



Commercial mortgages: An underutilized channel for scaling energy efficiency investments?

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ACEEE Summer Study on Buildings, 2016

Outline

- Premise and context: why commercial mortgages?
- Current practice
- Impacts of energy factors
- Potential interventions

Premise and Context: Why Commercial Mortgages?

Wide array of EE financing instruments

Green Bonds

Energy Performance Contracts

Capital Leases

On-bill Financing

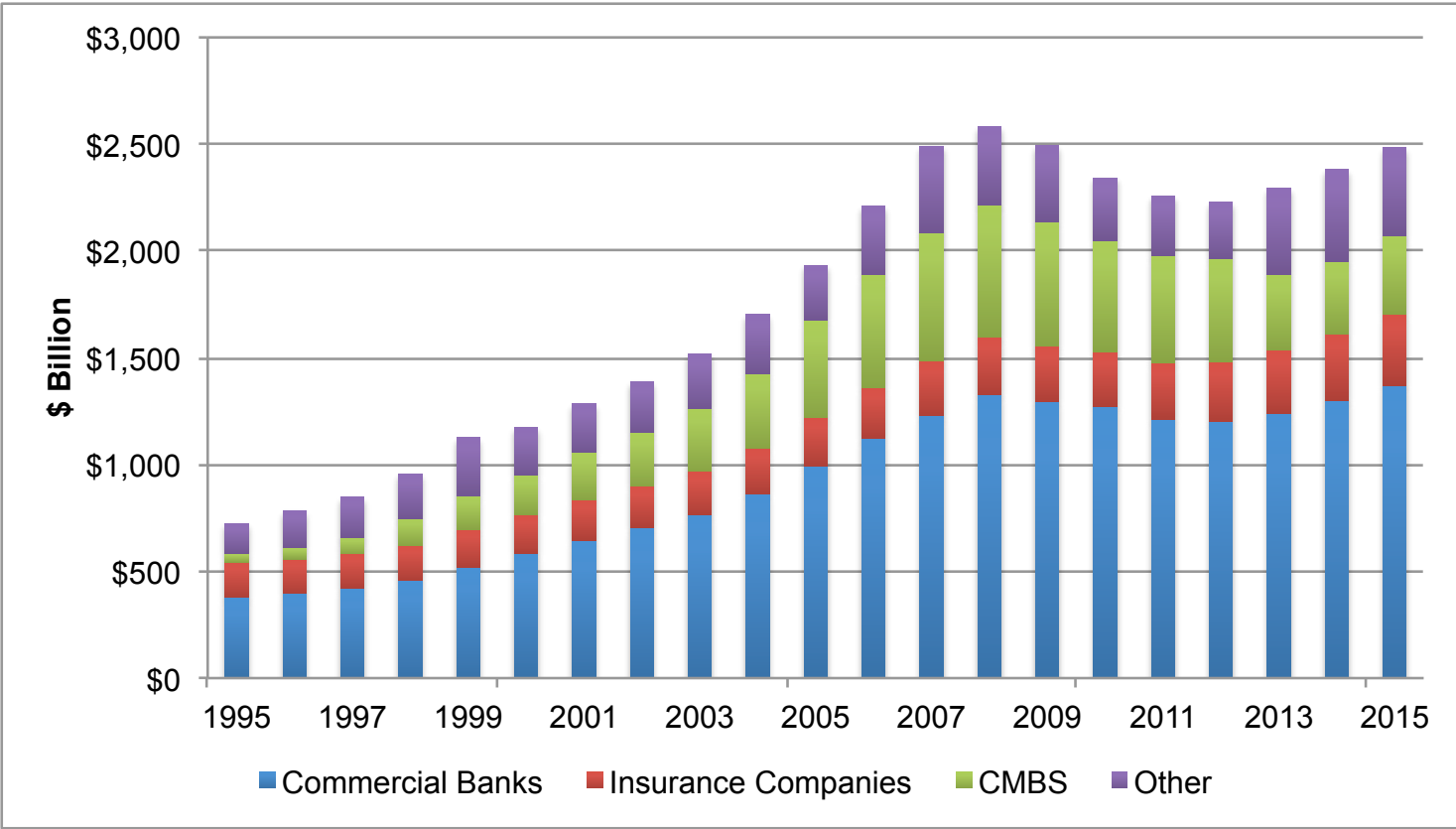
Revolving funds

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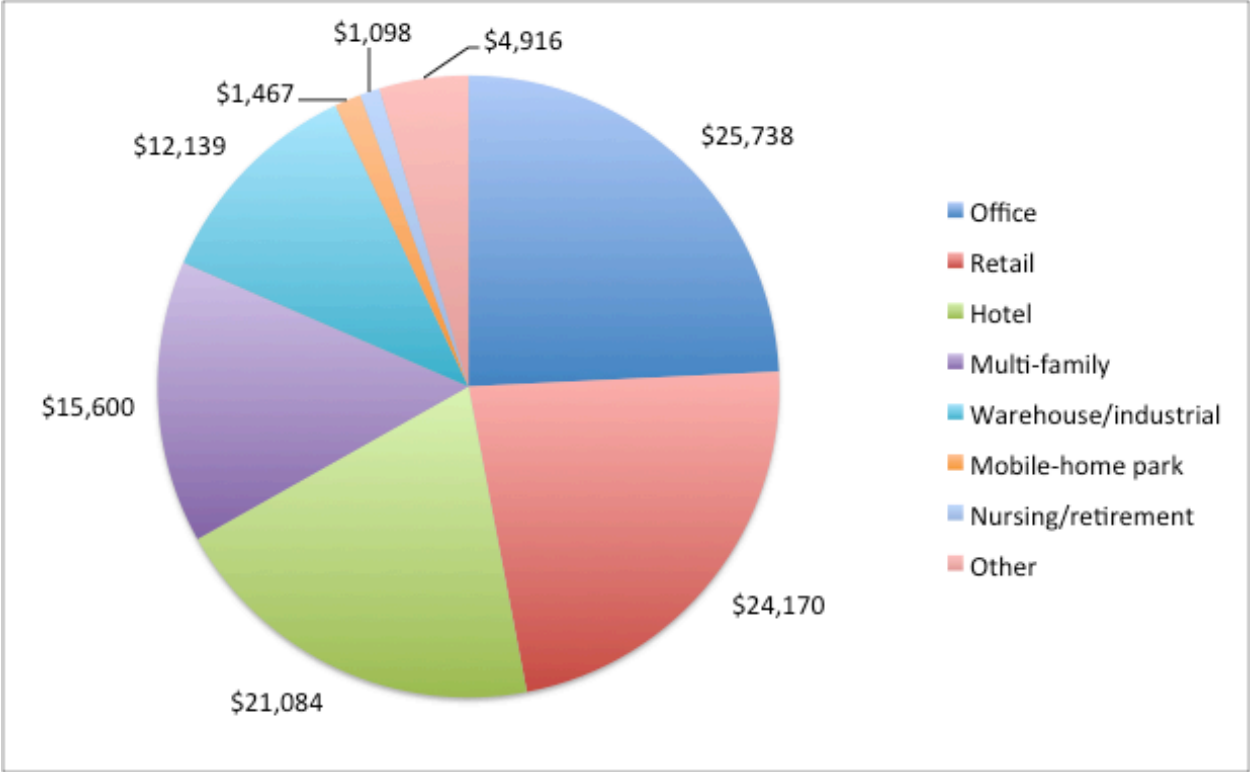
What about commercial mortgages?

- Commercial mortgages currently do not fully account for energy factors in underwriting and valuation...
- ...energy efficiency is not properly valued and energy risks are not properly assessed and mitigated.
- Commercial mortgages are a large lever and could be a significant channel for scaling energy efficiency.

\$ 2.5 trillion market



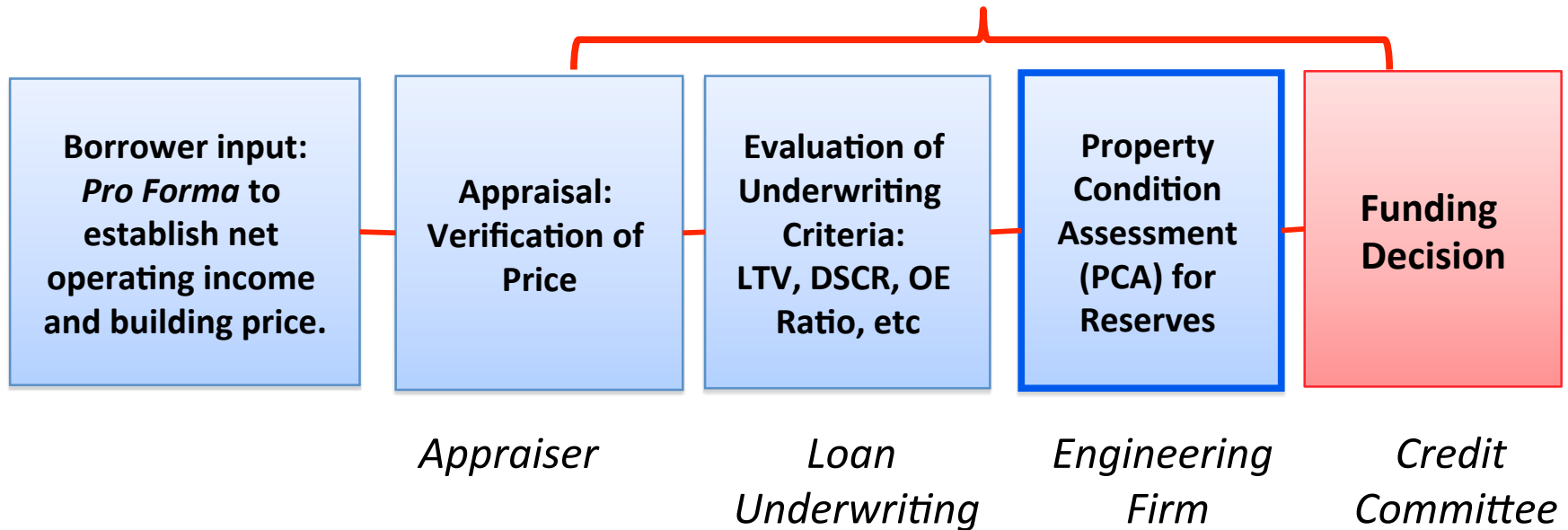
Key CMBS sectors: Office, Retail, Hotel, Multi-family



Current Practices

Current Practice

Current Underwriting Sequence



Energy Factors in Current Practice

- Appraisal typically includes little/no information on energy efficiency of assets
 - Although there are current efforts to address this
- Energy costs may not be properly represented in NOI
 - Usually based on historical data, if available
 - Does not account for energy consumption and price volatility during mortgage term
- PCAs do not normally include information on energy efficiency

Green features and property value: DOE 'meta analysis' of > 50 studies

Higher rental rates

LEED: 15-17%

ENERGY STAR: 7-9%

Increased sales price

LEED: 10-31%

ENERGY STAR: 6-10%

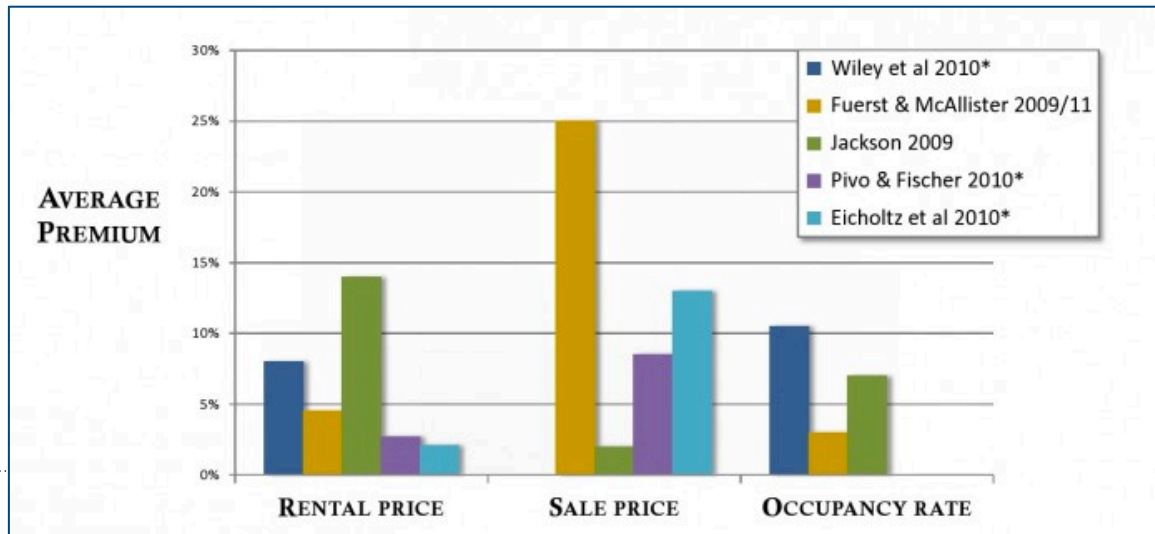
Higher occupancy rates

LEED: 16-18%

ENERGY STAR: 10-11%

Lower utility costs

ENERGY STAR: 13%



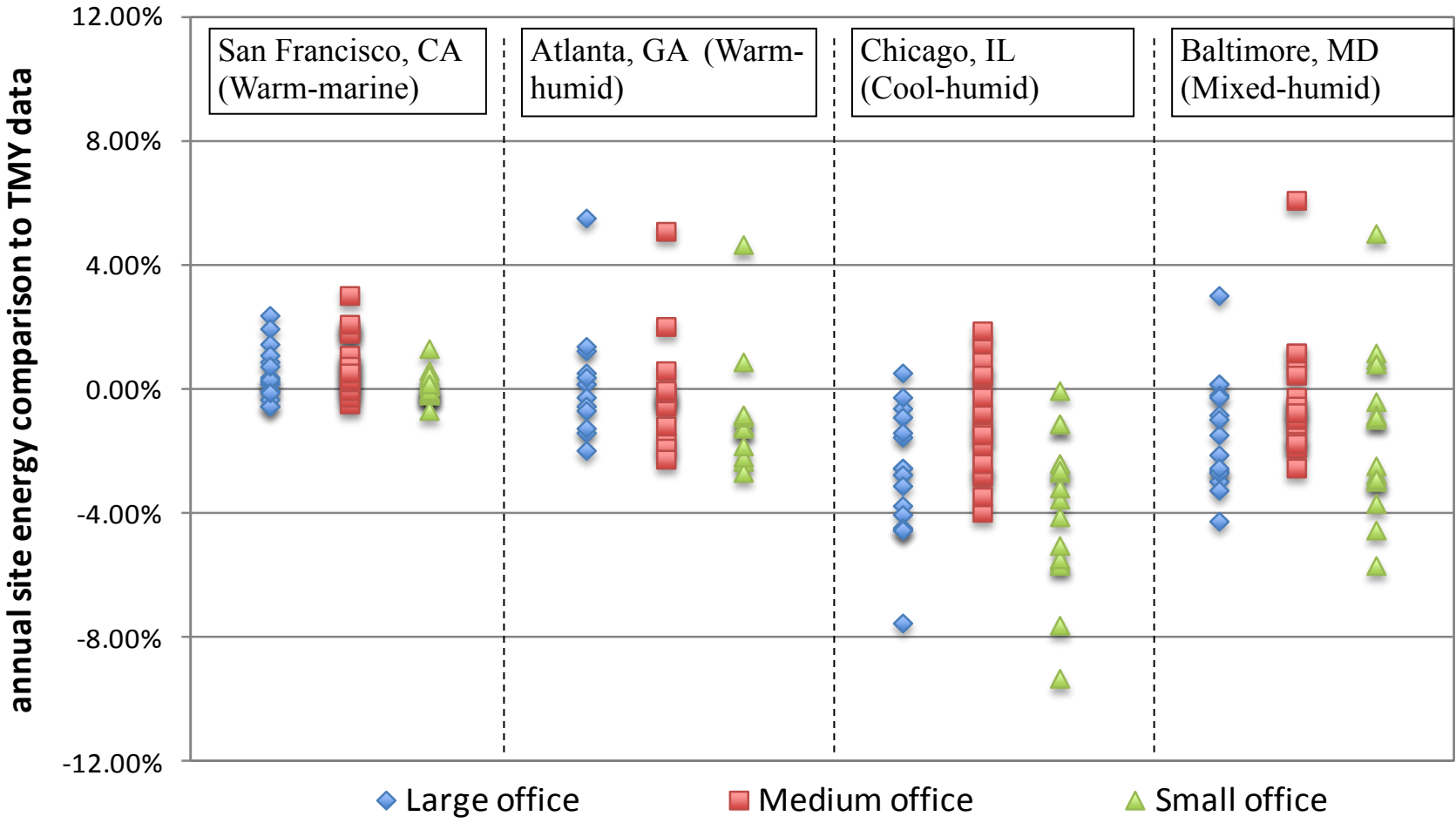
Impact of Energy Factors on NOI and Valuation

Energy factors that directly affect NOI

- Energy use volume
 - Electricity kWh/kW, fuel therms
 - Driven building features, operations, weather
- Energy use volatility (+/- %)
 - Driven by operations, weather
- Energy price
 - \$/kWh, \$/kW, \$/therm
- Energy price volatility
 - e.g. forward curves

Year-to-year weather impacts

Weather impact on site energy



A host of operational factors

Facilities management

Economizer settings

VAV box minimum flow setting

Supply air temperature reset

Static pressure reset

Chilled water/Hot water supply
temperature reset

Condenser water temperature
reset

Chiller /boiler sequencing

...

Occupant behavior

Lighting controls

Window operation

Thermostat setpoints/setback

Local heating/cooling equipment

Plug in equipment

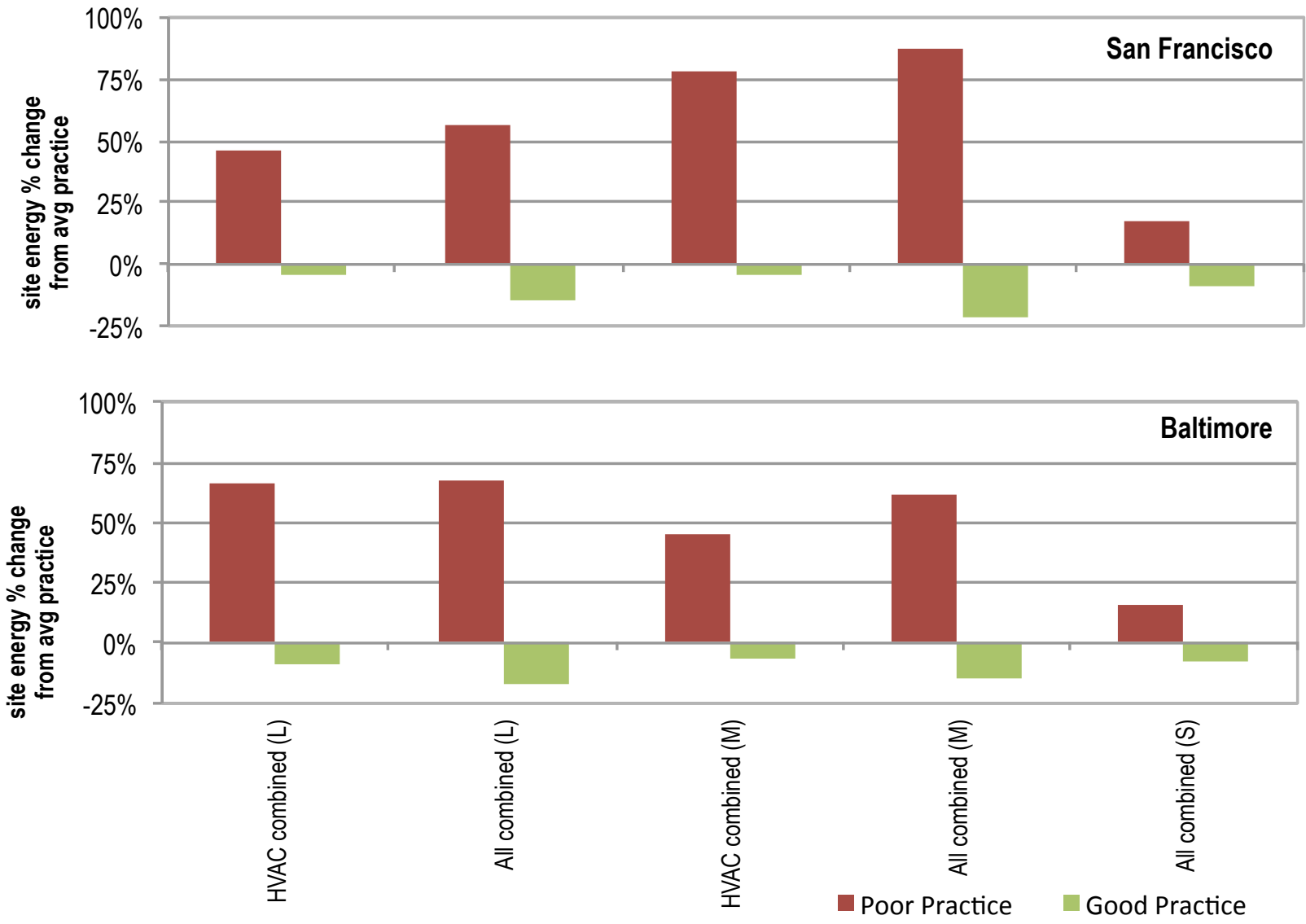
Maintenance

Damper/ valve check

Filter change

Coil cleaning

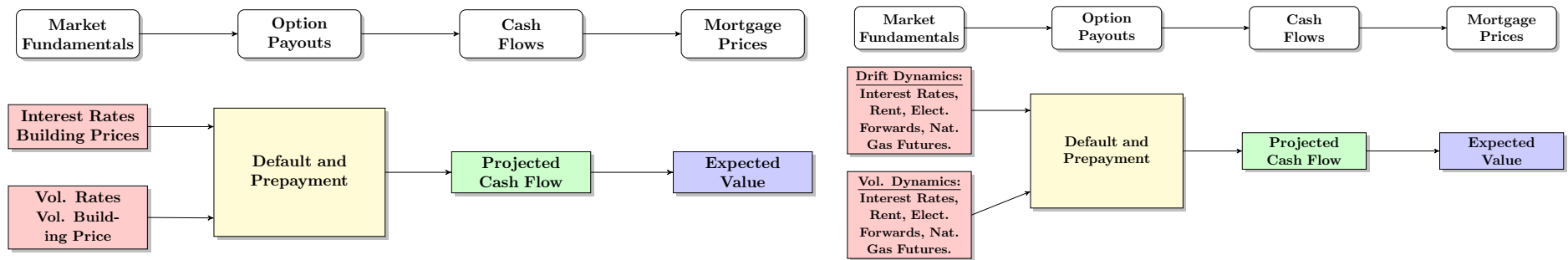
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Energy price risk and valuation

Traditional Commercial Mortgage Valuation Model (CMVM)

Wholesale (Energy-Hub) Pricing Augmented Valuation Model



Source: Jaffee, et al. Energy Efficiency and Commercial-Mortgage Valuation, Fisher Center for Real Estate, UC Berkeley

- **5% reduction** in mortgage value in due to energy price risk.
- Higher initial loan-to-value and larger loans are more mispriced.
- Greater mispricing in hot-humid climates or hot-humid-cold climates.
- Reducing energy use increased mortgage value

Potential Interventions: Results from a Scoping Study

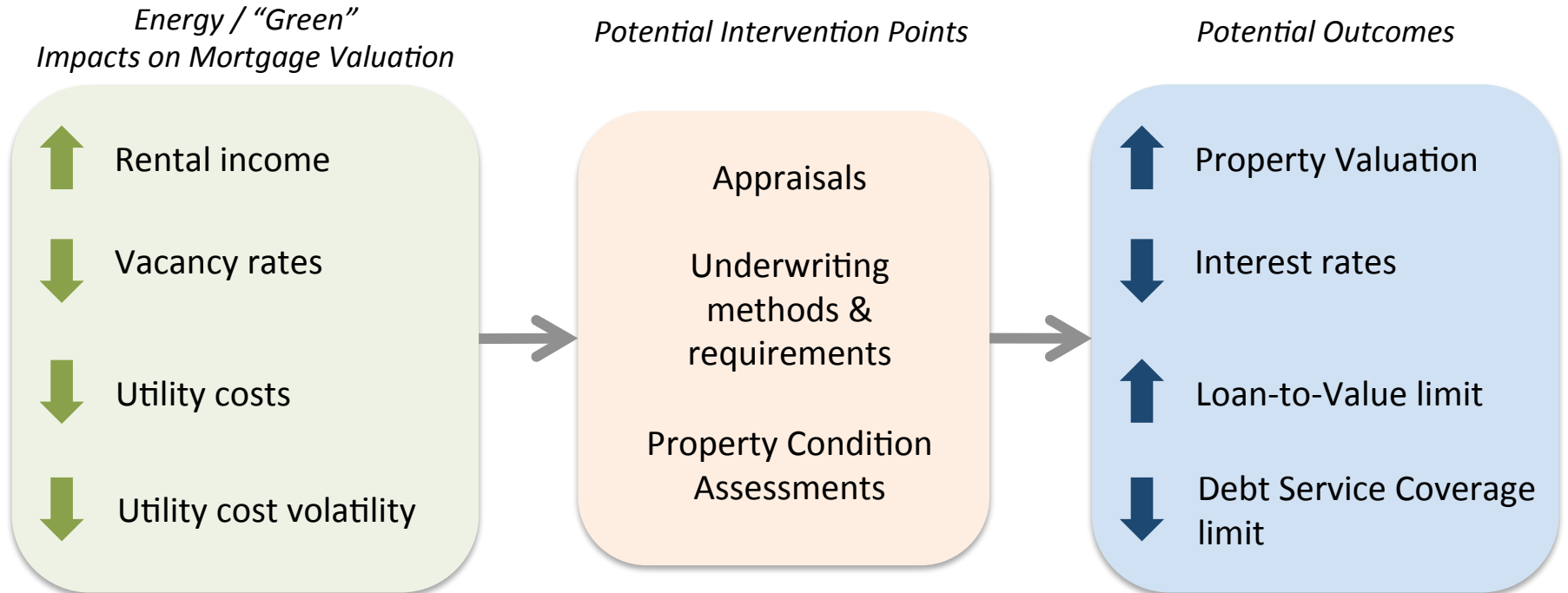
Challenges and opportunities...1

- Energy efficiency is generally not a motivating factor for lenders.
- Very limited awareness and analysis of energy cost impacts in underwriting.
- Underwriting is not standardized across the industry.
- The Property Condition Assessment (PCA) generally does not include information on energy efficiency.
- Most appraisals do not consider existing or planned energy efficiency features in property valuation.

Challenges and opportunities...2

- Many owners have not been able to see impact of energy factors on building value in their own portfolios.
- Context matters: all real estate is local. The impact of energy factors on valuation varies significantly by location, building type, quality, and market conditions.

Potential interventions and outcomes



Efforts currently underway

1. Demonstrate to lenders why, where, and how much energy factors “move the needle”
- Initial results in September 2016
2. Incorporate energy efficiency information in Property Condition Assessments (PCAs)
3. Incorporate energy efficiency routinely in appraisals
- DOE working group – see poster session

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<https://cbs.lbl.gov/energy-factors-commercial-mortgages>