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Building Value - How Energy Efficiency Impacts Mortgages & More

March 3, 2020

3:00 – 4:00 pm EDT

Blake Dressel

U.S. Department of Energy

Today’s Presenters

John Gilbert
Rudin Management Company (RMC)

Robert Azrin
Breckinridge Capital Advisors

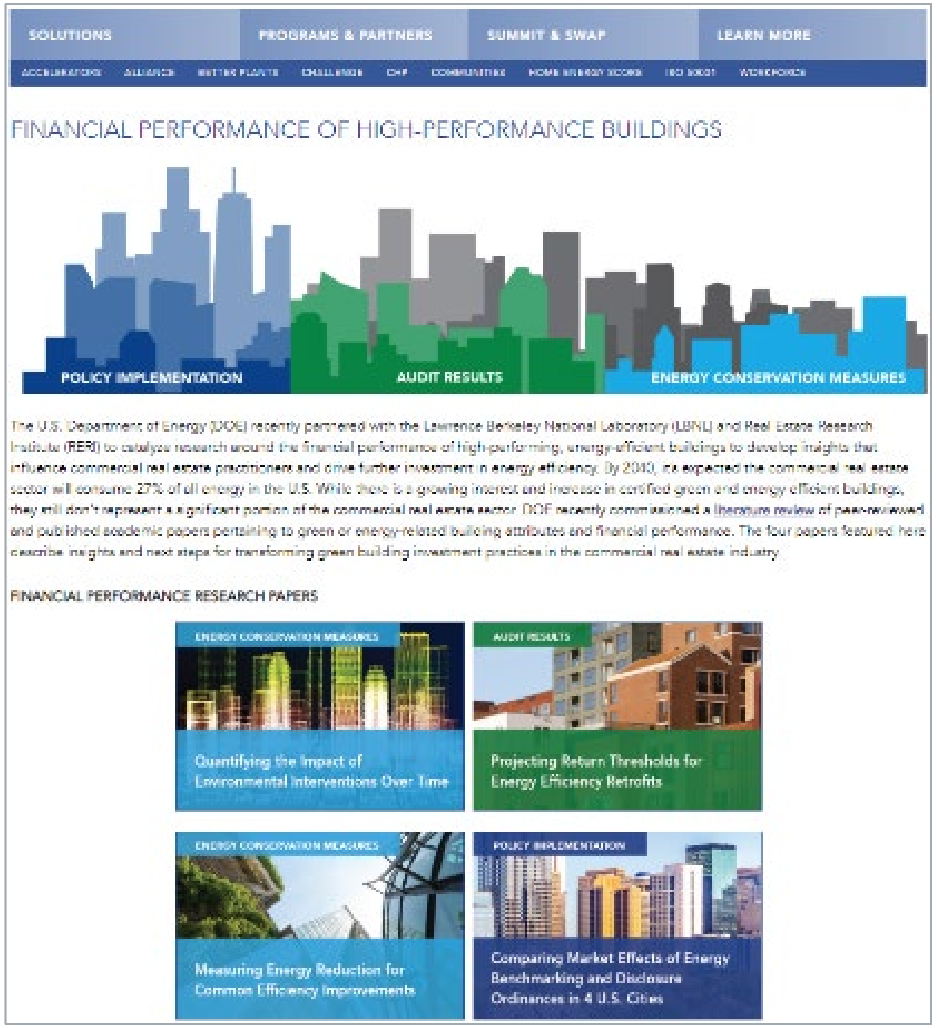
Nancy Wallace
UC Berkeley – Haas School of Business

Real Estate Research Institute (RERI) Research Projects

Title	Institutions	Key Metrics
The Impact of Environmental Interventions on CRE Operations	York University University of Guelph	ENERGY STAR®, LEED, NOI, OpEx
The Dynamics of Energy Consumption in Commercial Real Estate	Maastricht University University of Guelph	Building Certification, Energy use, Energy Efficiency, CapEx
Effect of Energy Benchmarking and Disclosure on Office Building Marketability	University of Washington	ENERGY STAR, EUI, Occupancy Rates
Estimating Office and Residential Building Energy Retrofit Hurdle Rates	NYU, University of Arizona, UNC Chapel Hill, Cambridge University	Energy Savings, CapEx, IRR
ESG Insights in Public Real Estate Performance	Tilburg University, University of Reading	ESG Ratings, REIT Returns

Technical Reports Found Here: https://buildings.lbl.gov/cbs/energy-efficiency-and-financial-valuation

Research Findings & Resources



- Market-focused summaries of research
- Links to research and resources on similar topics
  - Energy Risk in Commercial Mortgages
  - Appraisal Toolkit
- To learn more, please visit:

https://betterbuildingssolutioncenter.energy.gov/alliance/market-solutions/financial-performance

John Gilbert

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Robert Azrin

Breckinridge Capital Advisors

U.S. DEPARTMENT OF ENERGY

Better Buildings Webinar

Environmental, Social and Governance (ESG) Considerations in Municipal Market Investing

Robert Azrin, CFA, Vice President | March 3, 2020

Overview

FIRM
1993
Year Founded

- Investment grade fixed income manager
- Offices in Boston and San Diego
- 77 Employees and 34 Investment Professionals

OWNERSHIP
100%
Independently Owned

- Committed to independence
- Clients are our top priority

ASSETS
$40+ Billion
Assets Under Management

- Customized separate accounts
- Sector-focused and multi-sector strategies

AUM as of December 31, 2019.
See important disclosures on the last page of this presentation

ESG Integration Philosophy

Thoughtful and forward-looking assessment of risk would be incomplete without the inclusion of material ESG factors.

Driven by our research team, Breckinridge integrates material environmental, social and governance (ESG) issues to analyze and assess long-term and idiosyncratic risks, which we feel the market may misprice.

Why ESG in Fixed Income?

Systematic ESG analysis offers deeper insight into the underlying value and risk of an investment.

For investments in high grade debt:

- More emphasis is placed on risk mitigation.
- Investment horizons are longer-term.

What is Environmental, Social and Governance (ESG)?

Examples of Common ESG Factors in the Municipal Market

ENVIRONMENTAL

- Climate Change
- Carbon emissions
- Energy efficiency
- Pollution/Waste
- Sustainability/resiliency initiatives

SOCIAL

- Diversity/inclusion
- Demographics
- Education
- Affordable housing
- Income inequality
- Healthcare
- Crime

GOVERNANCE

- Transparency
- Quality & depth of reporting
- Management policies
- Cyber-risk

Municipal ESG Frameworks

Sample Sector Specific ESG Frameworks and Indicators

CITY/COUNTY

- Housing Affordability Index
- Income Inequality
- Climate Risk Preparedness

SCHOOL DISTRICT

- Academic Performance Relative to Socioeconomic Status
- Breadth of Sustainability Initiatives
- State support for teachers

WATER & SEWER

- Drought Vulnerability
- Rate Design & Management
- Age of Infrastructure

Municipal: ESG Research Approach

Our ESG integration methodology combines a quantitative assessment of ESG factors alongside a review of qualitative ESG considerations to derive a composite sustainability rating

Municipal Frameworks

- City/County
- Community/ Technical College
- Higher Education
- Hospital
- Public Electric Utility
- School District
- State
- Water/Sewer
- Transportation

Quantitative Assessment

- Environmental
- Social
- Governance

Quantitative Score (0-100)

Qualitative Assessment

Sustainability Rating (S1-S4)

Qualitative Assessment

- Review of a city's sustainability plan and/or sustainability initiatives
- Assess a university's commitment to sustainability through AASHE reporting and performance
- Consider a water utility's conservation and drought planning efforts
- Evaluate a hospital system's patient satisfaction and population health management efforts

See important disclosures on the last page of this presentation

Municipal Engagement

Our Long-Term Goals

- ✓ To gain a better understanding of the credit and ESG profiles of borrowers
- ✓ To encourage transparent and standardized reporting of material ESG issues
- ✓ To provide an idea generation platform for our analysts

Municipal ESG Engagement Themes

2018

- Reached out to cities to inquire about their sustainability initiatives
- Engaged with more than 25 U.S. cities across 18 states; cities were geographically and demographically diverse

2019

Thematic engagement focused on:

- Transportation (Airports) – Infrastructure Resiliency
- Higher Education – Access and Affordability
- Cities & Counties – Natural Hazard Mitigation

The engagement process targets specific themes and issuers. As such, not every issuer that is a client holding or on our coverage list will be engaged.

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The BBG Municipal Bond Index is considered representative of the broad market for investment grade, tax-exempt bonds with a maturity of at least one year.

The BBG U.S. Government/Credit Index measures the performance of investment grade, U.S.-dollar denominated government and corporate bonds with maturities of at least one year.

The BBG Managed Money Short measures the performance of U.S.-dollar denominated short term, tax-exempt bond market.

The S&P 500 Index is a common measure of the broad U.S. equity market and is composed of the top 500 publicly traded U.S. companies. (Source: S&P Dow Jones)

Nancy Wallace
UC Berkeley – Haas School of Business

U.S. DEPARTMENT OF ENERGY

Energy and default risk in commercial mortgages

Nancy Wallace	University of California, Berkeley
Paulo Issler	University of California, Berkeley
Paul Mathew	Lawrence Berkeley National Lab

BERKELEY LAB

U.S. DEPARTMENT OF ENERGY

The link between energy and valuation

Energy directly affects Net Operating Income (NOI) used in valuation.

Energy Use Volume
Electricity kWh/kW, fuel therms, etc.
Driven by bldg. features, operations, climate

Energy Price
$/kWh, $/kW, $/therm
Set by rate structure

Energy Use Volatility
+/- change over mortgage term
Driven by bldg operations, weather variation

Energy Price Volatility
+/- change over mortgage term
Driven by rate structure, forward price curves

Current practice does not fully account for these factors in calculation of Net Operating Income (NOI)

- Usually based on historical average cost data, if available
- Does not account for energy use and price volatility during mortgage term

Key question: How much do these factors "move the needle" for NOI and default risk?

The link between energy and mortgage default

Our prior empirical analysis shows energy use and electricity price have a statistically significant impact on default

- The higher the ***Source EUI*** (the more energy usage per square foot) the higher the likelihood of default. This also held for ***Scaled Source EUI*** (source EUI/NOIpsf)
- The higher the ***Electricity Price Gap***, (the larger the difference between the actual and the expected electricity prices since the loan origination), the higher the likelihood of default.

Office+MU+Retail model

	Coefficient Estimate	Standard Error
Intercept	0.00538	0.11067
Scaled Source EUI	0.00183***	0.000369
Origination Loan-to-Value Ratio	0.00263**	0.00117
Coupon Spread to 10 Year Treasury	0.00751	0.040
Electricity Price Gap	0.00003**	0.00001
Time to Maturity on Balloon	-0.00203**	0.00068
Origination Year Fixed Effects	Yes	
	N = 339, R^2 = .1768	

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Multifamily model

	Coefficient Estimate	Standard Error
Intercept	0.09654	0.09216
Scaled Source EUI	0.00088***	0.00025
Origination Loan-to-Value Ratio	0.00109	0.00009
Original Loan Balance	-0.00066	0.00087
Coupon Spread to 10 Yr. Treasury	0.02314	0.01488
Electricity Price Gap	0.000013**	0.00000
Time to Maturity on Balloon	-0.00126***	0.00057
State Fixed effects	Yes	
Post crisis Year Fixed Effects	Yes	
Origination Year Fixed Effects	Yes	
	N = 271, R^2 = .38	

* p<0.1; ** p<0.05; ***p<0.01

What are the impacts on specific loans?

Collaborate with lenders to:

1. Demonstrate impact of energy use and price on specific mortgage loans

2. Develop recommendations

Approach

- Compile info from Appraisals, PCAs, other sources.
- Estimate source EUI variations.
  - Simulation and empirical approaches
- Compute elec price gap using forward curves.
- Compute default risk impact due to source EUI and elec price gap.

Default risk impacts summary

Compare to TREPP average default rate of 800bp

Building	Source EUI variation (%)	Default rate variation (bp)	Default rate variation relative to TREPP avg (%)
Denver Office	-54% to +132%	-248 to +268	-31% to +34%
Sonoma Office	-40% to +183%	-161 to +331	-20% to +41%
San Jose Office	-62% to +119%	-308 to +249	-39% to +31%
Denver Hotel	-11% to +17%	-37 to +49	-5% to +6%
San Francisco Multi-family	-20% to +26%	-72 to +74	-9% to +9%

Wholesale price region	Default rate variation (bp)	Default rate variation relative to TREPP avg (%)
Denver area	+159 to +501	+20% to +63%
Northern California	-49 to +705	-6% to +88%

What is the link between commercial mortgage pricing and energy cost shocks?

With increased default risk, lender's should price mortgages accordingly.

- How much should mortgage interest rates and points respond to energy risks?
- Are there differences between office and multifamily mortgage pricing sensitivities?

Points and Coupon Sensitivity to Source EUI Shocks

Mortgage and coupon sensitivities to shocks on scaled source EUI (Δ1.0%)

	Points sensitivity to 1% change in Scaled Source EUI	Coupon sensitivity to 1% change in Scaled Source EUI
Office Loans	7.71 bp	2.10 bp
Multifamily Loans	4.00 bp	0.84 bp

What stakeholders can do now

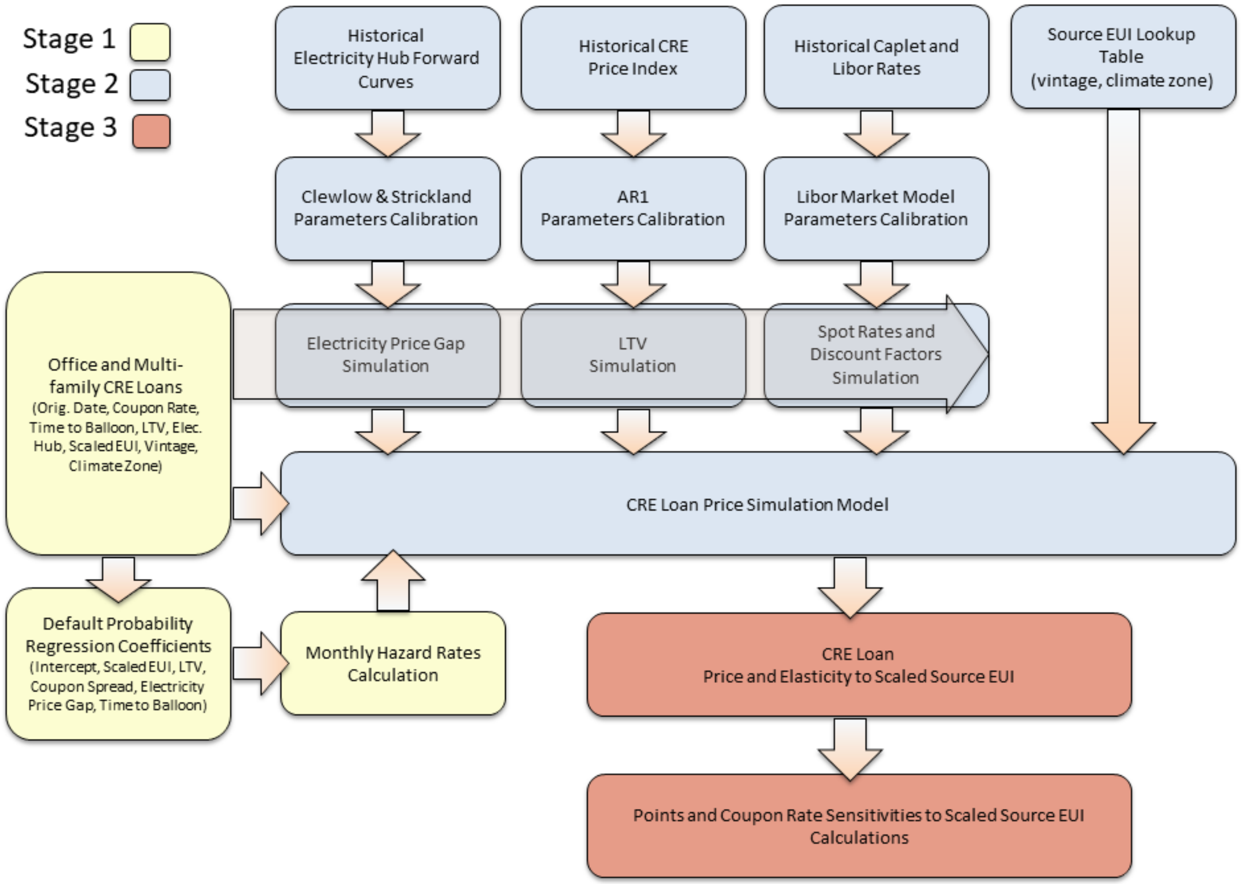
Lenders:

- Ask owners to provide info on energy cost range.
  - Account for variations in energy use and energy price.
  - Could be done as part of Property Condition Assessment.
  - Can reference ASTM standard
- Incorporate energy risk factor into underwriting and terms
  - e.g. Interest rate discount for lower risk
- Offer additional loan proceeds for EE investments

Owners:

- Ask lenders to account for energy efficiency when setting mortgage terms.
- Provide data on energy costs to lender.
  - Historical and anticipated
  - In appraisal and/or PCA

Appendix: Schematic of Mortgage Pricing Model

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