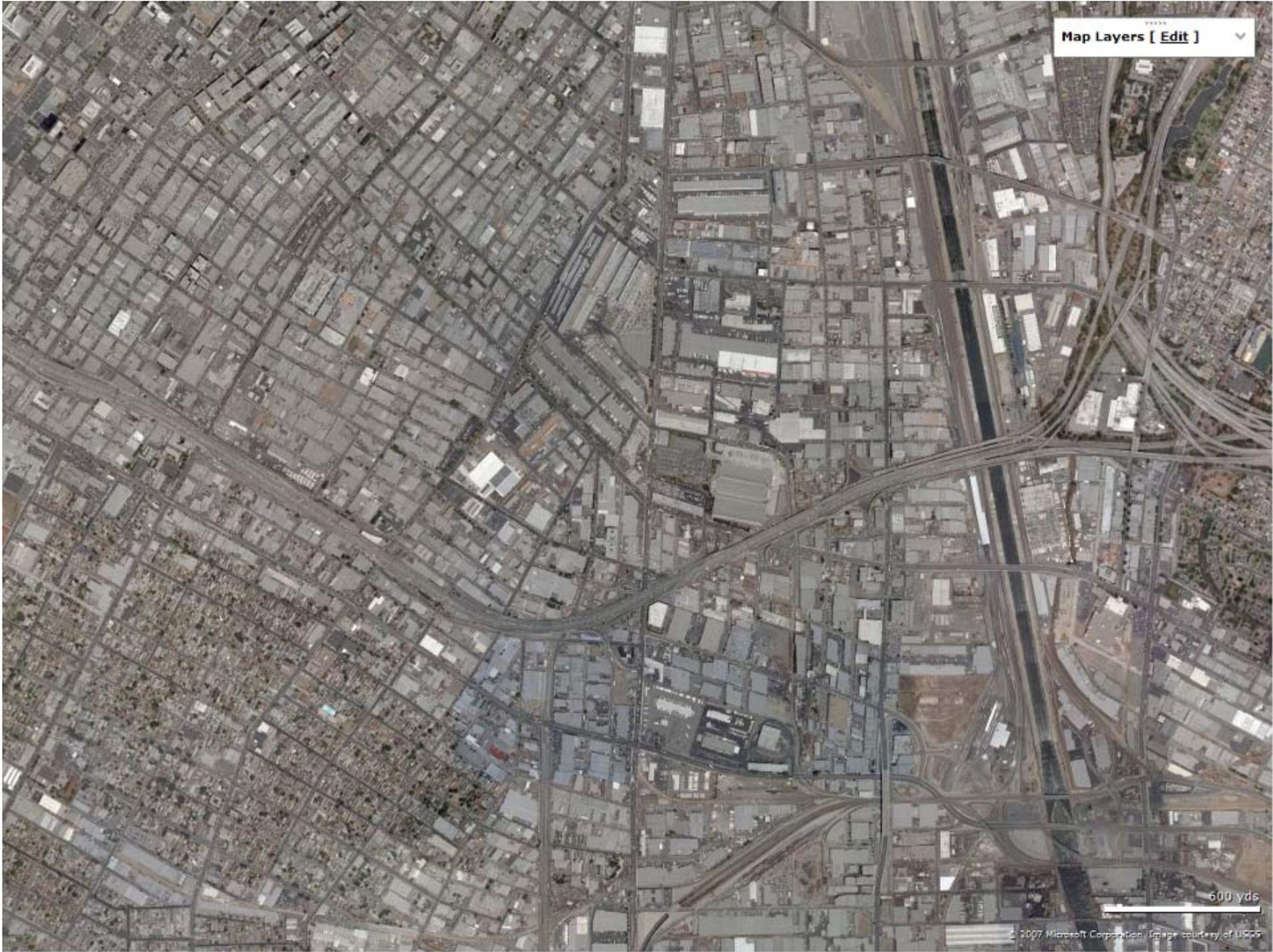
150 yds



Map Layers [ Edit ]

300 yds

© 2007 Microsoft Corporation. Image courtesy of USGS



Map Layers [ Edit ]

600 yds

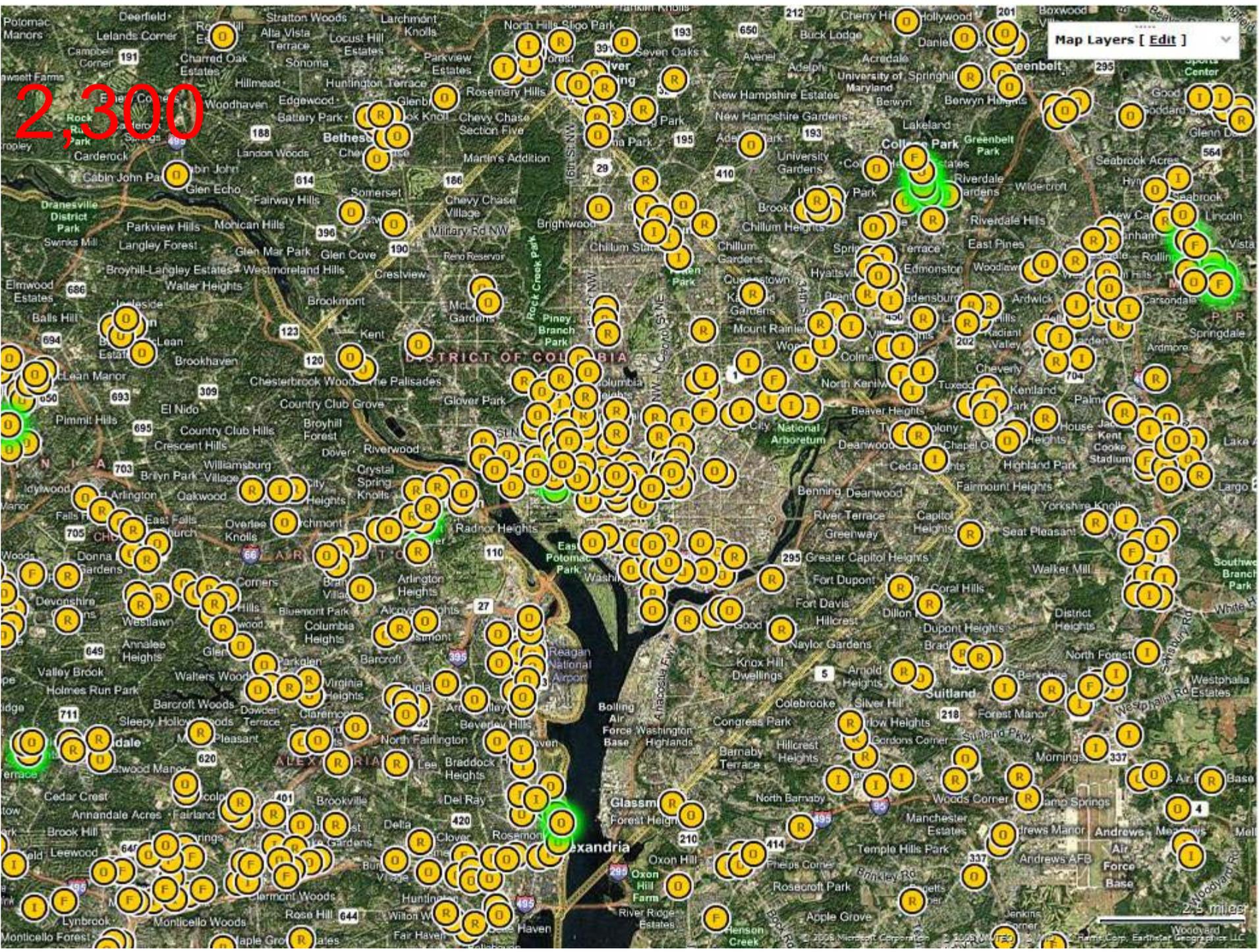
© 2007 Microsoft Corporation. Image courtesy of USGS

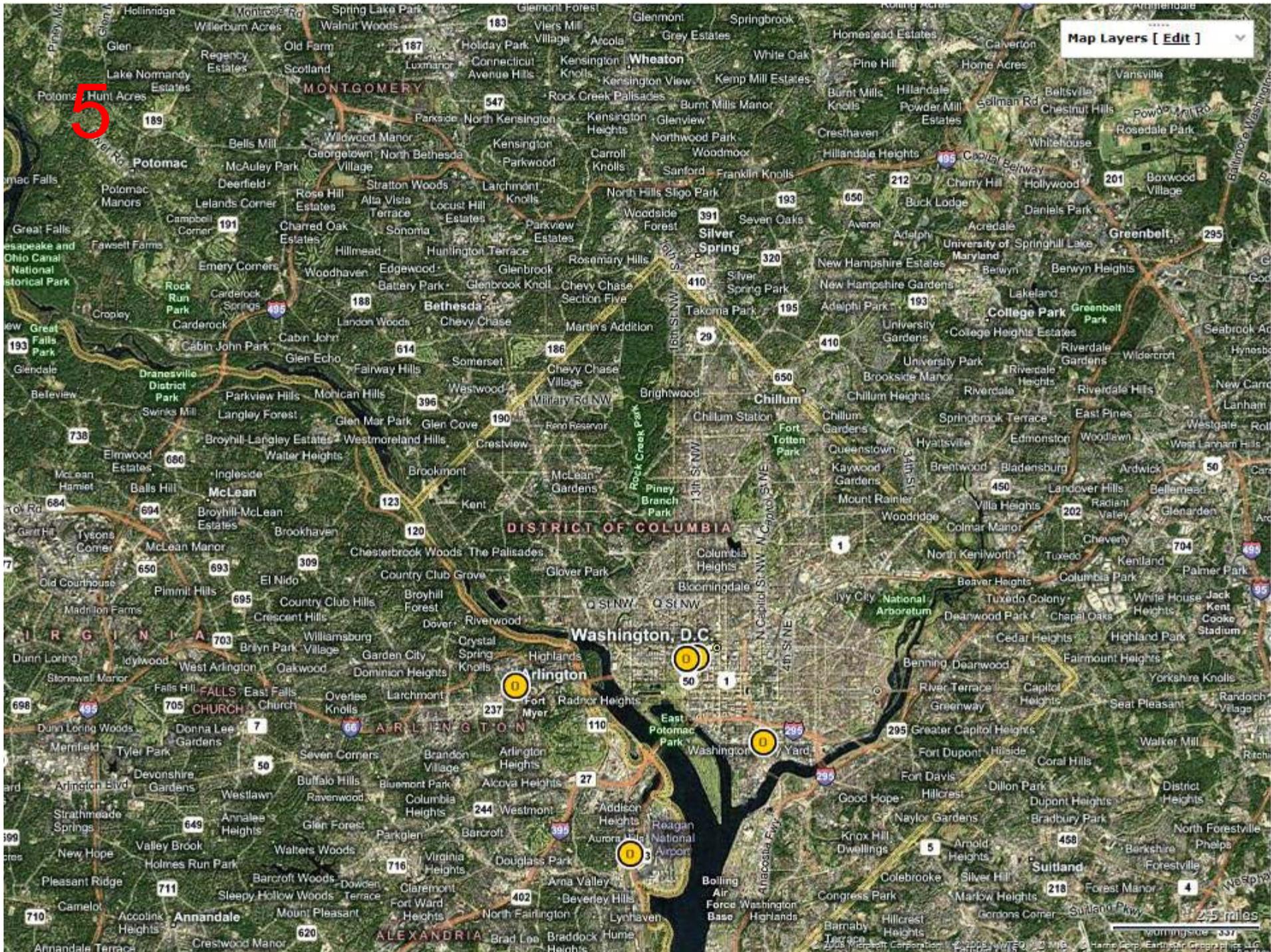


118,000 Commercial Properties in L.A.  
1 in 1,000 are Green

2,300

Map Layers [ Edit ]



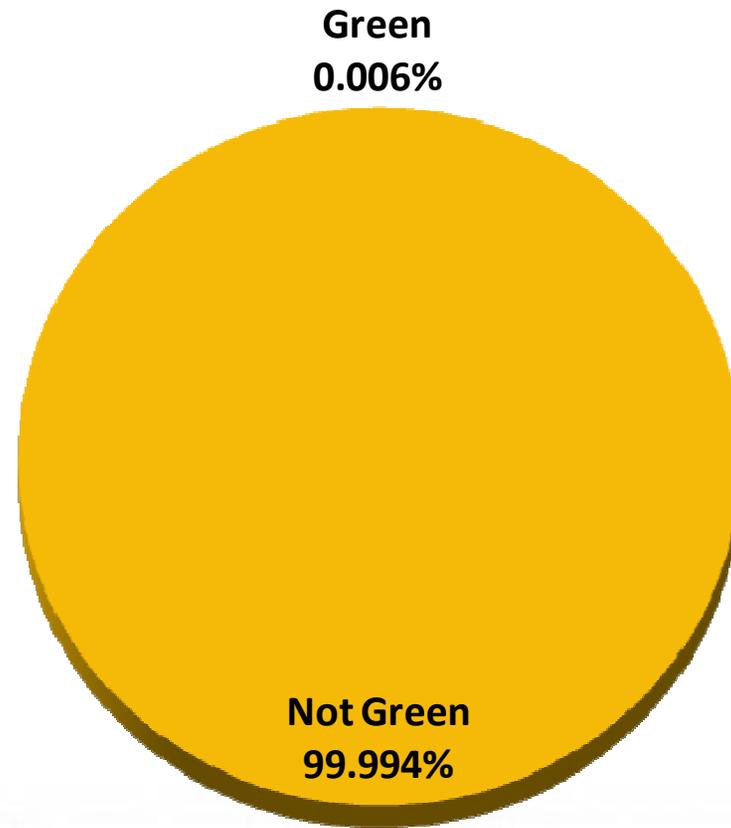


# A Infinitesimal Percentage of U.S. Buildings are Green



**1 in 15,671  
U.S. Commercial  
Properties are Green**

**15,500 buildings  
delivered in 2007  
...several dozen were  
green**



# Increasingly Companies & Gov are Adopting Sustainable Policies



“At EMC, we are keenly aware of the environmental responsibility we have to our shareholders, employees, customers, and the general public. We’re committed to conducting operations in as sustainable and responsible a manner as possible.”



“Safety, the environment and health are inseparable parts of the Petrobras System and our business performance is aligned with the efficient use of energy and the concept of sustainable development.”

“We will engage 100% of our property and facilities management and brokerage clients in proactive discussions about environmental issues, with a goal of the vast majority of our facilities and property management clients implementing energy saving technology and practices at their locations by 2010, thereby helping them reduce their green house gas emissions at the properties and corporate facilities we manage.”



# Corporate Commitments



- 60% of the Fortune 500 have joined the Carbon Disclosure Project
- 401 Companies have joined the Chicago Climate Exchange committing to Carbon Neutrality
- Growing Concern over the “cap and trade”
- Citigroup, JP Morgan and Morgan Stanley announce The Carbon Principal Commitment

Source: Sally Wilson  
CB Richard Ellis



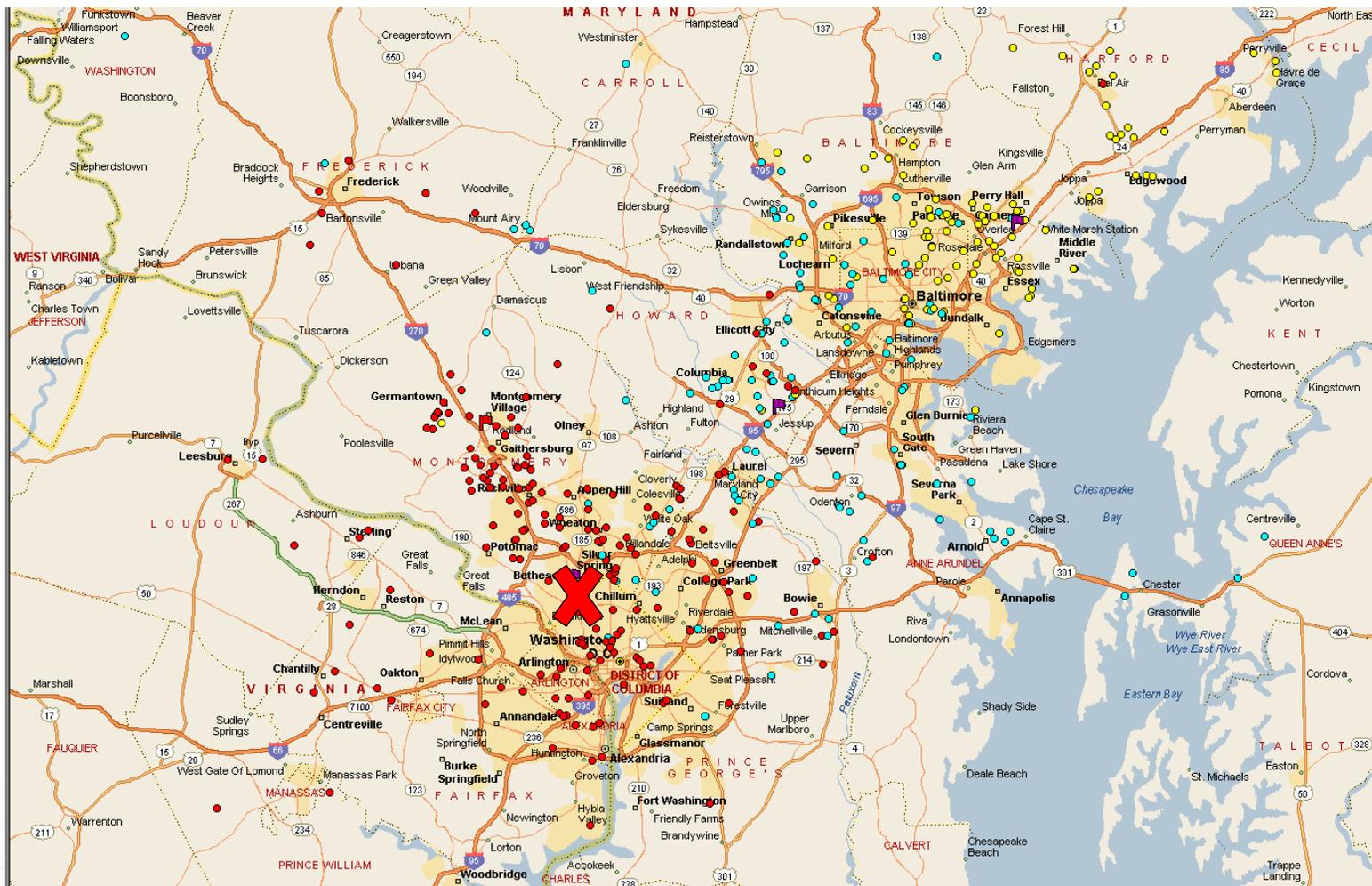
# Companies Doing Deals In Green Buildings Past 24 Mo.



Tenant	Green Leases	Green SF	Non Green Leases	Non Green SF	% Green SF
CB Richard Ellis	13	123,188	42	421,528	23%
Wells Fargo & Co	9	69,378	66	844,821	8%
<b>BHP Billiton</b>	<b>7</b>	<b>454,381</b>	<b>0</b>	<b>0</b>	<b>100%</b>
Wachovia Corporation	6	99,895	65	770,198	11%
U.S. General Services Administration	6	345,469	50	2,691,310	11%
The Travelers Companies, Inc.	6	285,695	7	43,103	87%
Goodrich Petroleum Corporation	5	8,031	0	0	100%
Citigroup, Inc.	5	89,249	93	948,606	9%
Citizens Financial Group, Inc.	5	112,746	17	119,248	49%
StatOil	4	124,798	0	0	100%
California Transplant Donor Network	4	21,512	0	0	100%
County of Los Angeles	4	78,978	6	106,888	42%
State of California	4	86,463	22	315,110	22%
University of Southern California	4	39,757	0	0	100%
Principal Life Insurance Company	4	25,504	4	56,713	31%
TGS-Nopec Geophysical Company, L.P.	4	35,211	0	0	100%
The Staubach Company	4	39,903	7	149,119	21%
Pay By Touch	4	92,936	1	23,984	79%
Liberty Mutual Group, Inc.	4	57,705	31	333,488	15%
Career Education Corporation	4	126,608	4	87,130	59%
Jones Lang LaSalle Americas, Inc.	4	24,259	14	142,769	15%



# Drive a Million Miles More Each Year to Move to a LEED Property?





# We Peered and Compared Each Green Building



Begin with 991 Energy Star buildings. Ten step process.

1 - Energy Star buildings peered to buildings with same submarket, same class, an RBA of 1/4 to 4x the Energy Star RBA, and # stories of 1/4 to 4x the Energy Star stories. 392 Peered

2 – For those not peered, repeated the same criteria above, except used a 5 mile radius instead of same submarket.

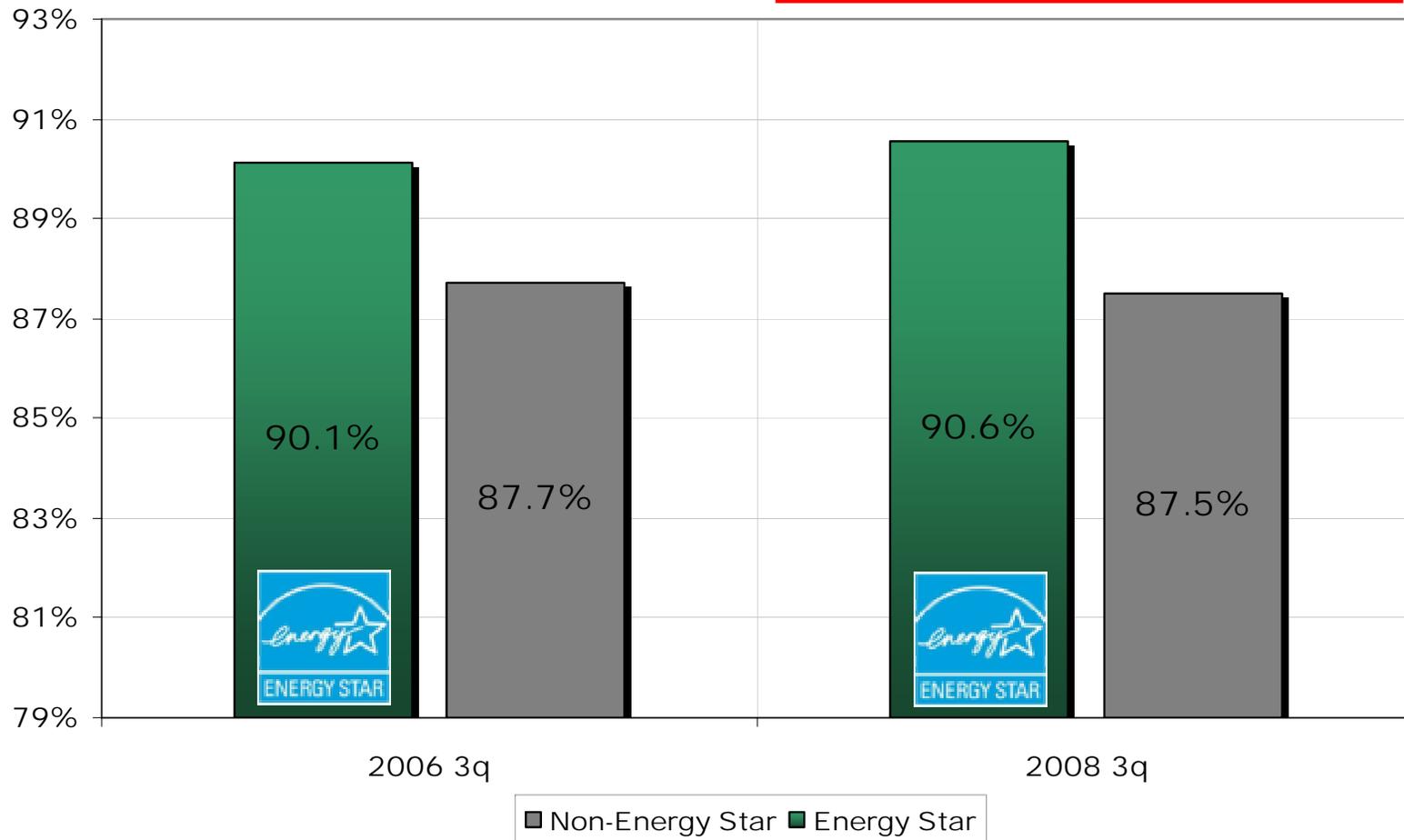
3 – For those still not peered, used the criteria from #1 above, but dropped the RBA/#Stories requirement and added that the tenancy be the same and the year built be + or - 10 years .

4...10

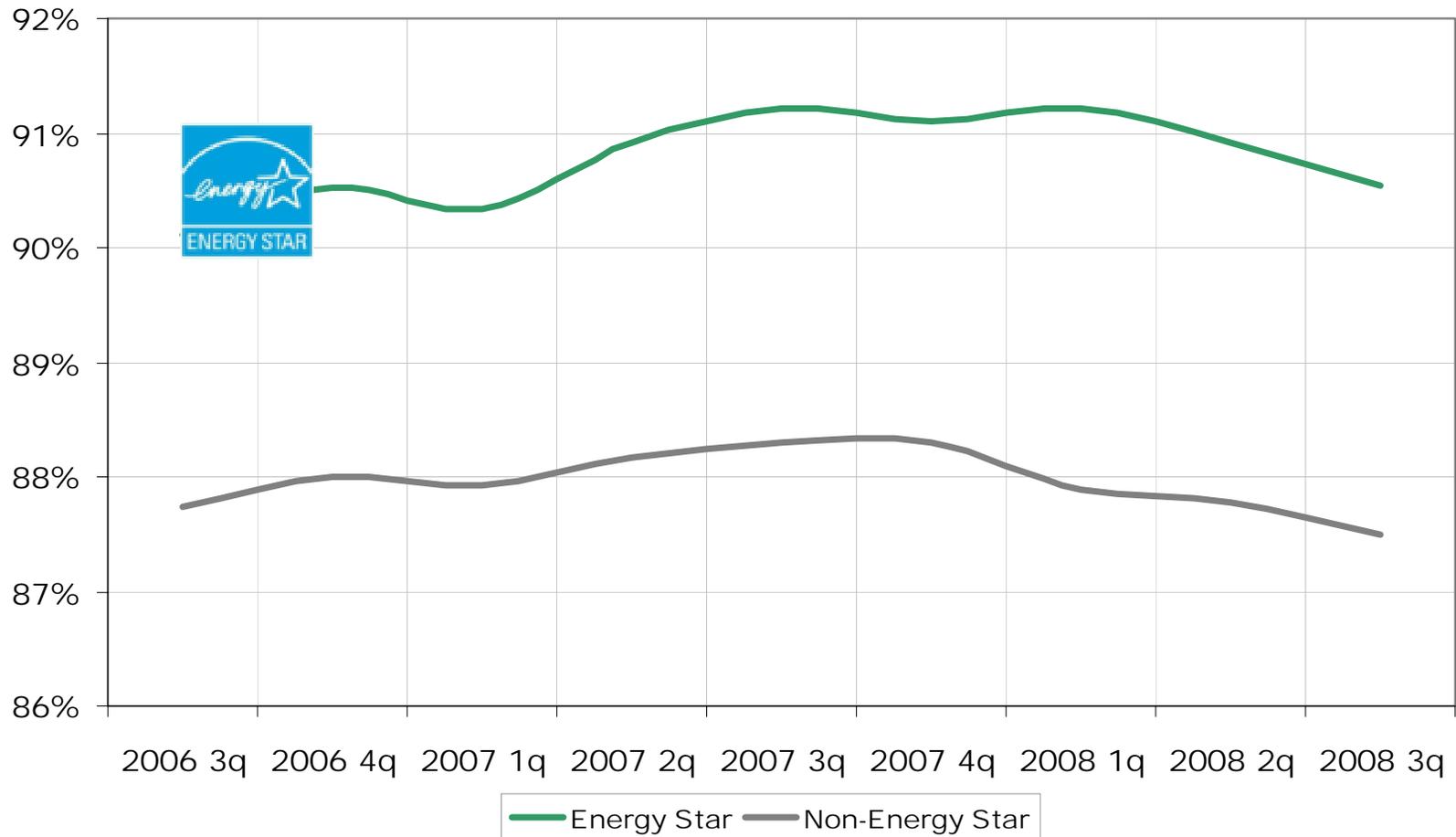


# Occupancy Rates National

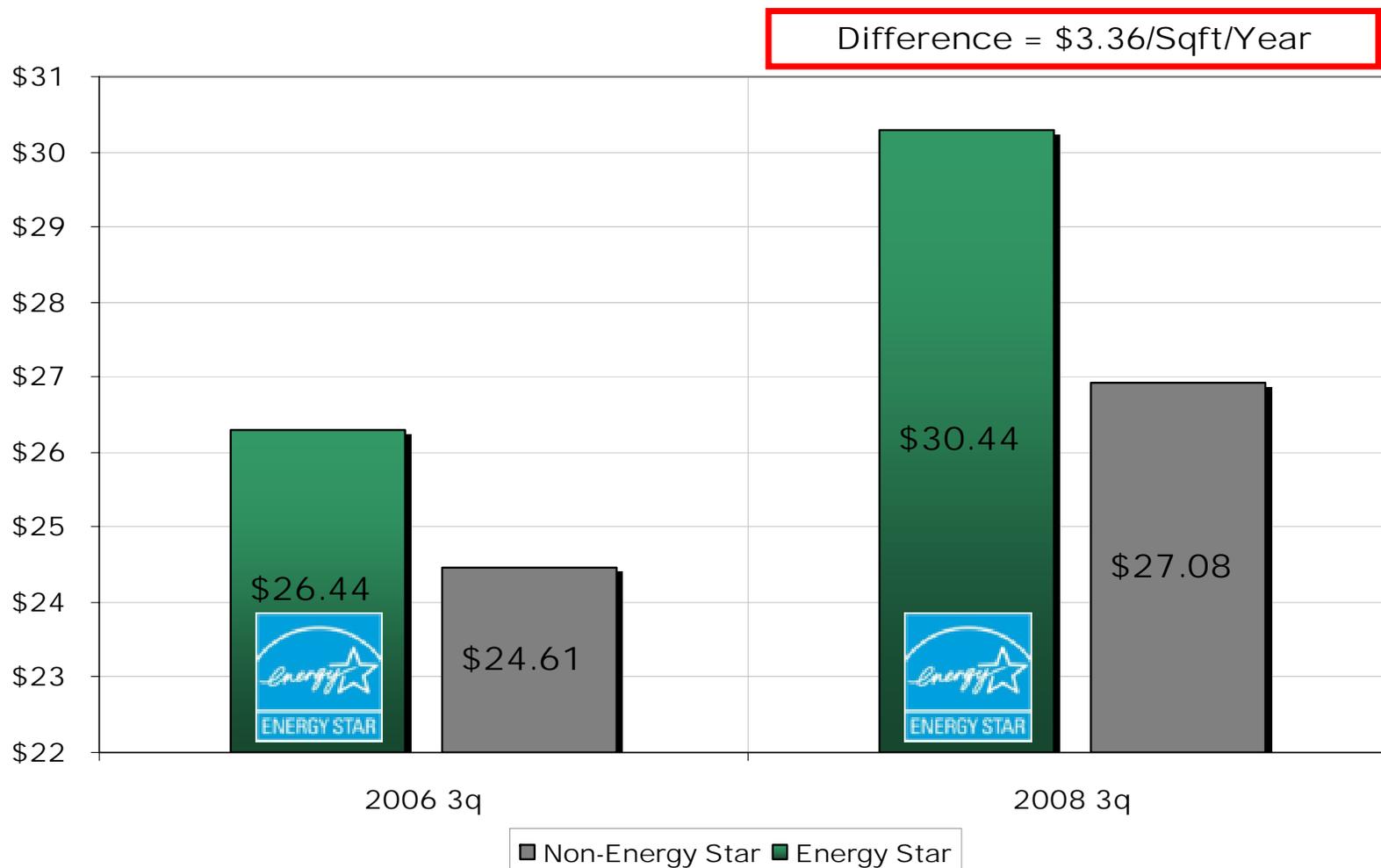
Difference = 306 Basis Points



# Occupancy Rates National

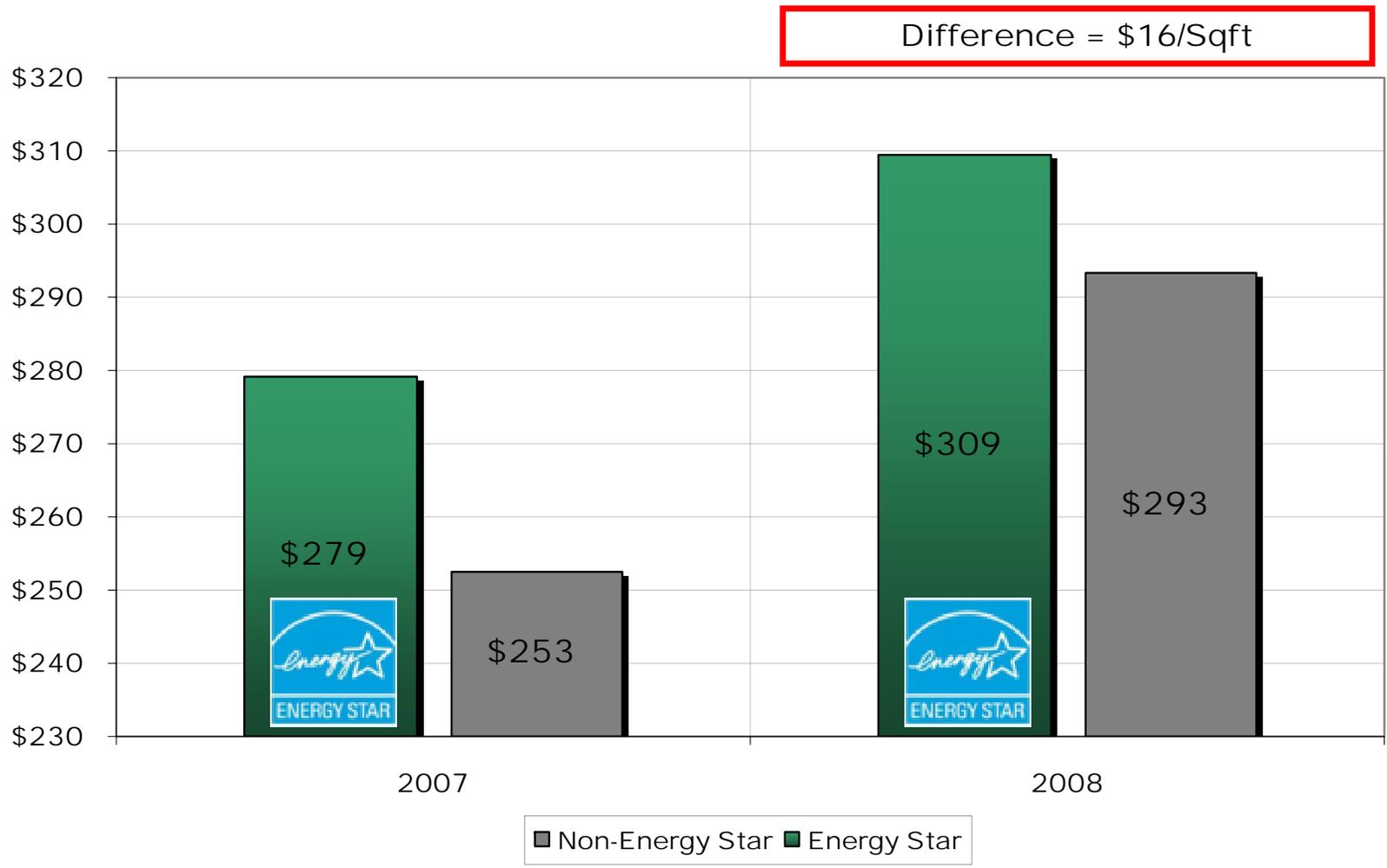


# Direct Rental Rates National





# Sales Prices / Square Foot National



# LEED



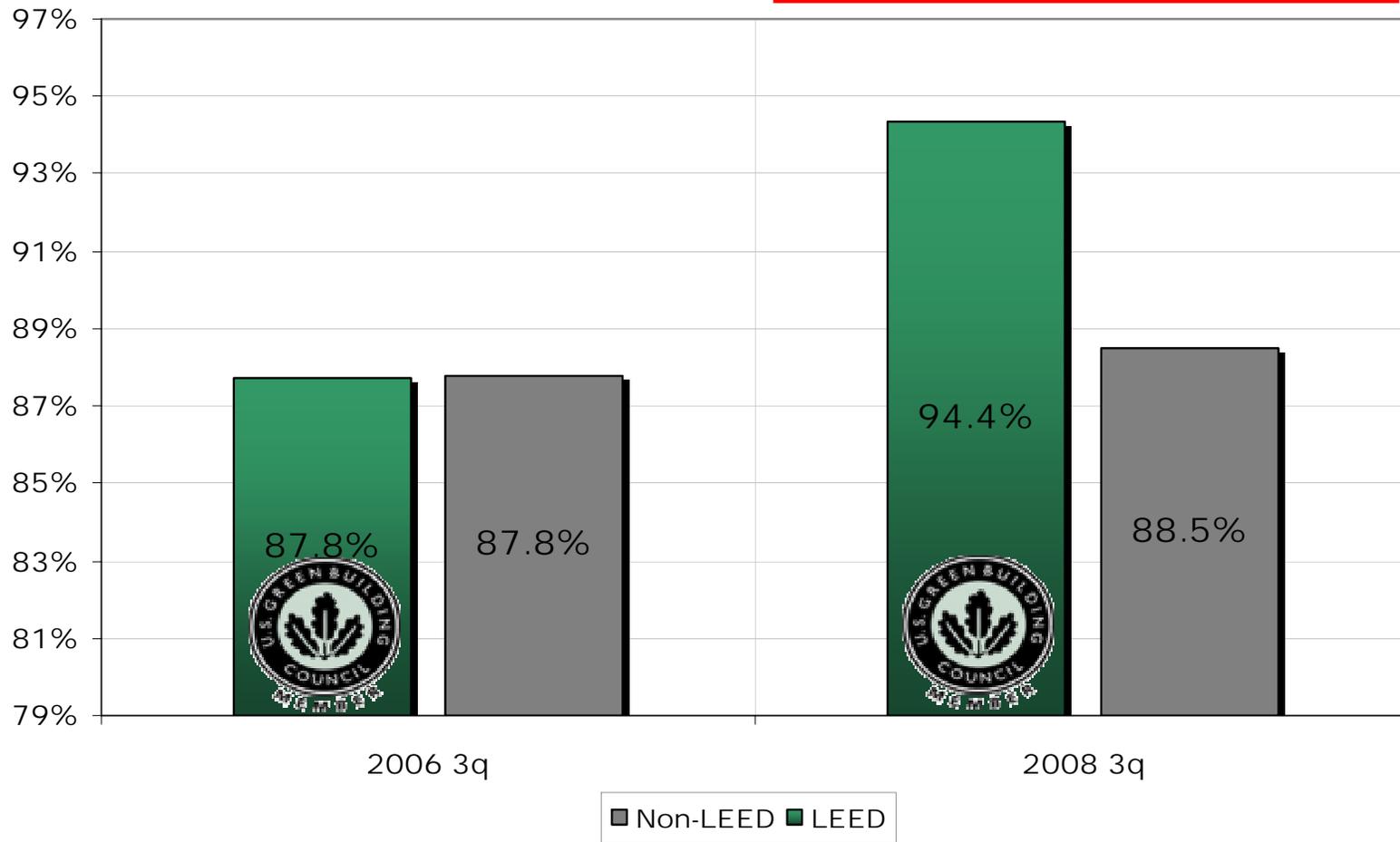
All Peers used for LEED were built post 2001



# Occupancy Rates National

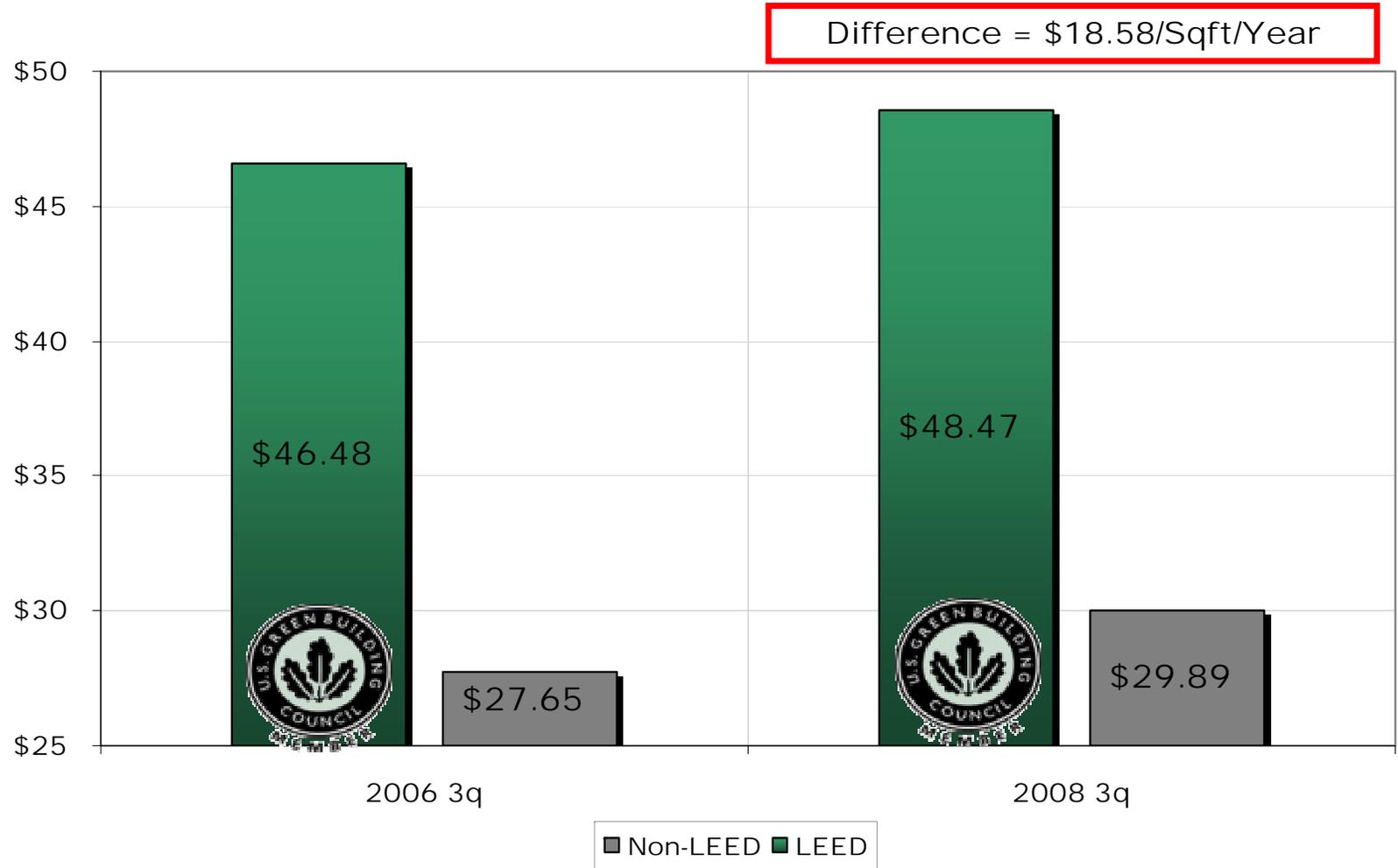


Difference = 588 Basis Points

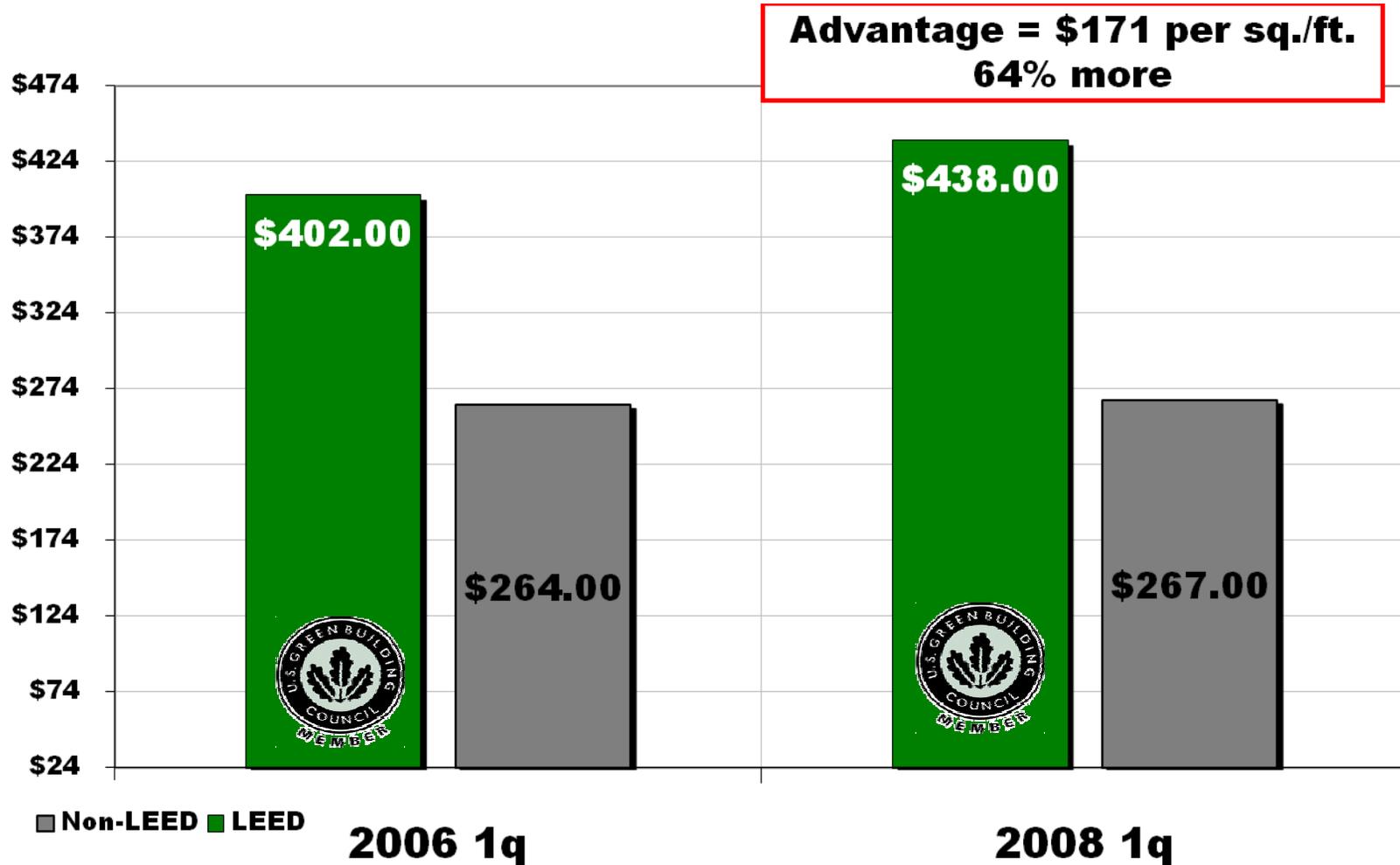




# Direct Rental Rates National



# LEED Rated Buildings Sales Price / Square Foot



# Dr. Norman Miller of the University of San Diego Found Similar Results



- Sales Price/Sq Ft =  $\alpha + \beta_1(\text{Age}) + \beta_2(\text{ES}) + \beta_3(\text{LEED}) + \beta_4(\text{Size}) + \beta_5(\text{CBD}) + \beta_6(\text{Yr Dummy}) + \beta_7(\text{City Dummy}) + \varepsilon$
- Where  $\alpha$  is the constant,  $\beta$  is the regression coefficient for each variable and  $\varepsilon$  is the error or residual term.
- **Paper presented for Peer Review in Academic Journals**  
Note: LEED and ES are not correlated so effects are cumulative.

		T-Stat
Intercept	201.39	11.03
Age	-4.66	-11.88
ES	13.99	1.41
LEED	24.14	1.49
Size	0	.835
CBD	64.05	8.52
2003	-6.92	18.59
2004	20.97	17.87
2005	51.73	17.52
2006	75.82	17.10
2007	103.04	17.98
Boston	161.26	18.17
LA	95.17	13.31
NYC	259.14	21.70
Wash DC	160.39	11.22
San Fran	121.51	19.19



# University of Reading Found Similar Results



- 3 Independent Studies
- Paper presented for Peer review to American Real Estate Society
- All Show Premium
- CoStar has donated \$100,000 + to sponsor additional research



## University of Reading



Dr. Franz Fuerst



Dr. Patrick McAllister



# Comparative Studies on Rents



	Miller, Spivey, & Florance	Fuerst and McAllister	Eicholtz, Kok & Quigley
<b>Green Buildings</b>			\$29.80(+4.4%)Regression controlled
<b>Energy Star</b>	\$30.50	\$29.34	
<b>LEED</b>	\$42.15	\$27.07(+9.4%)Regression controlled	
<b>Control Sample</b>	\$28.00	\$24.68 (all sample)	\$28.16



# Comparative Studies on Occupancy



Occupancy Rate	Miller, Spivey, Florance	Fuerst and McAllister	Eicholtz, Kok & Quigley
Green Buildings			88.99%
Energy Star	91.5%	88.40% (median)	
LEED	92.0%	88.40% (median)	
Control Sample	87.8%	86.06% (all median)	81.35%



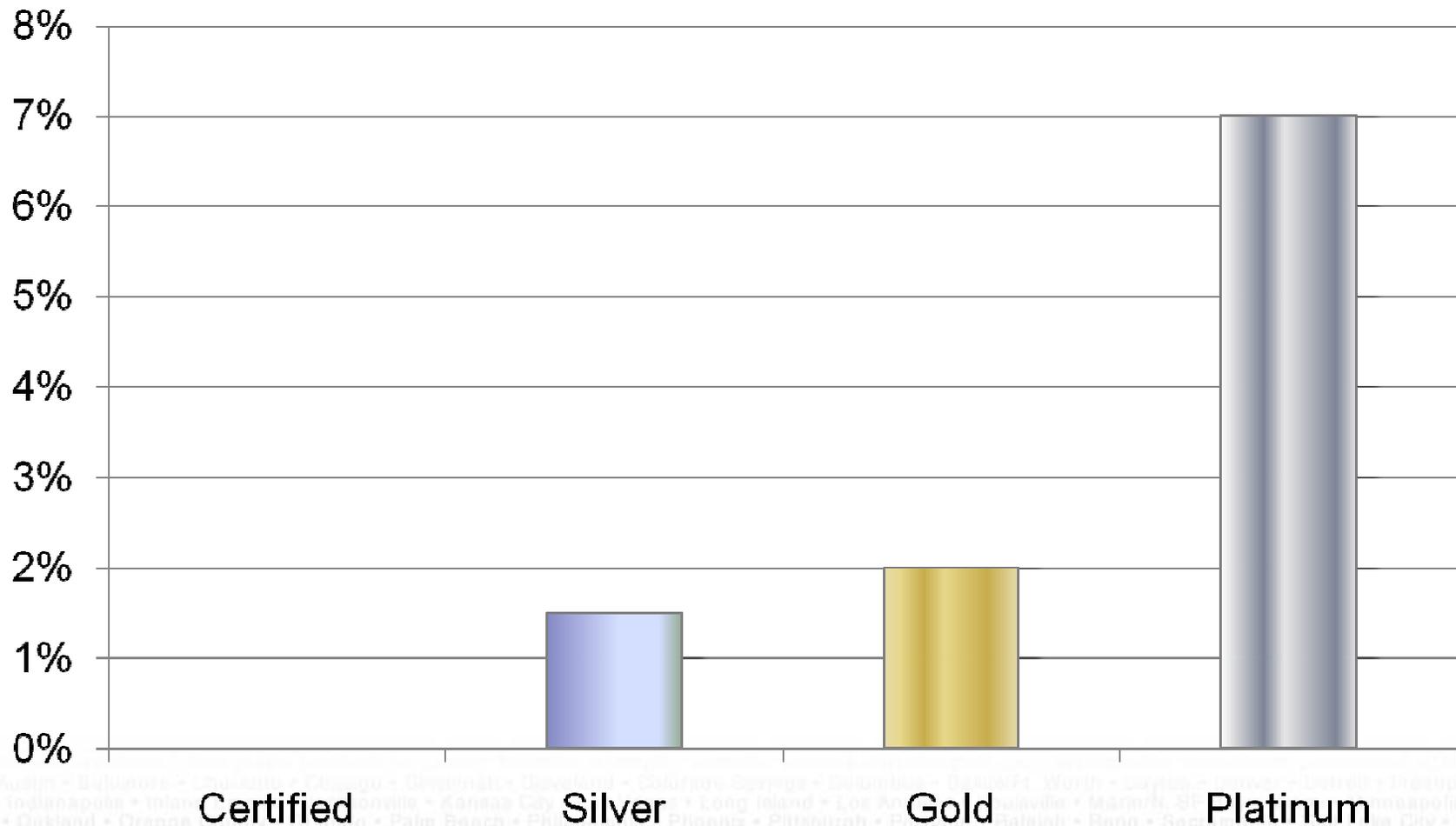
# Comparison Studies on Value Difference



	<b>Miller, Spivey, &amp; Florance</b>	<b>Fuerst and McAllister</b>
<b>Green Buildings</b>		
<b>Energy Star</b>	<b>+5.3%</b>	<b>+10.3%</b>
<b>LEED</b>	<b>+9.9%</b>	<b>+34.4%</b>



# Upfront Cost to Build a LEED Certified Buildings...USGBC



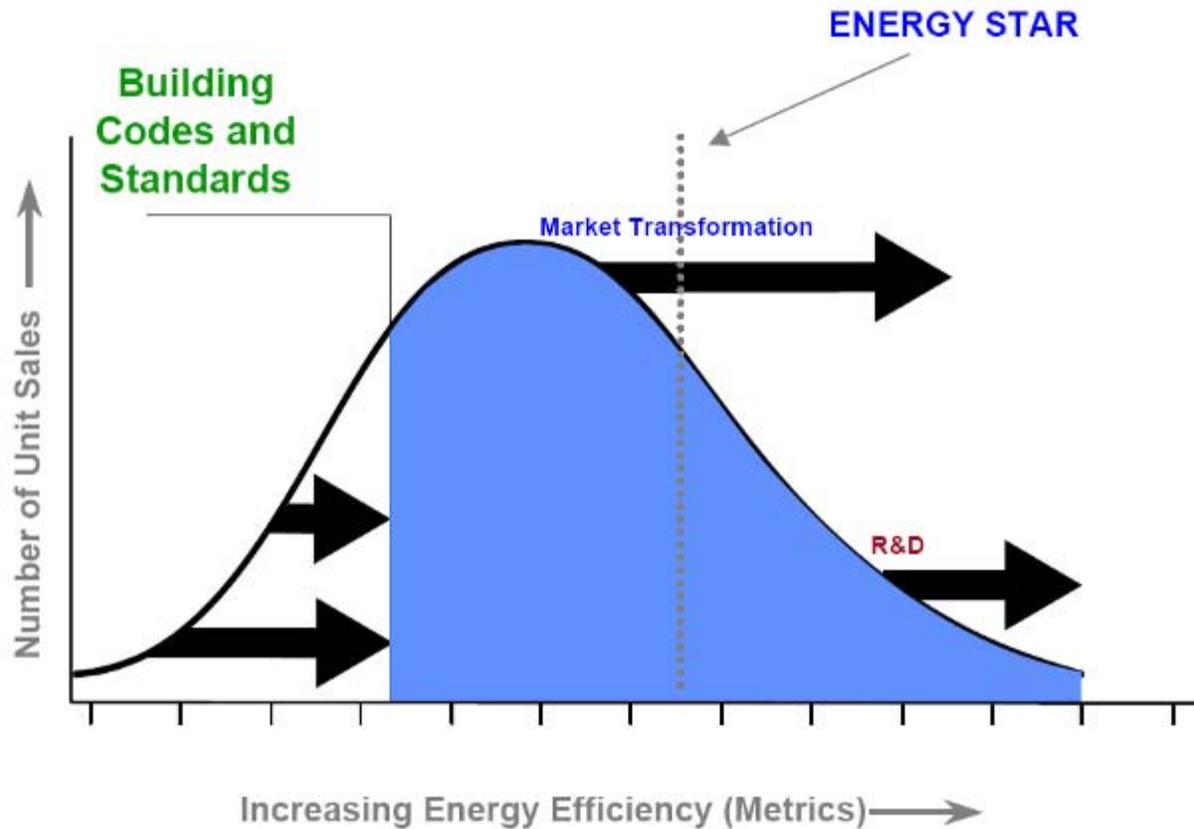
# Observations on "Green" Premium



- 3-5 year lead times required to build new LEED buildings that respond to demand means premium will continue for five plus years
- Economic distress and credit crunch will delay any new supply extending premium
- In the long run the premium will disappear
- Less than half of properties will ever respond to voluntary measures



# Theory of Criteria Setting in Refrigerators



# Energy Efficiency Improvements of the Refrigerator



U.S. Government Federal law prohibits removal of this label before consumer purchase.

# ENERGYGUIDE

Refrigerator-Freezer  
• Automatic Defrost  
• Side-Mounted Freezer  
• Through-the-Door Ice

XYZ Corporation  
Model ABC-L  
Capacity: 23 Cubic Feet

**Estimated Yearly Operating Cost**

**\$67**

Cost Range of Similar Models: \$57 to \$74

**630 kWh**  
Estimated Yearly Electricity Use

Your cost will depend on your utility rates and use.

- Cost range based only on models of similar capacity with automatic defrost, side-mounted freezer, and through-the-door ice.
- Estimated operating cost based on a 2007 national average electricity cost of 10.65 cents per kWh.
- For more information, visit [www.ftc.gov/appliances](http://www.ftc.gov/appliances).



# Energy Efficiency Improvements of the Refrigerator



Energy-efficiency standards are the primary reason that the average new refrigerator sold in the U.S. today uses one-quarter the electricity of the average new refrigerator manufactured 30 years ago.

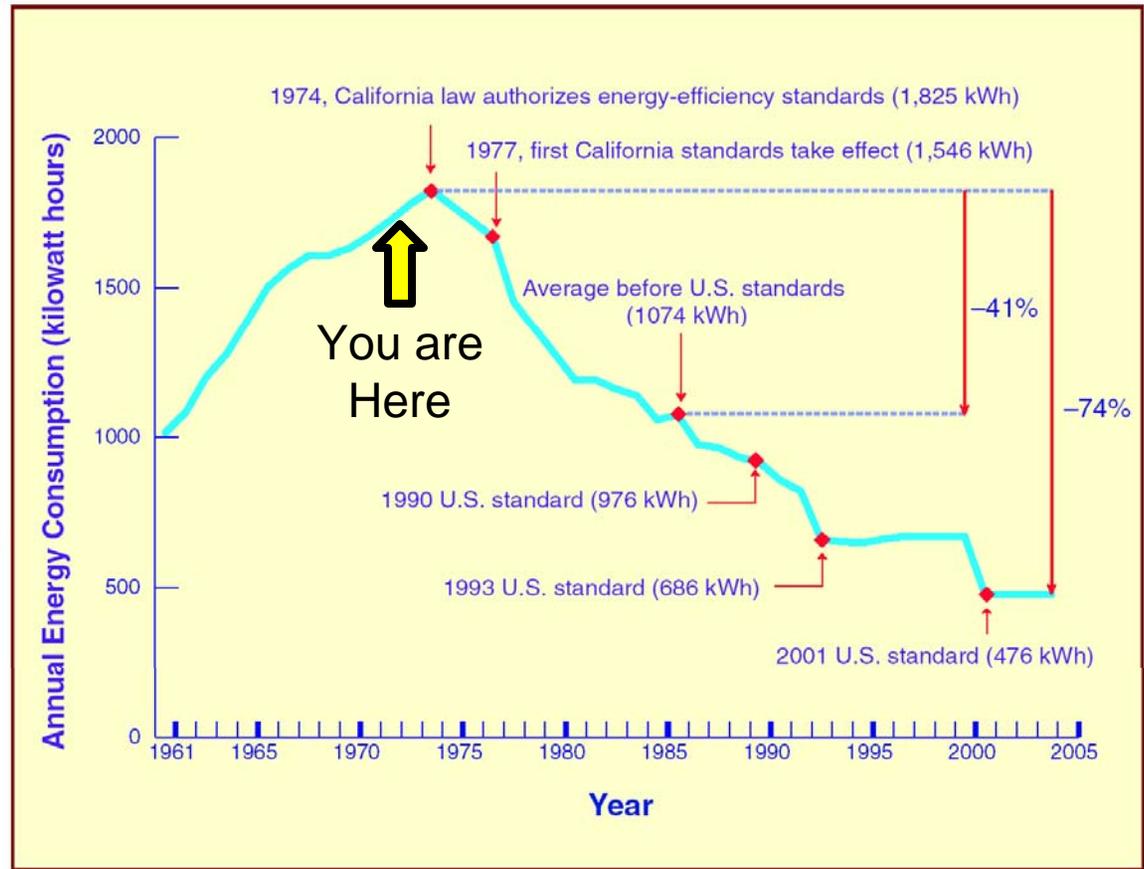
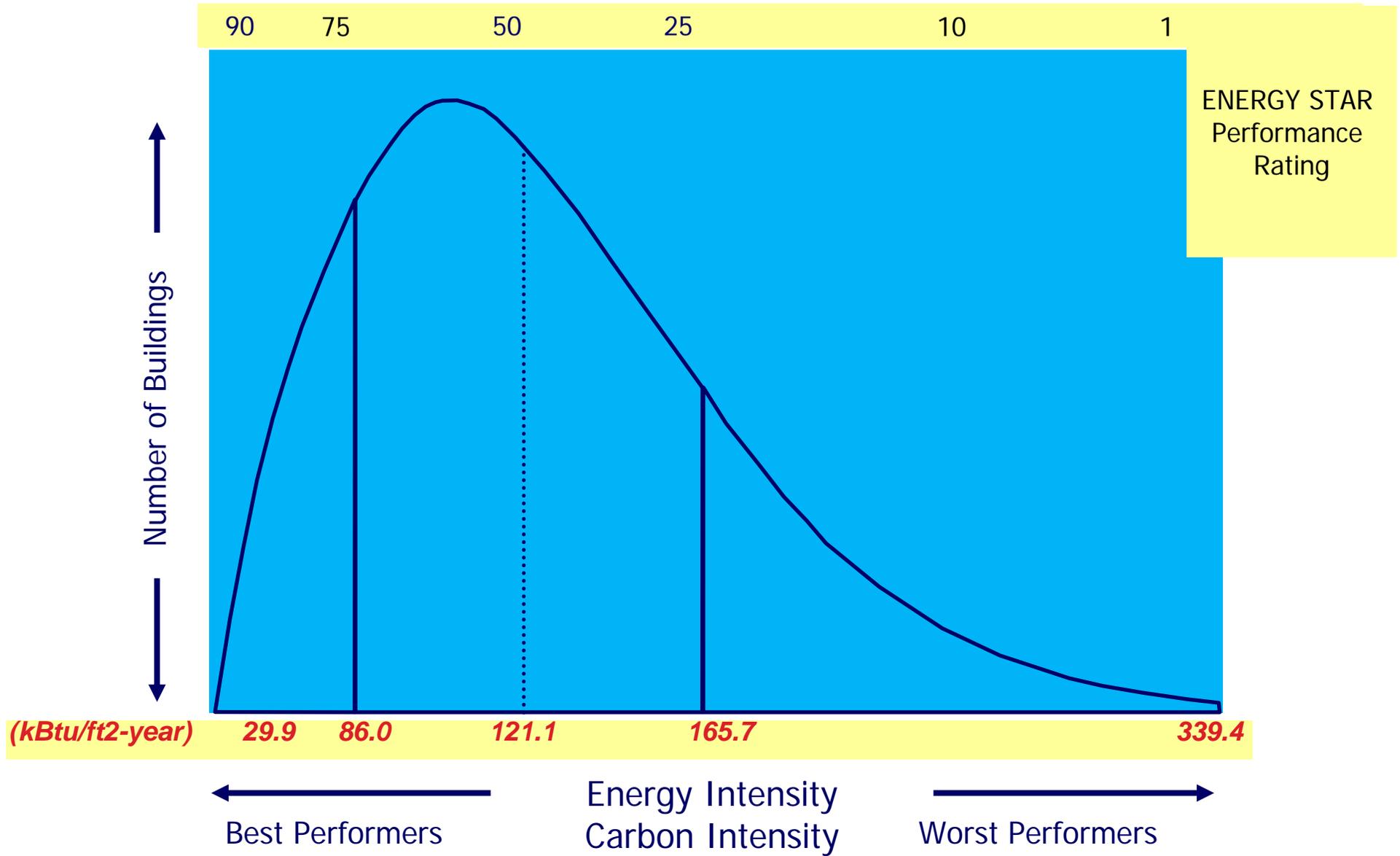


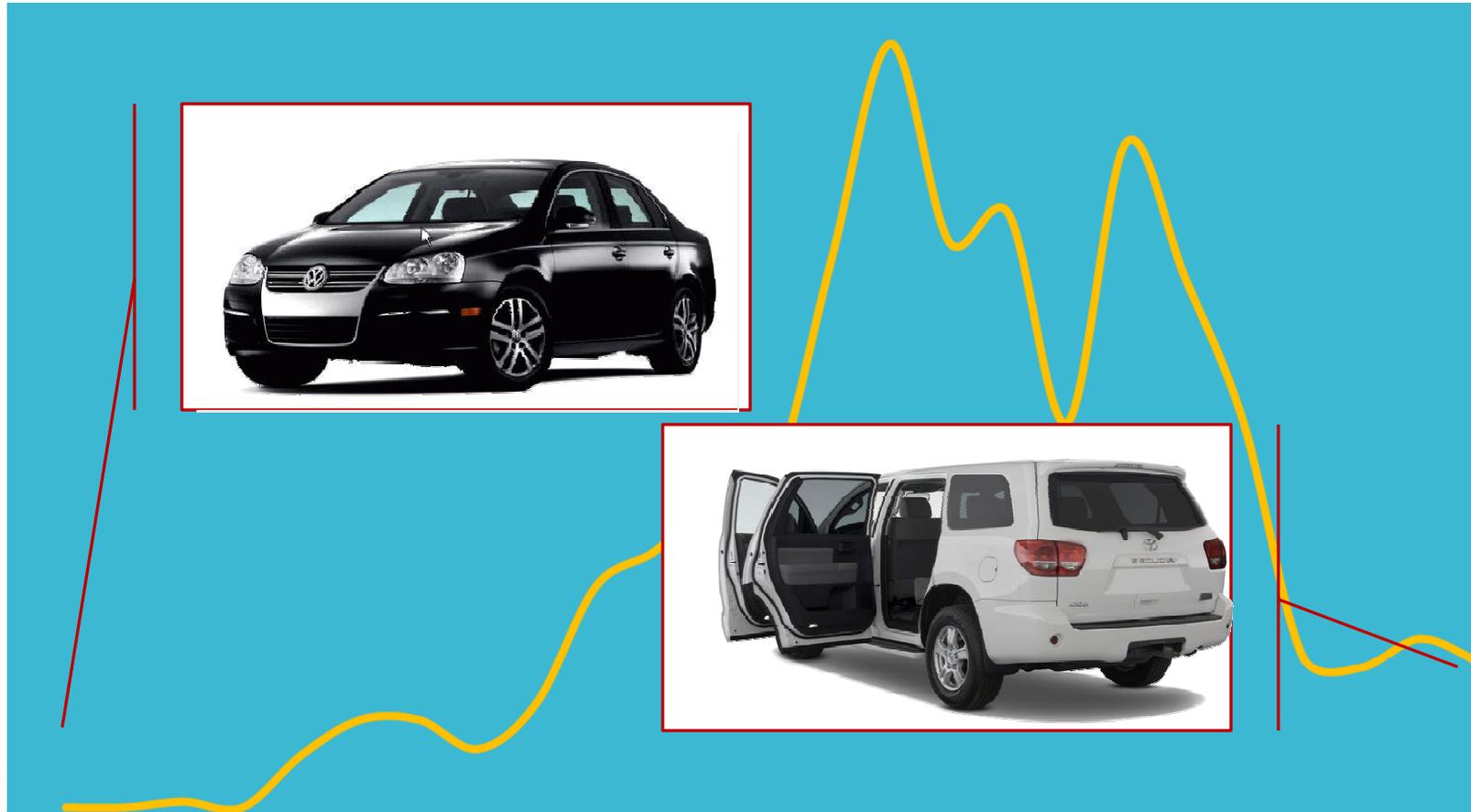
Figure 2-3 The power of ratcheting the stringency of standards: the example of U.S. refrigerator standards



# Distribution of Buildings Around Energy Intensity



# Distribution of Energy Efficiency Non-Hybrid Cars & Trucks



35

30

25

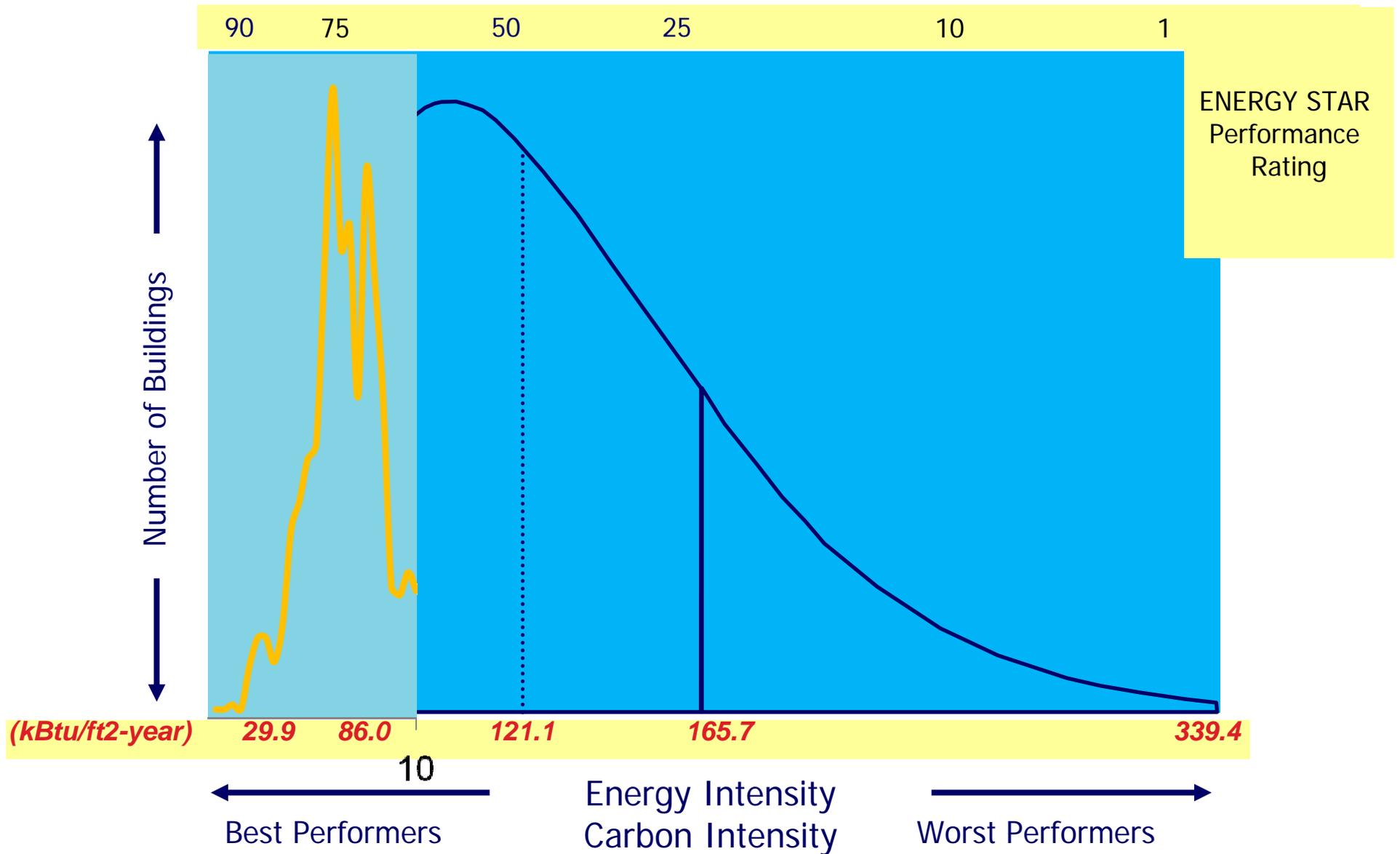
20

15

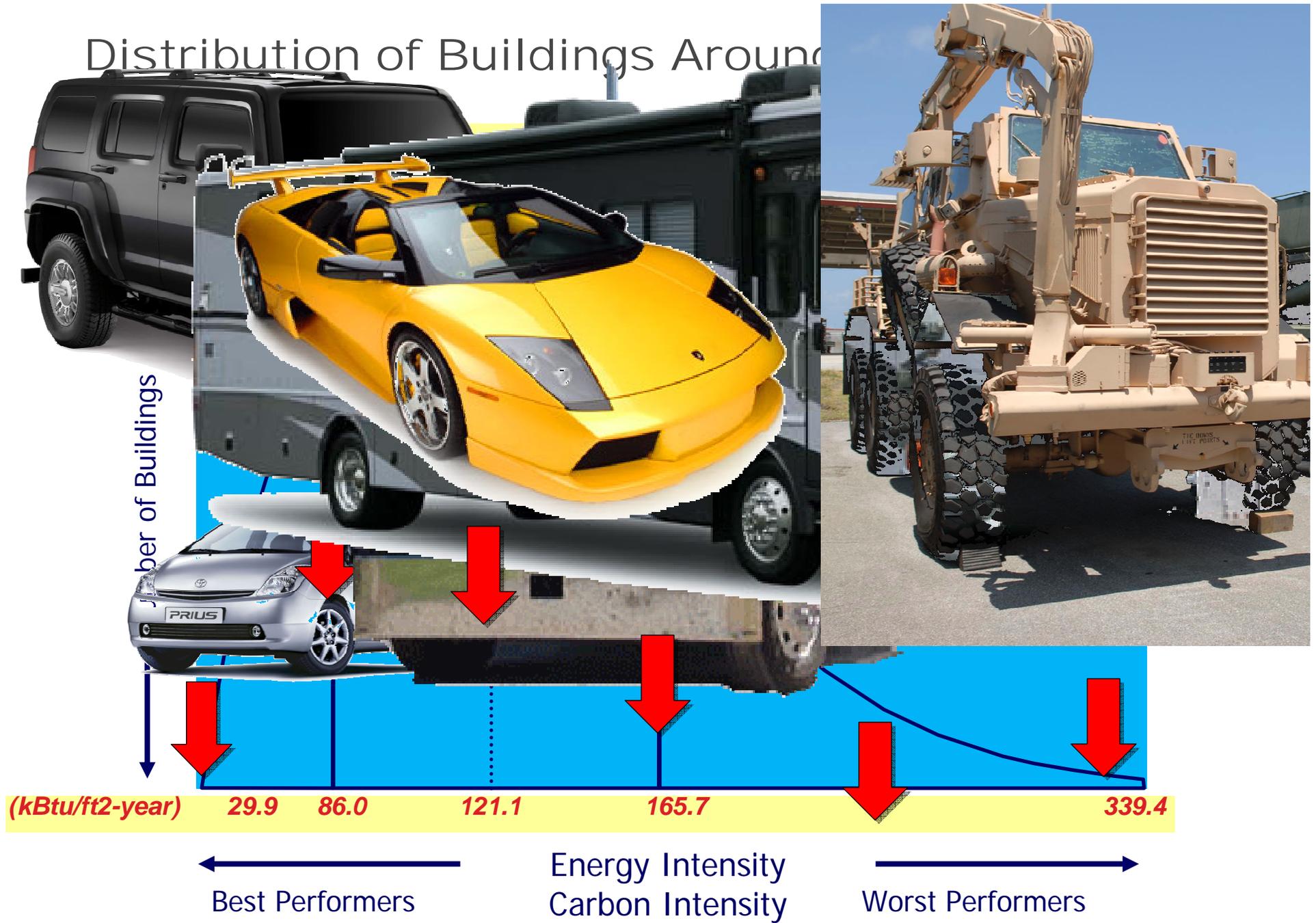
10



# Distribution of Buildings Around Energy Intensity



# Distribution of Buildings Around



# Transparent and effective metrics are essential



# We Test Cars Annually



# EU Fuel Economy Label

### Fuel Economy

CO<sub>2</sub> emission figure (g/km)

<100	A
101-120	B
121-150	C
151-180	D
181-185	E
186+	F

**Supermini Special** **B** 117g/km

Fuel cost (estimate) for 12,000 miles: £662

VED for 12 months: £85

**Environmental Information**

Model: Supermini Special  
Fuel type: Diesel  
Engine Capacity (cc): 1399  
Transmission: 5 speed manual

Fuel Consumption:

Drive cycle	Litres/100km	Mpg
Urban	5.3	53.3
Extra Urban	3.3	70.3
Combined	4.3	60.3



### Energy

Manufacturer Model

More efficient

A
B
C
D
E
F
G

Less efficient

Energy consumption kWh/cycle: 1.05

Washing performance: A

**ENERGY SCALE**



### Energy

Manufacturer Model

More efficient

A
B
C
D
E
F
G

Less efficient

Fridge-Freezer

**A**



### Energy

More efficient

A
B
C
D
E
F
G

Less efficient

**A**



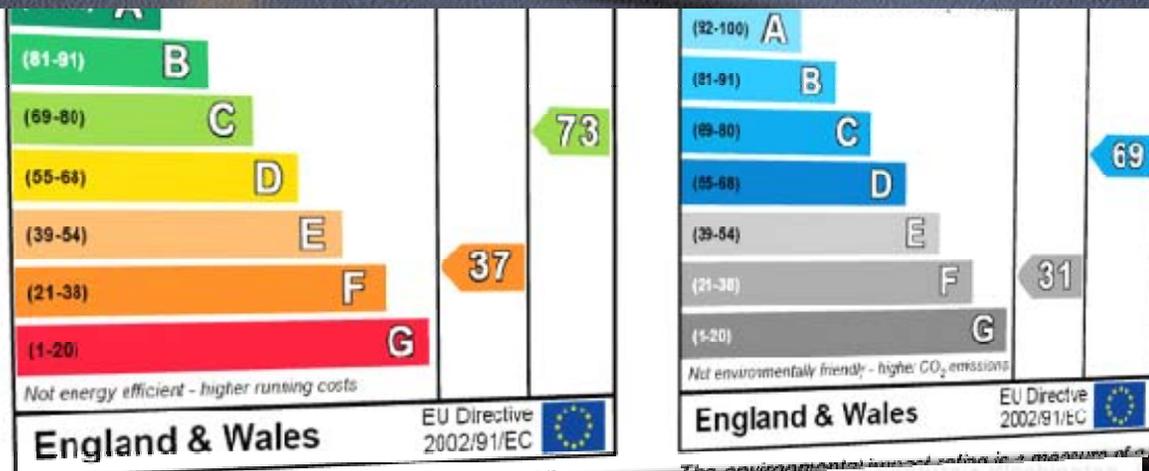
# WARNING

# YOU'RE NOT THE ONLY ONE SMOKING THIS CIGARETTE

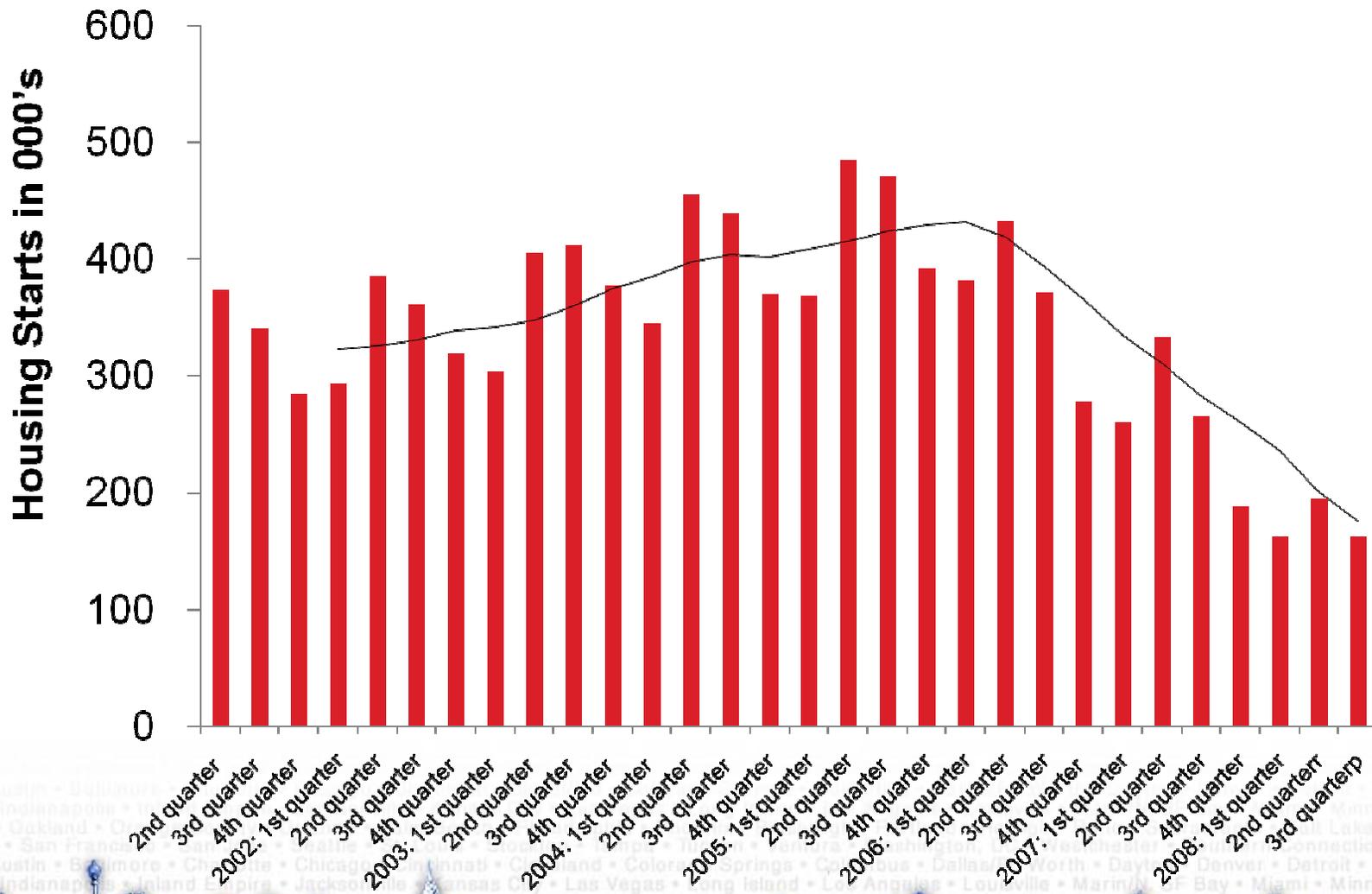
The smoke from a cigarette is not just inhaled by the smoker. It becomes second-hand smoke, which contains more than 50 cancer-causing agents.



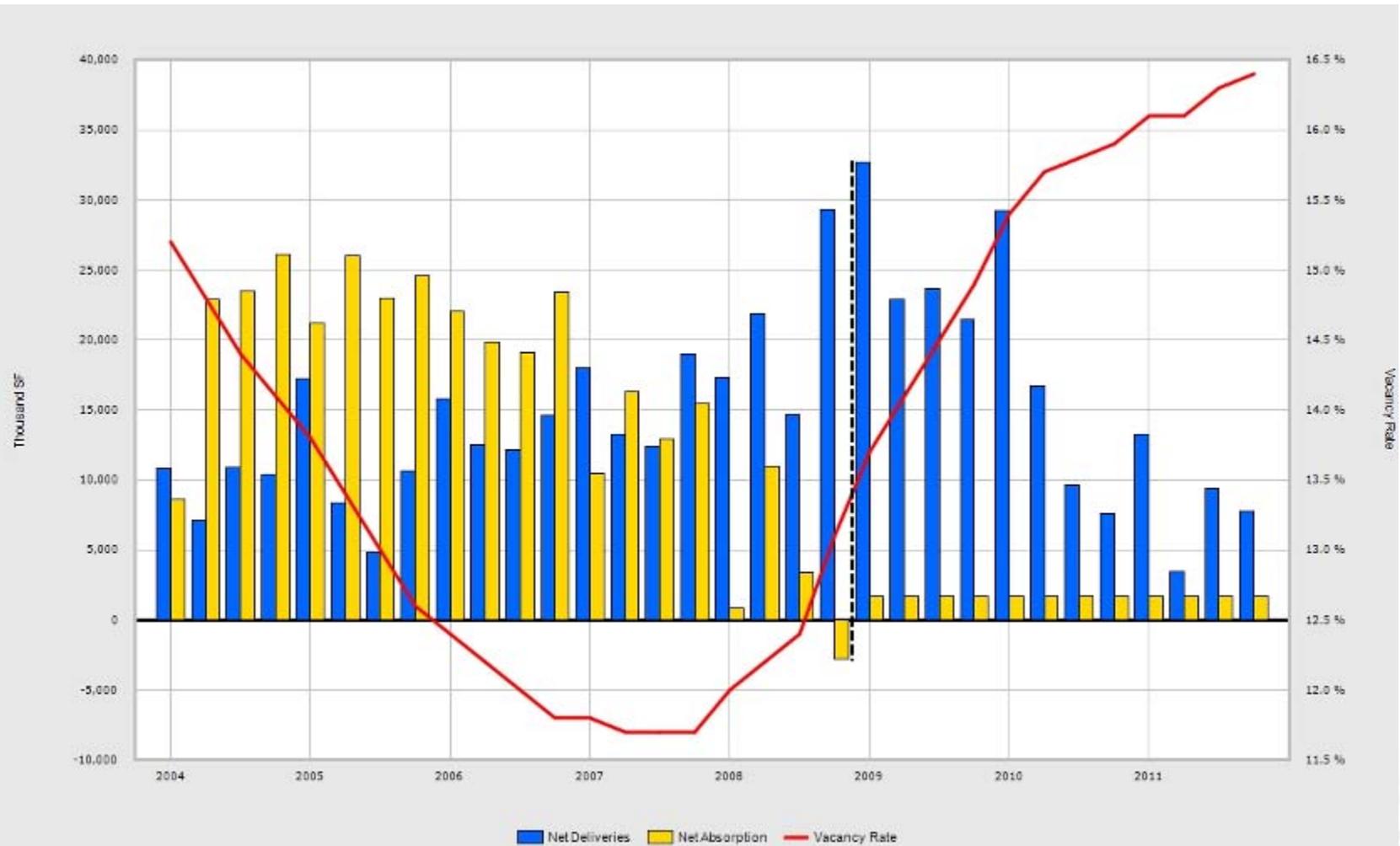
Health Canada



# Massive Job Losses in U.S. Construction Industry



# Massive Job Losses in U.S. Construction Industry



Tens of Millions of U.S. Homes with Single Pane Windows & Little Insulation...



# Tomorrow's Worst Performing Buildings can Perform Better than Today's Best

