

Identifying a Link Between Energy Cost and Mortgage Default

Recent research has shown that energy consumption can significantly impact mortgage default risk in commercial real estate. The study was conducted by Lawrence Berkeley National Laboratory (LBNL) and the University of California’s Haas School of Business (UCB), sponsored by the U.S. Department of Energy (DOE), and used mortgage performance data from [TREPP](#) and energy consumption data available from many major cities’ energy consumption disclosure laws. After matching mortgage performance data to energy consumption information for the same buildings, the correlation between energy usage and mortgage defaults was clear—higher energy use was linked to higher default rates. An example of how energy cost risk can impact an owner’s cash flow at the asset level is illustrated in Figure 1.

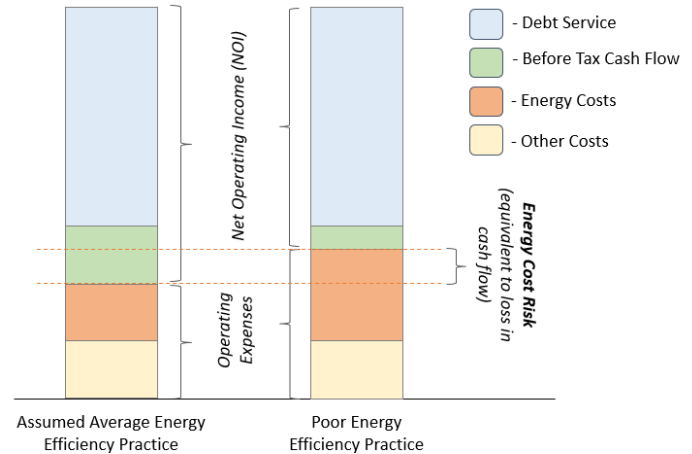


Figure 1. Illustration of Energy Cost Risk and its potential impact on pre-tax cash flow in average and poor energy management scenarios

Impact on Commercial Real Estate

Commercial real estate owners and operators have increased their focus on energy efficient operations and green building certifications in recent years, but investment in energy efficiency is still stymied by skeptics wishing to isolate and identify the extent to which certifications and retrofits can impact asset value. With this new research showing clearly that energy consumption is linked to investment risk, property owners should pay careful attention to building performance. LBNL and DOE are communicating the research results to banks and institutional investors and are working with key partners to pilot an energy risk score that will help in the valuation and underwriting of energy risk. Buildings that are less efficient may be less attractive to informed lenders, whereas more efficient properties may have the opportunity to maximize the value of their energy efficiency through financing incentive mechanisms. Owners of properties with improving energy performance may want to start a dialog with lenders to determine whether interest rate reductions are feasible, just as Fannie Mae is doing for multifamily properties. Less efficient properties may also want to consider analyzing their on-site operations and energy efficiency opportunities or determining where their property stands in comparison to its peers. Ultimately, as the pursuit of energy efficiency and green building certifications becomes more prevalent, owners should be prepared to understand how these trends can impact their financing strategy so they can optimize their approach and insulate themselves against potential shifts in lending practices.

Measuring Energy Risk

Building off the theoretical models described above, the research team collaborated with lender partners to examine loan data on specific buildings to determine the scale at which energy management practices could impact consumption and default risk. Figure 2 shows the potential range in energy consumption depending on the quality of energy management practices at the subject building. Each case study showed that energy management practices can have considerable implications on the scale of energy consumption at a property, and therefore its total utility costs. In an extreme scenario, the model for the subject property in Sonoma, CA showed that poor energy management practices (basically, poorly controlled lighting and HVAC) could lead to an 83% increase in energy consumption, while good energy management could lead to a 60% reduction compared to the existing consumption.

Impact of Good vs. Poor Energy Management Practices on Energy Consumption

	Good Energy Management	Deviation from Mean	Poor Energy Management	Deviation from Mean
Denver, CO	54%	-46%	132%	32%
Sonoma, CA	40%	-60%	183%	83%
San Jose, CA	62%	-38%	119%	19%

Figure 2. Impact of good vs. poor energy management practices on energy consumption in three office buildings.

So how does fluctuating energy performance impact a building's risk of default? Results from the default-risk study and the modeled energy consumption figures shown in Figure 2 were used to model this concept, and the results are shown in Figure 3 below.

Impact of Good vs. Poor Energy Management Practices on Mortgage Default Rate

	Good Energy Management	Default risk change from Mean (8%)	Poor Energy Management	Default risk change from Mean (8%)
Denver, CO	5.6%	-2.4%	10.7%	2.7%
Sonoma, CA	6.4%	-1.6%	10.7%	2.7%
San Jose, CA	4.9%	-3.1%	10.4%	2.4%

Figure 3. Impact of good vs. poor energy management practices on default rate in three office buildings.

The research team's models are clear. Each case study showed that energy management practices have considerable implications on the risk for default. For example, Figure 3 above shows how a case study subject Denver office building in one lender's portfolio demonstrated roughly a third greater default risk than the industry standard of 8% when it was modeled with poor energy management. The same building was about a third less likely to default than the 8% average when modeled with good energy management practices. The findings also held true for a Denver hotel and San Francisco multi-family building (not shown in charts).

Next Steps

Unfortunately, standard industry lending practices largely overlook energy expenses, with standard practice often uses industry averages rather than actual data to estimate NOI. They also rarely consider the volatility of either energy consumption or prices in developing the loan offer, and the research results show that this volatility and its impacts can be considerable. DOE and LBNL are developing a working group of interested investors and commercial real estate owners who would like to understand the implications of energy risk on their investments, develop case studies and conduct pilot projects, and communicate with lenders on the benefits of being a lower energy risk investment.

If you are interested in joining the working group, please contact the project's principal investigators, Paul Mathew (PAMathew@lbl.gov) or Nancy Wallace (newallace@berkeley.edu). For additional news articles and technical reports related to this research, please visit:

- <https://urbanland.uli.org/news/study-finds-buildings-poor-energy-efficiency-default-higher-rate/>
- <https://info.trepp.com/trepp-talk/poor-energy-efficiency-may-predict-cmbs-default-risk>
- <https://buildings.lbl.gov/cbs/energy-factors-commercial-mortgages>

Participants to date:

