

June 16th, 2011 Webinar

Welcome to:
VALUING SUSTAINABLE REAL ESTATE

Featuring: James F. Finlay, Wells Fargo Bank
Nils Kok, University of California, Berkeley

Moderators: John Clapp, University of Connecticut
Norman G. Miller, University of San Diego
David L. Pogue, LEED AP, CB Richard Ellis



The Economics of “Green” Building
Global Trends, Local Implications

Nils Kok

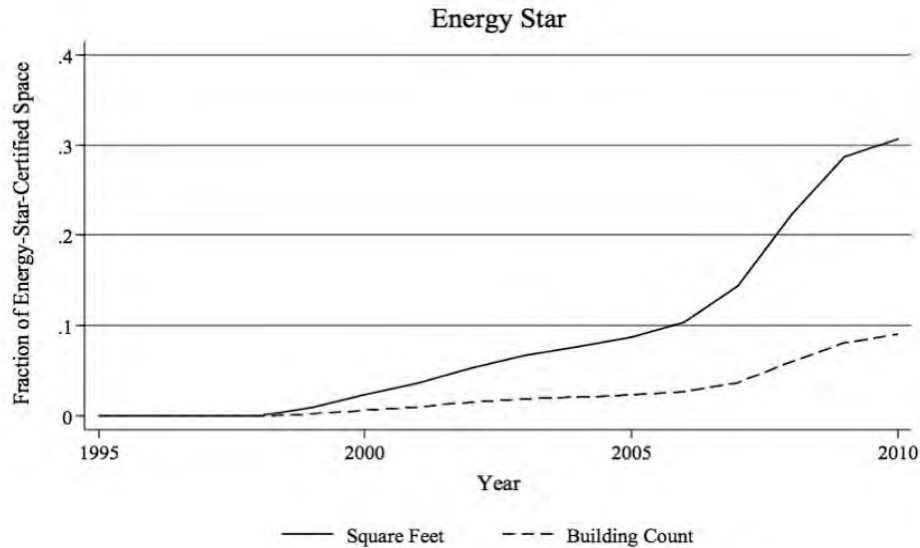
Maastricht University

UC Berkeley

Valuing Sustainable Real Estate
June 2011

“Green” building in the marketplace

Trends in 48 MSAs, 1995 – 2010

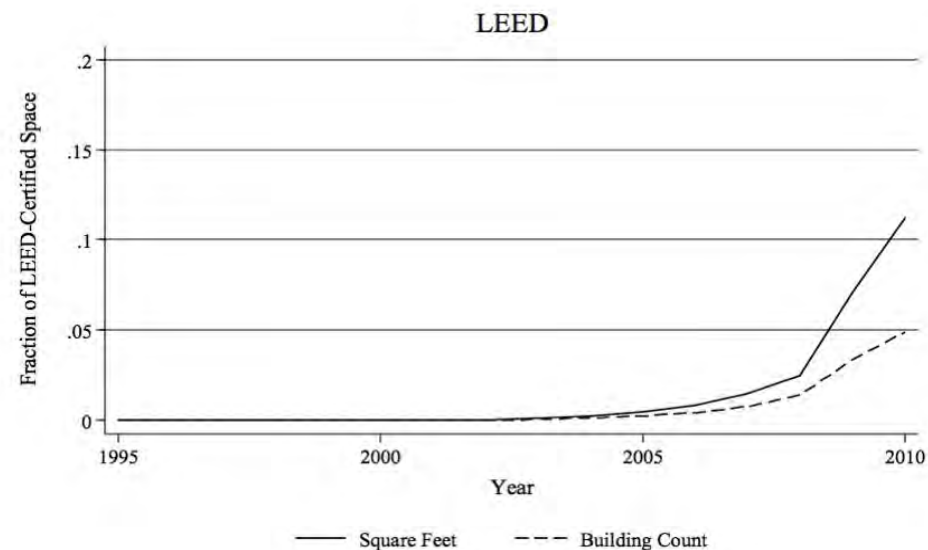
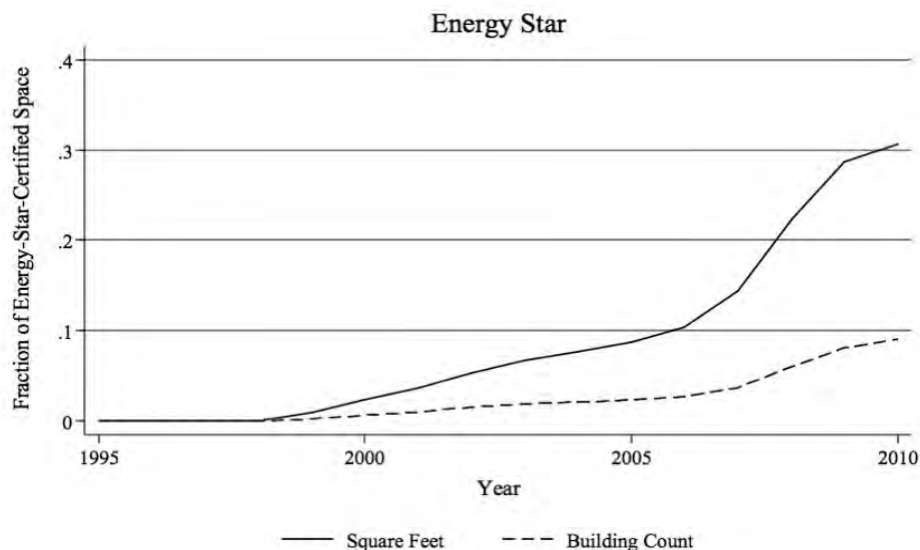


- Energy Star, 2010:
 - 10 percent of office buildings
 - 30 percent of stock

- Size effect (Snyder, et al., 2003)

“Green” building in the marketplace

Trends in 48 MSAs, 1995 – 2010



- Energy Star, 2010:
 - 10 percent of office buildings
 - 30 percent of stock

- Size effect (Snyder, et al., 2003)

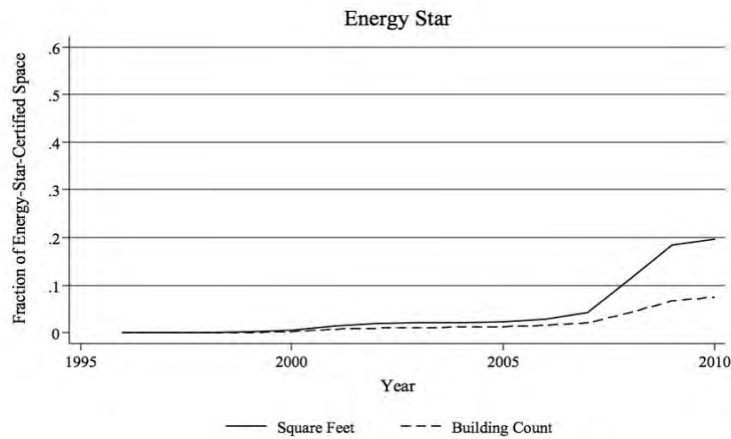
- LEED, 2010:
 - 5 percent of office buildings
 - 10 percent of stock

- *Registered*: 27,000 buildings
(6b sq.ft.)

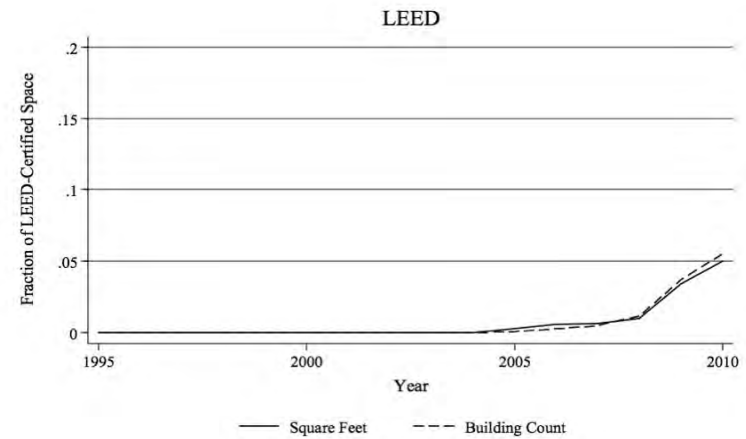
Diffusion of certified space in the U.S.

Substantial differences in timing and growth across MSAs

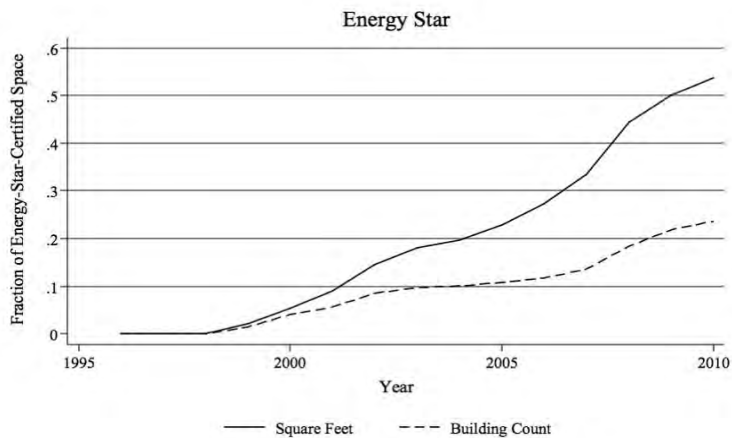
New York



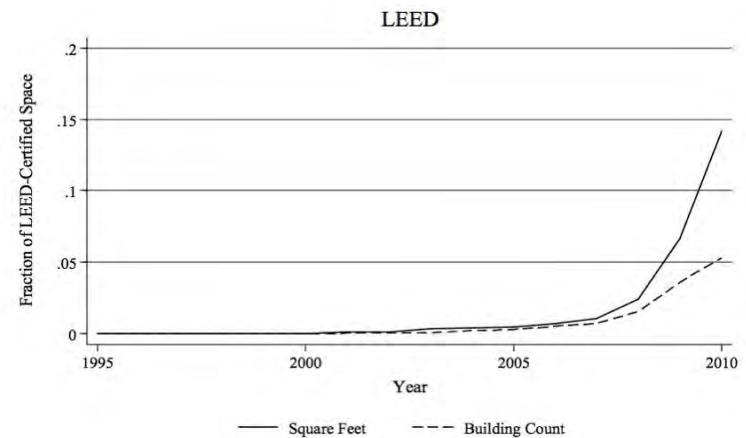
New York



Los Angeles

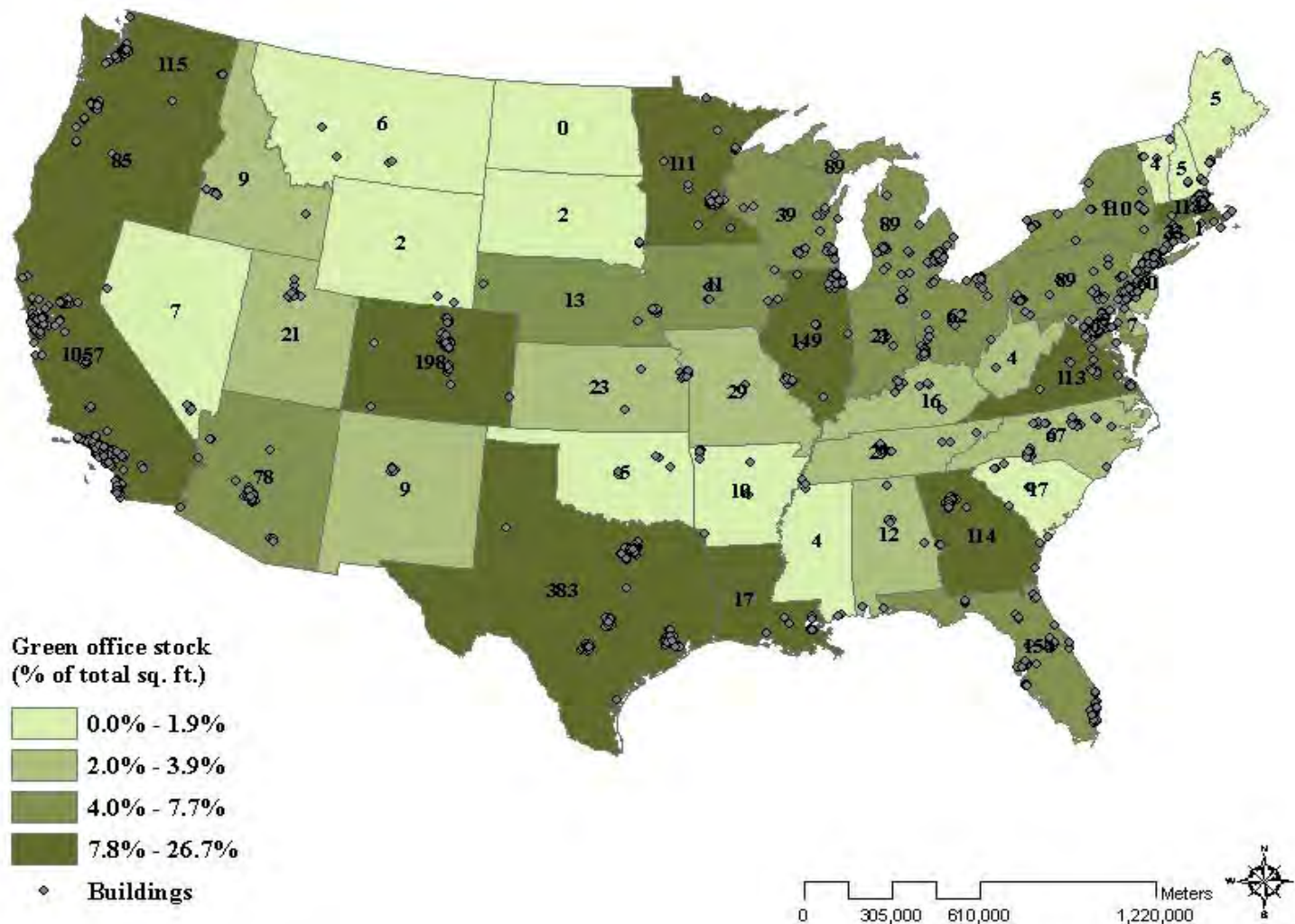


Los Angeles



The U.S. building stock is transforming...

Fraction of rated space per state



But...what are the financial implications?

Important for investors, lenders (and appraisers)

- The cost side
 - Incremental cost still unclear (Davis Langdon: trivial differences)
 - “Smarter” building managers/software
- The benefit side
 - Direct savings
 - Energy savings; lower insurance costs
 - Reduced carbon emissions (CRC in UK)
 - Stronger rent roll
 - Reflection of lower service costs
 - Reputation; corporate preferences (IEQ)
 - Higher building value
 - Reflection of stronger rent roll
 - Lower risk; longer economic life
- Limited body of literature
 - Case studies on the economic implications focus often on new buildings
 - Some first evidence: Eichholtz, et al. (2010), Fuerst and McAllister (2011)

Research design: sample selection

Energy Star and LEED-rated office buildings

101 California St

◀ previous 10 of 33 next ▶

📄 download hi-res image 📄 copy to clipboard 🖨️ print

⌵ close window ✕

101 California St, San Francisco: Energy Star certified, LEED Gold

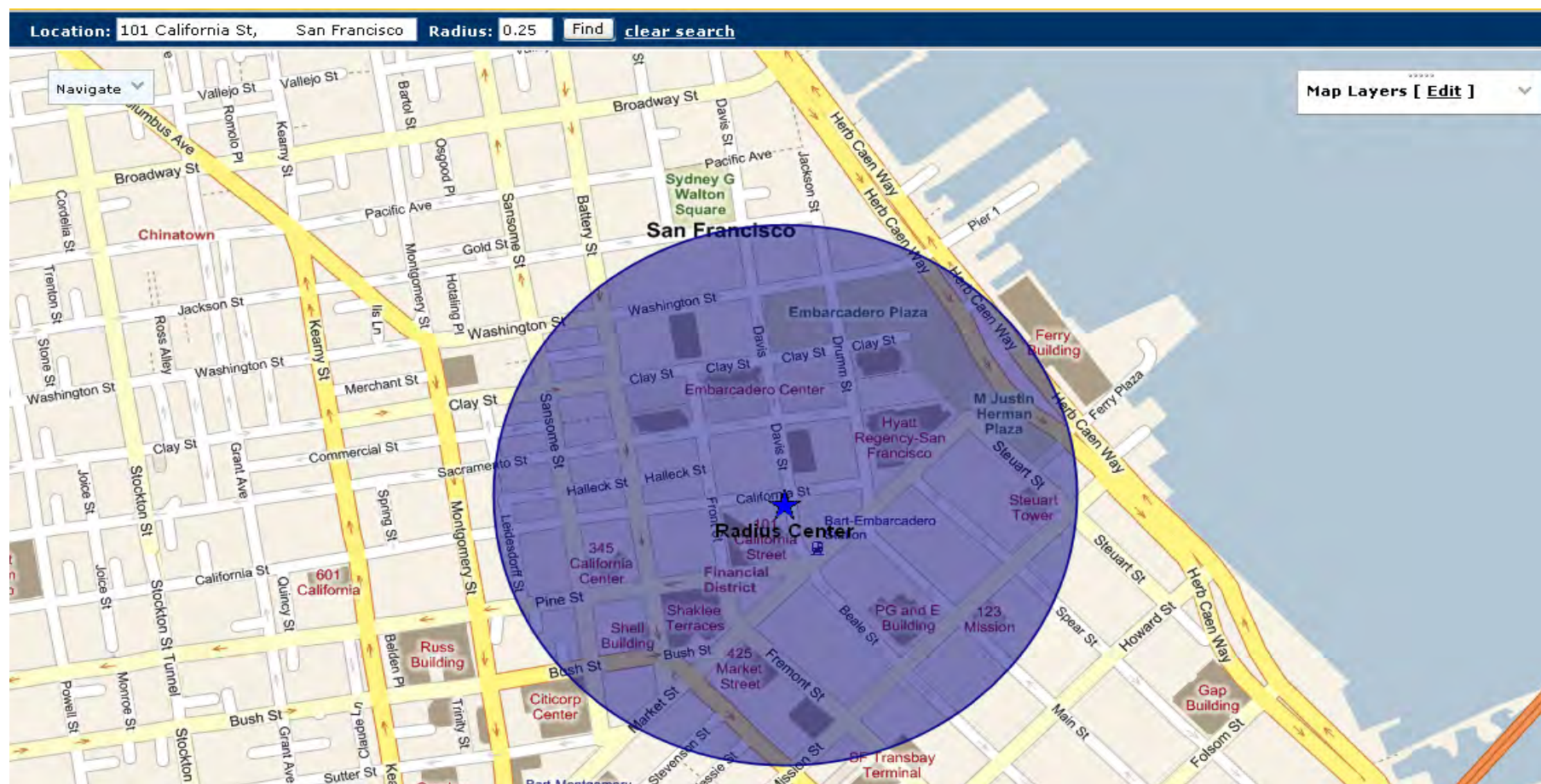


Alternate Dusk Shot

Defining conventional comparables

All nearby non-rated office buildings

- Based upon longitude and latitude, we use GIS to identify all conventional office buildings in a 0.25 mile radius



But...these are apples and oranges

Green buildings and conventional “comparables”

	Rental Sample			Sales Sample		
	Rated Buildings	Control Buildings	PSM Controls	Rated Buildings	Control Buildings	PSM Controls
Sample Size	1,943	18,858	18,858	744	5,249	5,249
Size (thousands sq. ft.)	299.83 (292.40)	155.65 (245.73)	282.88 (176.74)	326.39 (336.85)	139.92 (275.21)	139.92 (275.21)
Building Class (percent)						
A	75.75 (42.87)	26.9 (44.34)	71.94 (37.53)	75.66 (42.95)	21.50 (41.09)	21.50 (41.09)
B	23.21 (42.23)	52.73 (49.93)	26.90 (12.57)	23.47 (42.41)	51.16 (49.99)	51.16 (49.99)
C	1.04 (10.15)	20.37 (40.27)	1.16 (1.31)	0.87 (9.32)	27.34 (44.58)	27.34 (44.58)
Age (years)	24.65 (17.36)	53.22 (34.33)	25.93 (7.56)	26.31 (19.47)	60.48 (37.29)	60.48 (37.29)
Rental Contract (percent)						
Triple Net	22.11 (41.51)	14.74 (35.45)	22.94 (23.04)			
Plus Electric	7.99 (27.12)	8.16 (27.38)	9.22 (13.22)			
Modified Gross	1.31 (11.39)	7.94 (27.04)	2.58 (5.79)			
Plus All Utilities	0.82 (9.03)	1.34 (11.51)	0.64 (2.89)			
Gross	67.76 (46.75)	67.81 (46.72)	64.62 (30.07)			



A little statistical trick helps...

More weight on comparable non-rated buildings

Propensity score weighting substantially reduces differences

	Rental Sample			Sales Sample	
	Rated Buildings	Control Buildings	PSM Controls	Rated Buildings	Control Buildings
Sample Size	1,943	18,858	18,858	744	5,249
Size (thousands sq. ft.)	299.83 (292.40)	155.65 (245.73)	282.88 (176.74)	326.39 (336.85)	139.92 (275.21)
Building Class (percent)					
A	75.75 (42.87)	26.9 (44.34)	71.94 (37.53)	75.66 (42.95)	21.50 (41.09)
B	23.21 (42.23)	52.73 (49.93)	26.90 (12.57)	23.47 (42.41)	51.16 (49.99)
C	1.04 (10.15)	20.37 (40.27)	1.16 (1.31)	0.87 (9.32)	27.34 (44.58)
Age (years)	24.65 (17.36)	53.22 (34.33)	25.93 (7.56)	26.31 (19.47)	60.48 (37.29)
Rental Contract (percent)					
Triple Net	22.11 (41.51)	14.74 (35.45)	22.94 (23.04)		
Plus Electric	7.99 (27.12)	8.16 (27.38)	9.22 (13.22)		
Modified Gross	1.31 (11.39)	7.94 (27.04)	2.58 (5.79)		
Plus All Utilities	0.82 (9.03)	1.34 (11.51)	0.64 (2.89)		
Gross	67.76 (46.75)	67.81 (46.72)	64.62 (30.07)		

A necessary evil...

Hedonic pricing model

- The market implications of “green” certification in commercial office properties:

$$\log R_{in} = \alpha + \beta_i X_i + \sum_{n=1}^N \gamma_n c_n + \delta g_i + \varepsilon_{in}$$

- R_{in} is the rent, effective rent or transaction price per sq.ft.
- X_i is a vector of hedonic characteristics
 - **Size, age, renovation, class, amenities, public transport, ...**
- Percent change in employment in service sector (CBSA) to control for regional variation in demand for office space
- Cluster c_n **dummies to control for location** – 1,943 (744) separate dummies in the rental (transaction) sample
- Dummy **variables for year of sale** in transaction sample



Results: green ratings and rents

Market implications of Energy Star and LEED (I)

Dependent Variable	Rent (per sq. ft)	
	(1)	(2)
Green Rating (1 = yes)	0.026*** [0.007]	
Energy Star (1 = yes)		0.021*** [0.005]
Label Vintage (years)		-0.004** [0.002]
LEED (1 = yes)		0.058*** [0.010]
		Age Stories Amenities Rental Contract Public Transport Location Clusters
<i>N</i>	20,801	20,801
Adj R ²	0.816	0.817

Results: green ratings and effective rents

Market implications of Energy Star and LEED (II)

Dependent Variable	Effective Rent (per sq. ft)	
	(3)	(4)
Green Rating (1 = yes)	0.076*** [0.010]	
Energy Star (1 = yes)		0.065*** [0.007]
Label Vintage (years)		-0.010*** [0.002]
LEED (1 = yes)		0.060*** [0.015]
		Age Stories Amenities Rental Contract Public Transport Location Clusters
<i>N</i>	20,801	20,801
Adj R ²	0.709	0.710

Results: green ratings and transaction prices

Market implications of Energy Star and LEED (II)

Dependent Variable	Sales Price (per sq. ft)	
	(5)	(6)
Green Rating (1 = yes)	0.133*** [0.017]	
Energy Star (1 = yes)		0.129*** [0.0191]
Label Vintage (years)		-0.017* [0.011]
LEED (1 = yes)		0.111*** [0.0419]
		Age Stories Amenities Rental Contract Public Transport Location Clusters
<i>N</i>	5,993	5,993
Adj R ²	0.616	0.616



Conclusions part I

Still stronger rent rolls for certified buildings

1. Is there still a “green premium” in 2009? Once rigorously controlled for differences in building quality?
 - Propensity score weighting effectively wipes out differences
 - Green buildings: rents +3%, effective rents +8%, transaction price +13%
 - Implied cap rate is 3%: lower risk premium for green buildings
 - Energy-Star-effect fades over time
2. What drives the “green premium”?
3. What happened to the returns of “green” buildings during the crisis?



The greener the better?

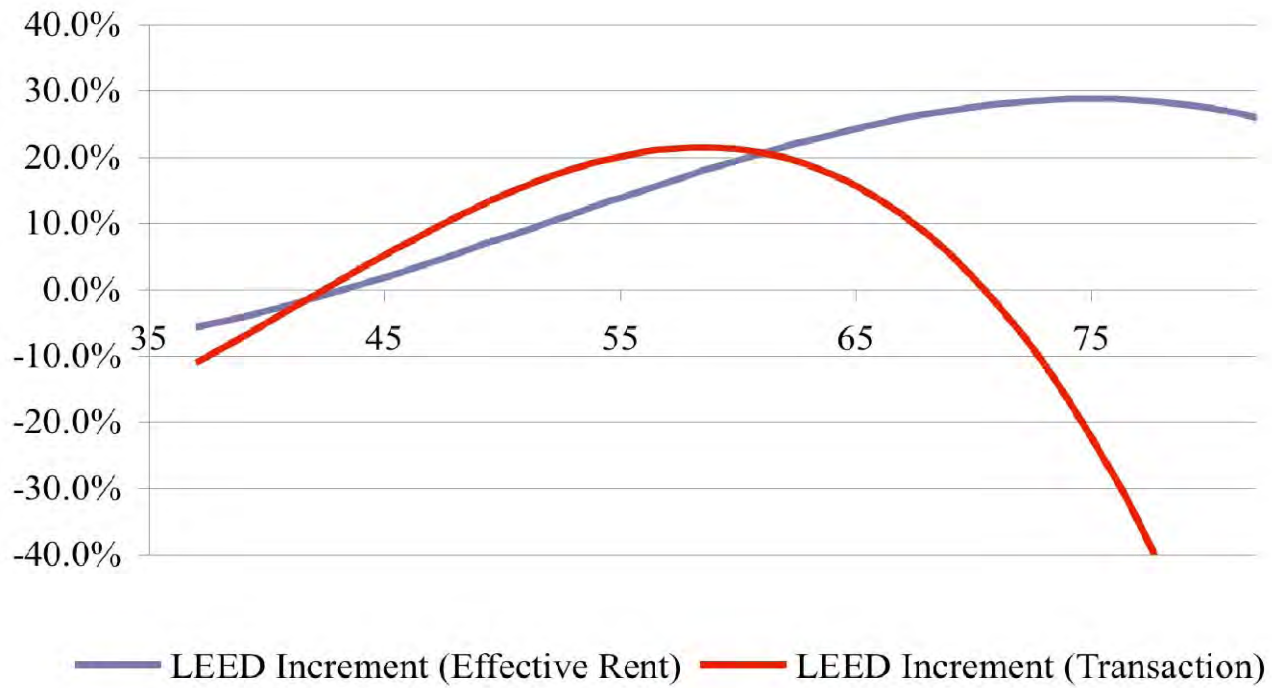
Detailed information on LEED-rated buildings

- For 209 (103) LEED-rated buildings, we have information on:

	Rental Sample	Transaction Sample
Total Observations	209	103
Available Observations		
Registered LEED	121	54
Certified LEED	88	49
Certified Energy Star	110	58
Mean Evaluation for All Certified Buildings		
Total Points	50.27	45.00
(1 – 100)	(11.06)	(19.90)
Mean Evaluation for Subset of Certified Buildings		
Available Observations	40	24
Sustainable Sites	50.60	52.29
(1 – 100)	(11.22)	(18.50)
Water Efficiency	53.75	48.16
(1 – 100)	(20.34)	(18.48)
Energy & Atmosphere	37.57	42.96
(1 – 100)	(16.41)	(25.50)
Materials & Resources	44.87	60.54
(1 – 100)	(21.78)	(19.69)
Indoor Environmental Quality	55.51	77.86
(1 – 100)	(17.42)	(24.67)
Innovation	76.50	53.63
(1 – 100)	(24.28)	(10.27)

“Greenness matters” (until LEED Platinum)

Interpretation of regression results



Is energy efficiency capitalized?

Emissions of efficient buildings are substantial...

- For 1,719 Energy Star-rated buildings, we have information on:

	Rental Sample	Transaction Sample
Total Observations	1,719	638
Certified LEED	40	22
Mean Evaluation for Subset of Buildings		
Available Observations	774	293
Site Energy Consumption (kBTU per sq.ft per year)	65.15 (15.62)	66.64 (15.82)
Source Energy Consumption (kBTU per sq.ft per year)	198.88 (43.25)	203.44 (44.51)
Emissions (tons of CO ₂ per building per year)	4326.04 (5222.54)	4331.29 (4401.81)
Estimated Energy Cost (\$ per sq.ft)	1.88 (0.54)	1.89 (0.51)
Total Degree Days	4452.13 (1480.38)	4684.87 1942.63

- Average emission of a building in our sample: 4,326 tons of CO₂
 - 750 (US) cars, 9,000 barrels of oil, ...
 - Energy Star-rated buildings emit at least a quarter less carbon as compared to conventional office buildings



Energy efficiency capitalized quite precisely....

Interpretation of results

- A \$1 saving in energy costs is associated with an increase in effective rent of 95 cents

- A \$1 saving in energy costs is associated with a 4.9 percent premium in market capitalization, which is equivalent to \$13/sq.ft.
 - This implies a cap rate of about 8 percent

- The commercial property market is efficient...
 - Direct capitalization of energy efficiency important information for investments in building retrofits

Conclusions part 2 (and 3)

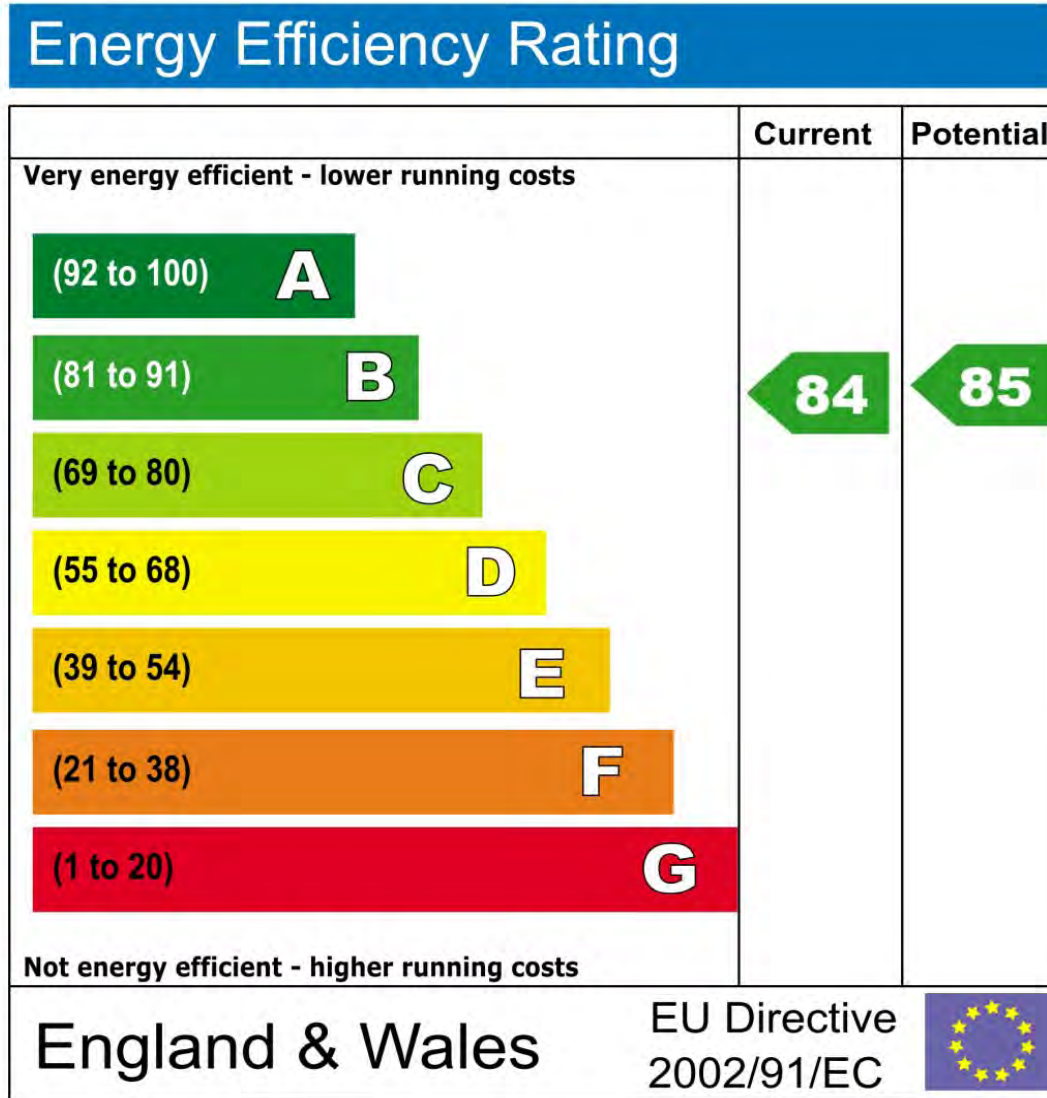
Premium varies with energy efficiency and “sustainability”

1. Is there still a “green premium” in 2009? Once rigorously controlled for differences in building quality?
 - ❑ Propensity score weighting effectively wipes out differences
 - ❑ Green buildings: rents +3%, effective rents +8%, transaction price +13%
 - ❑ Energy-Star-effect fades over time

2. What drives the “green premium”?
 - ❑ LEED score explains size of green premium, but tenants and investors have an “upper limit”
 - ❑ Energy efficiency very efficiently incorporated in rents and prices
 - ❑ LEED and Energy Star are complimentary

3. What happened to the returns of “green” buildings during the crisis?
 - ❑ Premium decreased slightly
 - ❑ Returns for green buildings not lower compared to similar buildings

So, what happens in Europe...?



Market-based initiatives less successful...

The problem: a patchwork of labels

breeam



DGNB

Deutsches Institut für Nachhaltige Gebäude e.V.
German Sustainable Building Council

HQE

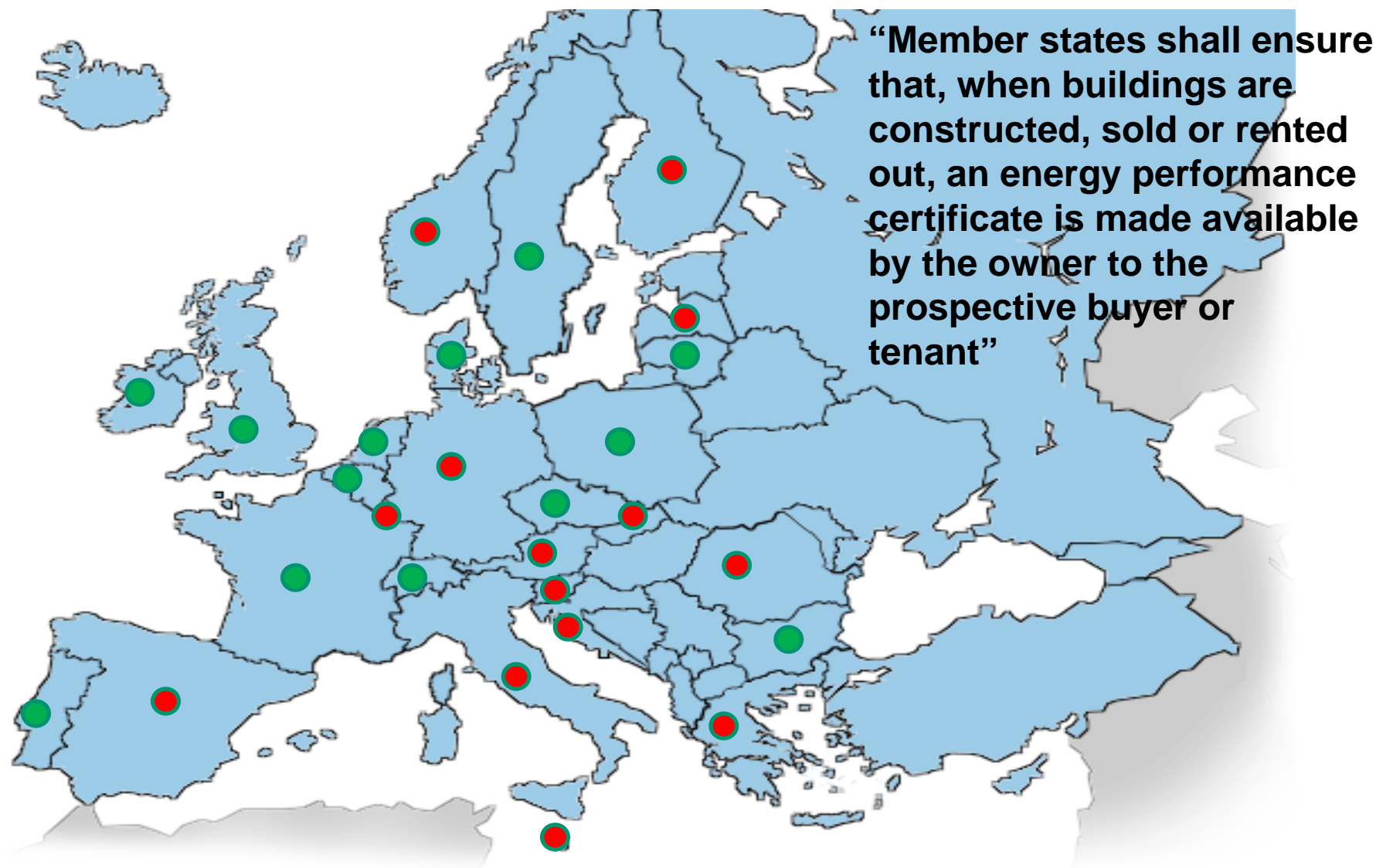
Haute Qualité Environnementale



breeam nl

But...strong government interference

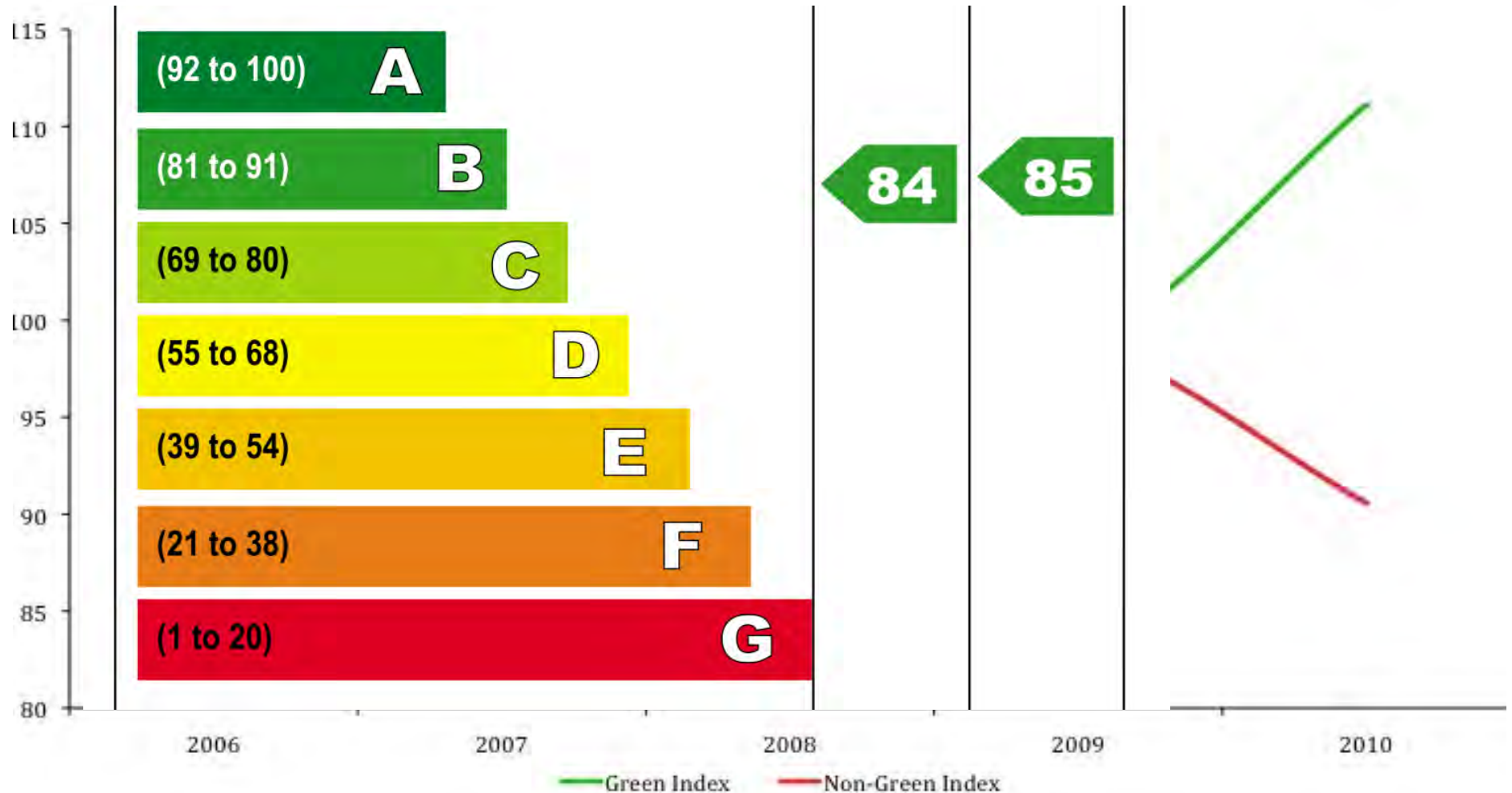
The EU Energy Performance of Buildings Directive



The energy label affects market rents

Environmental characteristics are a risk factor

Rental transaction data from CBRE, DTZ and Jones Lang LaSalle (Holland)





So what?

Implications for vendors, building managers and owners

Vendors/building managers

- Payback period too narrow
 - Efficiency measures have indirect return
- Lower utility bill reflected in higher rents
 - Important for "triple net" leases
- It's about total housing cost...!

Building owners

- Environmental performance affects building value
 - Portfolio risk management
 - Optimize equity yield



So what? (II)

Implications for policy makers and capital providers

Policy makers

- Market is (relatively) efficient in pricing "green" features
- Cheap labels increase information transparency
- Mandatory disclosure will reinforce trend
- More aggressive rating systems?

Capital providers

Debt

- Higher risk for buildings more exposed to energy shocks
 - Lower LTVs, higher DSCRs
 - Additional PACE "lien" on building not necessarily bad news

Equity

- "Green" real estate funds (Hines-CalPERS)
- Screening investments on environmental performance...

www.gresb.com



Investor-led initiative to screen fund managers

The Global Real Estate Sustainability Benchmark

\$1.6 trillion

 All Pensions Group							
	 Wolfgang Bedrijfspensioenfonds voor de detailhandel					 Real value in a changing world	
							

Collected data used by investors

Benchmark score and scorecard for each property fund

“Relative to the top-10 in other geographic areas, the best environmental performers in the U.S. underperform.”

best environmental performers in the U.S. still underperform: if we were to create a global ranking of individual property companies based on environmental performance, then Vornado would

be number 21 on the list. The top-10 U.S. performers barely show up in the right tail of the global environmental performance distribution. Clearly, a large part of the U.S. property industry has yet not woken up to the fact that optimizing environmental management and energy investments in their buildings can create positive value for their stakeholders. These findings also imply that there is substantial upside potential.

Table 5. Leaders in the U.S.: Top-10 Listed Property Companies

Rank	Company	Management & Policy	Implementation & Measurement	Total
1.	Vornado Realty Trust	83	37	55
2.	Liberty Property Trust	43	56	51
3.	Douglas Emmett	74	34	50
4.	Simon Property Group	61	40	48
5.	Washington Real Estate Investment Trust	65	30	44
6.	AMB Property Corporation	65	26	41
7.	Macerich	74	20	41
8.	ProLogis ¹³	35	43	40
9.	Digital Realty Trust	48	34	40
10.	Kilroy Realty Corporation	39	29	33



Conclusions and implications

Environmental characteristics are a risk factor

- Energy efficient and sustainable office space is now a large share of the commercial property sector -- getting mainstream
- Market seems to be relatively efficient in pricing aspects of “sustainability”
 - Energy efficiency as well as “greenness”
- Clear implications for investors
 - These developments will affect the existing stock of non-certified buildings
 - Environmental characteristics are a risk factor that should be priced in
- Global developments in regulation and institutional pressure will reinforce trends

Valuation and Due Diligence for Financing Energy/Resource Performance Retrofits

James F. Finlay

VP, Commercial Real Estate Appraisal Manager

Wells Fargo Bank – RETECHS Los Angeles

Chair, Commercial RE & Finance Committee, USGBC-Los Angeles

Valuing Sustainable Real Estate , webinar, June 16, 2011

Burnham-Moores Center for Real Estate, Univ. of San Diego

CBRE – CB Richard Ellis

CRE - Counselors of Real Estate

Center for Real Estate, University of Connecticut

Robinson & Cole LLP

Together we'll go far

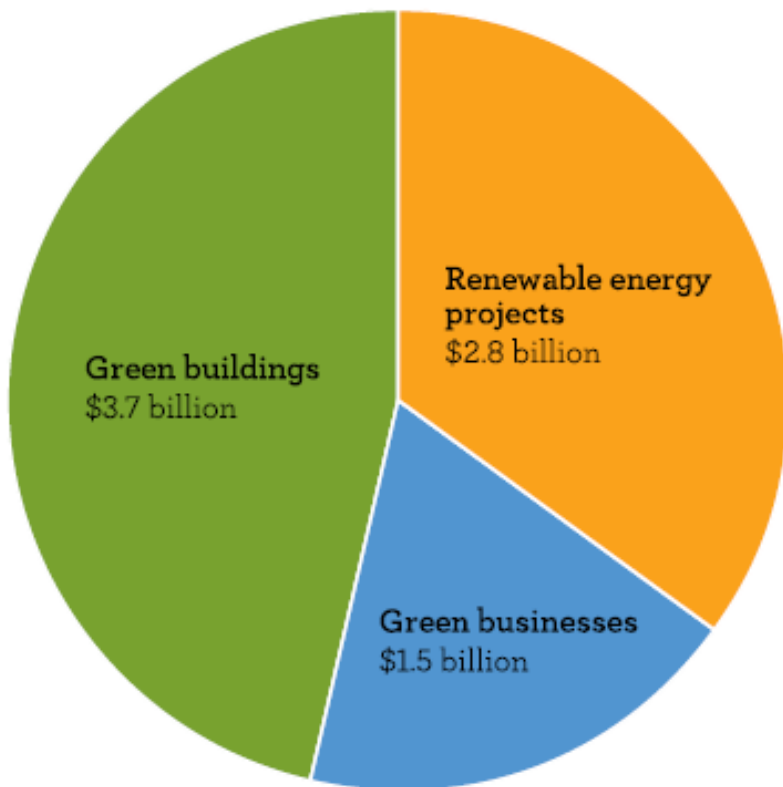


Wells Fargo Bank and sustainability

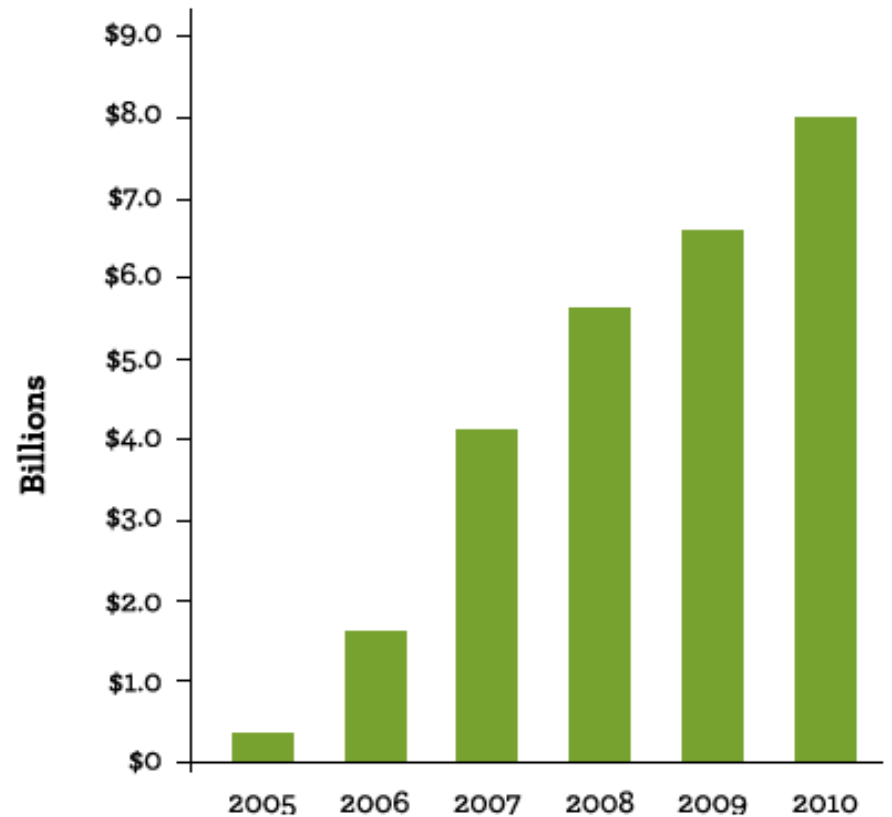
- July 2005: 10-point environmental commitment, creates the Environmental Initiative team
- Now Environmental Affairs
 - My role: Primary appraisal manager, risk analysis, trends
- More than \$3.7 billion in loans for high-performance designed real estate – LEED, Energy Star

Wells Fargo Environmental Finance Report

Environmental loans & investments
\$8 billion as of December 2010



Cumulative environmental loans and investments
\$8 billion including over \$1.3 billion in 2010



Presentation goals :

Review of energy/performance financing value/risk

- 3rd party due diligence loan underwriting reporting
- What is a *Resource Appraisal* , connection of value?
- Similarities: Valuation Appraisal & Resource Appraisal
- Real time valuation via an Energy Management System
- The *Retrofit Triangle* – operations + tech + finance
- Stages of a ideal performance retrofit
- The *Resource Appraisal* as a property asset
- Credit enhancement and *EETComps*
- Final points and Watch The Downside

Increasing Emphasis on Energy Efficiency Retrofits

- Obama “Better Buildings Initiative”, DOE, SBA
- Utility companies, NEEA
- USGBC Existing Building O&M registrations
- Energy Upgrade California, Energy Upgrade LA
- PACE commercial, creative financing options

- Energy Service Companies [ESCO], experience with bldg tech [M&V], performance contracting guarantees
- Increasing cost of energy

- National Security: Stuxnet ICS malware, US utility grid

Insufficient energy efficiency financing

- Construction lending is costly to manage
- As Proposed value in the appraisal is difficult
- Energy/resource Efficient design is complex:
 - measuring today's value of future events that don't happen
 - Upgrades have different risk profiles
 - On-site power – solar photovoltaic, wind, hydro
 - “Negawatts” – insulation, windows, doors, occupancy sensors
 - Power offset – solar thermal, fuel cells, cogeneration
- Small loans difficult for a bank to make profitably
 - Standardized process, credit based or credit enhanced

Risk challenges have been met before

- Third party (not lender & not borrower) reports common in loan process
- Accepted by underwriters, bank regulators; transfer risk
- Most common: FIRREA (Financial Institutions Reform, Recovery and Enforcement Act) Valuation Appraisal
 - Complies with USPAP (Uniform Standard of Prof Appr. Practice)
- Environmental Site Assessment Phase I (ASTM)
 - Continues to evolve, now “All Appropriate Inquiries”
- PCA (Property Condition Assessment) – Frequently required by Freddie-Fannie and SBA (Small Business Administration)

A quick review of loan underwriting

- Wells Fargo loan underwriting criteria:
 - #1 People
 - #2 Credit
 - #3 Real Estate
- RE Market value – via Income Approach
 - Income, Vacancy, Expenses [= NOI], Risk
- Cash flow & debt coverage

What is a *Resource Appraisal*?

A document, a process, an idea

- Loan due diligence report with financial analysis
- Data flow from real time operations tracking
- Make energy use and cost visible, in real time
 - *Loan pool bonds; higher precision = lower risk/cost

What else is in a *Resource Appraisal*?

- Combines components of:
 - PCA [Property Condition Assessment]
 - Energy Audit (ASHRAE)
 - Energy Management System [EMS]
with data exhaust display, archive
 - Financial analysis from EMS data
 - Working in real time
- “Green PCA’s” a current reference, but not exactly
- Energy Service Companies very close

Similarities to the Valuation Appraisal process

- Valuation appraisal process is familiar
- Starts with detailed inspection, building survey
- PCA [Prop. Cond. Assmt.] for energy modeling
- Financial analysis per upgrade design options
- Review by lender for content, analysis

But wait there's more . . .

- Scope evolves into bldg systems integration
- Data output standards like ASTM BEPA (Building Energy Performance Assessment) real time

Reporting cultures varies by property type

- One size program or report does not fit all
- Seven major property types, reports & cultures
 1. SFR/ 1-4u: Single Family Residences, 1 to 4 unit apartments
 2. Small C&I: SBA, mom & pop/owner-user. Valuations < \$2MM
 3. Medium C&I: larger owner-user/part owner-user, local investor
– values \$2MM to \$10MM
 4. Large C&I: multi-tenant leased investment – values >\$10MM
 5. Multifamily: medium/large investor grade apartments, condos
 6. Specialty: gas station, fast food, hotel, theater, data center
 7. MUSH: Municipal, University, School (grades 1-12), Hospitals

Risk varies by property type -

- Holding period – MUSH vs. investor
- Access to capital – SBA vs. Large C&I
- Split incentive – owner user vs. leased
- Owner vs. bank vs. debt pool security view
- Results are reported on three levels:
 - “The Number”, Executive Summary, Full Detail

Energy/resource Management System [EMS]

- Once up and running a RA can be in real time
- Linked to the property EMS [Energy Mngt System]
- So data flows from operations, is not “extra”
- EMS is the heart of the *Resource Appraisal*

- Resources tracked are the *Resource Quintet*
 - Energy, Water, Waste, Carbon
 - IEQ/air and light [Interior Environmental Quality]

Other Resource Appraisal items

- Behavior influence of EMS data flow
- Behavior of operations staff and workers
- Making energy/resources visible
- Weather influence tracking, operational impact
- Events outside the property line
 - Walkability score, local pollution (freeways)

Spinning the *Retrofit Triangle*

- Linking the 3 retrofit elements:
Operations, Technology, Finance
- Usually exist in organizational silos
- Operations uses tech to manage operations and sends data to finance who uses it to support upgrade investments
- Spinning a flywheel; the first turn is hardest

Performance retrofits (should) happen in stages

- The six ideal retrofit stages:
 - 1 - As-Is, Where-Is and historic operation
 - 2 – Fruit on the ground; EMS, maintenance tweaks
 - 3 – Low hanging fruit; payback <2 yr payback
 - 4 – Medium Payback; 2-7 years
 - 5 – Long Payback; >7 years
 - 6 - Net Zero (Energy) or as close to it as can you get

It's a staged process, so go slow

- Speed, accuracy, price: you only get two
 - Fast/cheap, not good. Good/fast, but expensive.
- Changing occupant behavior takes time
 - And it's really important (BECC Conference)
- Confidence builds over time
 - Higher confidence = lower risk/interest rate
- Plan capital upgrades as needed/proven

The *Resource Appraisal* is a property asset

- Tracking resource use and proving performance has market value; data proves it
- The RA is tied to Energy/resource Mngt. System [EMS]
- Investment in process control has value just as the savings produced have value

Is it all worth it?

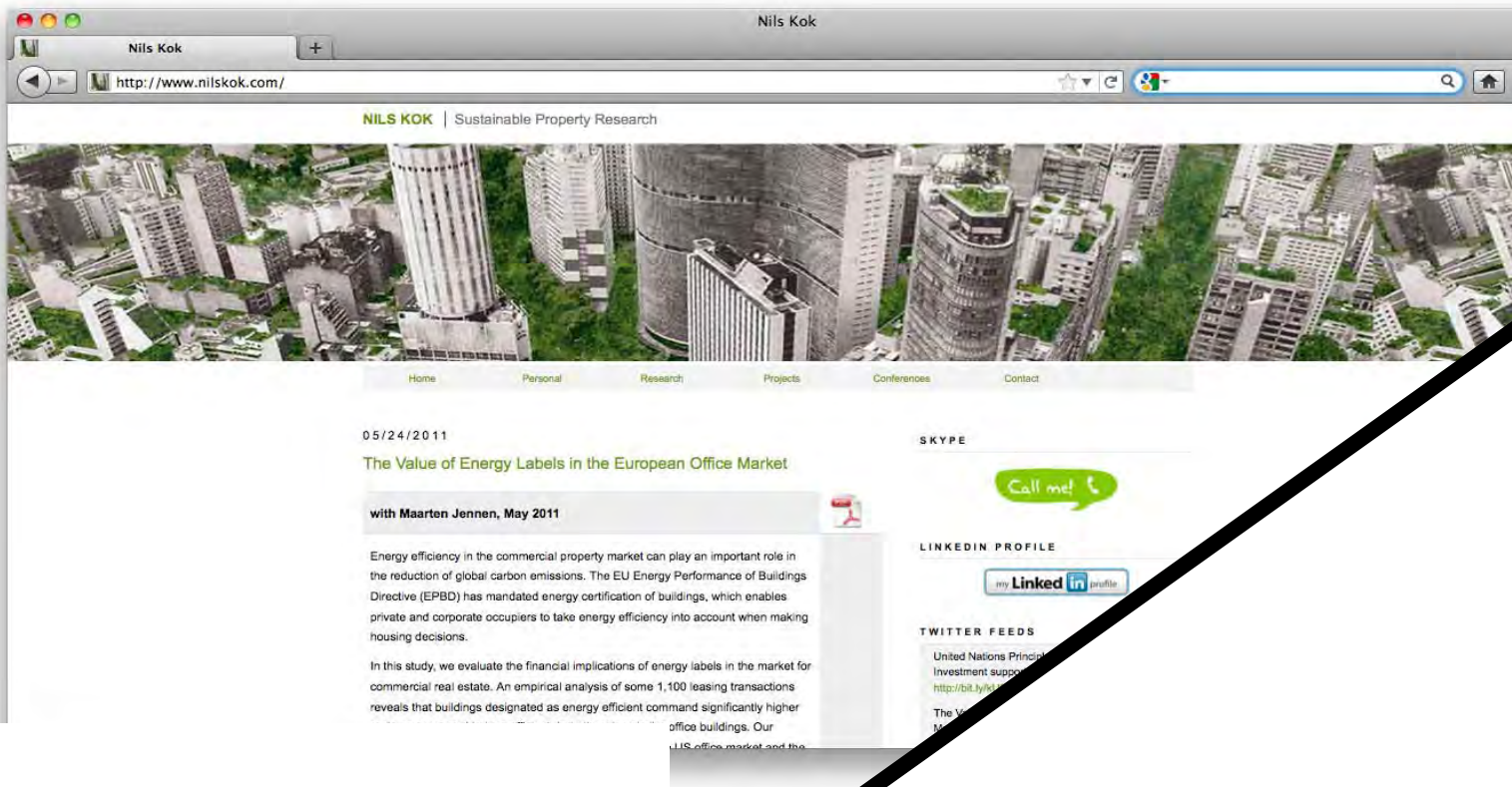
- Upside value is good, but watch out for the downside of doing nothing
- Loss emotion is twice as strong as gain emotion
- RA and Net Zero design exercise IDs the “dogs”
- It is not expensive if done with care.

Public disclosure of Energy/resource use

- A key payback to any incentive program
- *EETComps* - Energy/resource Efficiency Comparables
 - Data standards: *BEPA, EPA Portfolio Manager*
 - Building Energy Performance Assessment
- Particularly important now
- Utility installed smart meters are challenged
 - Impact of trust and control on behavior

Conclusions:

- The RA is a topical framework to risk & value
- Goal is to tease out the vital elements
- Incenting EE investment is still not cracked
- PACE, other EE finance programs need a plan
- RA test drive in Energy Upgrade Los Angeles
- Match design to behavior, not the other way



Papers/presentations/blog @
kok@haas.berkeley.edu
Papers at:
www.nilskok.com

James F. Finlay

VP, Commercial Appraisal Manager
Wells Fargo Bank – RETECHS
707 Wilshire Blvd, 11th Fl
Los Angeles, CA 90017
310-821-8111

James.F.Finlay@WellsFargo.com

I'm LinkedIn

Together we'll go far

