Energy Costs and Valuation of Commercial Properties by Appraisers and Lenders

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ABSTRACT

In this paper we explore linkages between energy costs and asset value of commercial buildings. Common methods of appraisal practice determine building value as a function of net operating income; therefore it should follow that lower energy costs be directly correlated with higher building value. We argue, however, that because of a number of market barriers — including lack of information, entrenched professional practices, and doubt about the consistency of energy performance over time — energy costs are insufficiently recognized in the property-valuation methods of appraisers and lenders. We believe that enhanced energy-performance documentation systems supported by diagnostics and maintenance could bolster consideration of energy costs in appraisals. Stronger recognition of energy costs, in turn, could present sellers and buyers of buildings with powerful financial incentives to pursue energy-efficiency investments, including higher resale value and expanded borrowing privileges.

Introduction

In this paper we explore linkages between energy costs and the appraised asset value of commercial buildings. Energy costs directly affect a building's overall operating costs and net operating income, which according to widely used methods, is the basis for the building's appraised value. For a variety of reasons, however, energy costs and energy savings are not rigorously recognized in standard appraisal practice. We believe that energy-performance documentation could help appraisers to recognize energy-related value more accurately, could boost the resale values of energy-efficient properties, and could help convince lenders that incremental value from low energy use is robust enough to serve as a basis for expanded mortgage financing.

While our paper focuses on the practices of appraisers, we acknowledge that appraisals are not the sole determinants of whether energy-related value is recognized by commercial-property investors and lenders. Developers of new buildings and prospective buyers of existing buildings often do seek to document energy costs when conducting due diligence on their expected investments. Thus, even if an *appraisal* fails to take energy costs rigorously into account, it is possible that the *negotiated selling price* or the *negotiated financing terms* of the building will reflect value related to energy use. Moreover, in certain documented cases, owners of energy-efficient buildings have been able to secure enhanced financing for their buildings on the basis of energy efficiency.[1] But such cases are quite rare.

We believe that if responsibility for reporting energy costs and advocating energy-related value enhancements continues to lie exclusively with developers, owners, and would-be buyers, financial markets will continue to ignore energy-related value on a widespread scale. We think that in a more ideally functioning market, energy efficiency would be regularly taken into account in standard

[1] Wilson et al. (Rocky Mountain Institute) 1998, pp. 232-277.

practices in lending and appraisal, without the need for extraordinarily active advocacy among owners and buyers. The purpose of this paper is to illuminate how energy-cost considerations might thus be institutionalized and strengthened in property-valuation practice.

Valuation of commercial properties

Property value is a fundamental aspect of investment and financing decisions in real estate. The value of property is by definition the amount that investors, under ideal market conditions, would be willing to pay for it — that is, value in an ideal market is equivalent to selling price. Property value also directly affects lenders' decisions on the terms of property-backed financing (mortgages). Lenders carefully consider the ratio of the proposed loan to the value of the property because they need assurance that in the event of foreclosure, the property could be sold for a price that covers the costs of the defaulted loan. Most often, the basis for the lending decision is an appraisal report, an estimate of property value commissioned by the would-be lender and prepared by a licensed appraiser.

The income-capitalization approach and the effect of energy costs on value

An appraiser may use various standard methods, including comparison with similar properties and estimation of deterioration and replacement costs. One of the most common and widely accepted approaches for commercial real estate, the *income capitalization approach*, considers the property as a source of income for the owner. Operating costs are subtracted from projected gross revenues, yielding an estimate of net operating income (NOI). The sum of total present and discounted future net operating income equals the value of the property.[2] Table 1 shows a simplified application of the income capitalization approach.

Table 1. Valuation of an office building via the income-capitalization approach

Leasable area	10,000 SF
Estimated market rent	$24/SF
Expected vacancy rate	5%
Potential gross annual revenue	$ 240,000
Expected gross annual revenue (potential gross annual revenue x 0.95)	**$ 228,000**
Estimated operating expenses (incl. taxes, maintenance, utilities)	$4/SF
Total operating expenses	**$ 40,000**
Net operating income (NOI = Expected gross ann. revenue – Total op. exps.)	**$ 188,000**
Capitalization rate (R_o)	**0.10**
VALUE (NOI/ R_o)	**$ 1,880,000**

[2] The income capitalization approach considers a one-year estimate of NOI, which is then divided by a *capitalization rate* to yield an estimate of value. The capitalization rate is generally determined from comparable sales, and reflects the expected duration and reliability of future income. A similar method, the *discounted cash-flow approach*, forecasts expected NOI over multiple years instead of one year, and discounts future income by means of a *discount rate* chosen to reflect a competitive market-based investment yield.

Reductions in energy use lower a building's operating costs and, where utility costs are not passed on to tenants, raise net operating income for the building owner. *Based on the income capitalization approach, then, it is evident that reductions in energy costs ought to boost overall appraised property value*, and conversely, that higher energy use should lead to lower value. In subsequent sections of this paper, we discuss why, despite this apparent linkage, appraisers and lenders generally do not consider energy costs as a significant component of value. We then suggest ways to strengthen this connection in actual practice among appraisers and lenders; finally, we explore the new incentives and the potential market-transformation implications that might result if the linkage between energy costs and value were successfully made.

A note on the distinction between low energy costs and efficient energy performance

Strictly applied, the income capitalization approach is sensitive only to the magnitude of energy costs, and not to the relative efficiency of energy use. Therefore buildings with low energy use related to inadequate lighting, uncomfortable conditions, or high vacancy rates are indistinguishable in terms of energy-related value from buildings with similarly low energy use resulting from the presence of advanced features. Conversely, buildings with unfavorable locations and long operating hours might be penalized by an energy-conscious appraisal, even if the building has advanced energy-efficient features that are all working as intended.

Energy-efficiency advocates may be dismayed at the possibility of strengthening market recognition of energy use but not efficiency per se. But we believe that rigorous consideration of energy costs alone in appraisals is still vastly preferable to the status quo, in which energy use is considered only very roughly, if at all. Furthermore, given linkages between energy costs and asset value, the incentives to *improve* a building's energy-efficient performance and thus enhance value would still apply widely, no matter what the given building's locational or operational features. And lest owners seek an energy-related boost to property value by allowing negative conditions such as poor thermal comfort or inadequate lighting, they should recognize that a thorough appraisal would readily identify and reflect the non-energy value-dampening effects of the deficiencies.

We note, moreover, that in the particular case of net leases, in which tenants pay for operating expenses, owners seeking enhanced value might see a incentive specifically to pursue greater efficiency, not lower energy use, in their buildings. Tenants who pay their own energy bills should be willing to pay higher rents if they can be convinced that for a given level of expected comfort, they will see reduced utility costs that compensate for higher occupancy charges. In this case, an owner could enhance NOI and building value by installing energy-efficient measures, reducing tenant utility bills, and raising rents. The owner could not expect to garner any increased rent income if reductions in energy use led to poorer comfort conditions.

Barriers to recognition of energy costs by appraisers and lenders

Based on discussions and preliminary survey information from appraisers,[3] we believe that a number of barriers keep energy costs from being rigorously and accurately reflected in appraised

[3] In May 1998 we distributed survey questionnaires on energy-related valuation practices via fax broadcast to more than 1,000 commercial-property appraisers in California. Survey returns have been disappointing; less than five percent of survey recipients have responded as of June 1998. Since our current pool of responses cannot yield precise results or convincing conclusions, we plan to conduct telephone surveys based on the same survey questionnaire used in the initial fax

estimates of property value. We believe further that inaccurate or incomplete recognition of energy costs in appraisals obscures incremental energy related-value from consideration by real-estate and financial markets — and suppresses property-based financial incentives for energy efficiency.

Here we examine three key barriers:

Appraisers' lack of information on building energy performance

Unlike appliances, vehicles, and even residential buildings, commercial buildings lack any convenient rating or labeling system indicating their energy performance. This lack of information may hinder markets from considering differences among the energy costs and performance levels of various buildings. Where markets lack information on relative costs, value cannot be assessed.

Our inquiries have revealed that many appraisers are aware of the wide variations in energy costs of buildings, and do desire to take energy efficiency into account in determining property values. The problem, they say, is that they lack sufficient information on energy use, especially where energy-use comparisons among properties might be desired. Even utility records, when available, may offer little conclusive insight, since confounding factors like weather and occupant behavior can affect energy consumption as much as the characteristics of the building itself.

In the absence of specific energy-cost information, appraisers often use simple rules of thumb, highly aggregated statistical data, or assumed similarities to known properties to estimate the building's operating costs. And even where energy-efficient equipment or built features are present in the building, it appears that appraisers rarely if ever adjust their energy-cost estimates downward from their assumed values.

Entrenched professional practice

Taking account of energy efficiency is simply not standard practice in the appraisal field. Licensing boards require no special training for appraisers on energy-efficient design, technology, and equipment; indeed, even if an appraiser were to have an interest in the subject, training and continuing-education courses in energy efficiency are rarely offered. Furthermore, standard procedures of the appraisal itself routinely ignore energy efficiency. The Uniform Commercial and Industrial Appraisal Report (UCIAR), the standard form for commercial and industrial property appraisals, is fourteen pages long and has numerous blanks for the various value-related features of the property. Nowhere, however, is energy efficiency directly addressed on the form.

Doubt about savings reliability

Appraisers and especially lenders may hesitate to assign value to expected energy savings because of doubt about savings reliability. Such doubt may spring either from the lack of a known track record for certain new technologies, or from concern that poor maintenance or unsound operating regimes would cause measures to fail. The risk of failed measures and unachieved payback may well make lenders reluctant to approve expanded loans on the basis of projected energy savings.

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broadcast; these phone surveys will be administered among California certified general appraisers during the second half of June 1998. Survey results will be available from the authors thereafter.

A strategy for lowering the barriers: delivery of performance documentation

We believe that it would be possible to develop mechanisms to deliver convenient and credible information on building energy performance to appraisers and lenders in order to raise their awareness of energy-related value in commercial buildings. We believe that the foundation for such mechanisms already exists in the burgeoning variety of tools and services — offered by utilities, energy service companies, controls firms, and others — to assure lasting efficient performance in buildings. We envision that these services, if appropriately certified and linked with user-friendly documentation, could serve as the basis for a performance record which appraisers and financial markets would use to determine energy costs and energy-related effects on value.

We envision that the performance record of the building would be kept by the building manager or an outside energy-services provider. The record might show, in as much detail as analysis costs and data availability warrant, any or all of the following information: a modeled estimate of design-based building energy consumption; monthly energy billing data and daily and monthly energy consumption patterns; and an index of energy cost per square foot, normalized for weather, operating regimes, and other factors. The performance record would also note whether the building had installed diagnostic systems or contractual performance-assurance arrangements which might reduce the likelihood of declining performance over time.

It could also contain an energy-efficiency rating, directed not so much at the appraiser as at the owner or buyer; this rating would provide a basis for assessing energy performance per se, relative to code-stipulated levels or other baselines. The performance record and rating could also contain space in which the provider of the document could offer suggestions on how to lower costs and improve the rating through energy-efficiency improvements.

The energy-cost information from the performance document would be delivered in printed or electronic form to an appraiser. The appraiser would use the performance document's energy-cost index as a basis for estimating energy costs; use of the income capitalization approach would then capture the effect of energy costs and energy savings on overall present value.

Realignment of market incentives for energy efficiency

Stronger linkages between energy costs and asset value could dramatically abbreviate the time horizon in which building owners would see payback from energy efficiency; if low energy costs were reflected in greater asset value, then instead of having to wait for gradual savings spread out over future time, owners who pursue energy-efficient improvements would have the opportunity for immediate enhanced cash flow from enhanced resale value or expanded low-interest financing. Thus, *without even changing the tendency of owners to resist making up-front cash outlays*, better integration of energy costs into estimates of property value could greatly increase the financial attractiveness of energy-efficiency investment.

Let us imagine, for example, a commercial building with 100,000 square feet of leasable area, and average yearly operating costs of $4 per square foot. These operating costs are about average for the region and building type, and are paid by the owner, not passed on to tenants. An array of energy-saving measures is installed at a cost of $5 per square foot, a conservatively high estimate. The building owner also engages a reputable energy service company to maintain and document the performance of the installed measures.

After two years of operation, performance records show that the new yearly operating costs of the building consistently average $3 per square foot. A normalization algorithm, working with measured data imputs, verifies that the savings have arisen from the installed measures, not weather or occupancy changes. Thus the building owner is reliably saving $100,000 per year as a result of the initial investment — that is, the simple payback time is five years.

The building owner decides to sell, and an appraiser is summoned to assign a value to the property. The appraiser receives the verified information from the performance documents and determines that operating expenses may indeed be expected to continue at current (post-retrofit) levels. If the capitalization rate for the building is 0.10, then the value added to the building by the energy-efficiency measures is $1,000,000 — or twice the original cost of the improvements. If this value were recognized upon resale, then the owner would make a tidy profit of $500,000 at resale as a result of the original energy-efficiency investment, in addition to having saved $200,000 during the two years between retrofit and sale.

And even if the building were not up for sale, the owner could still benefit from an appraisal enhanced through consideration of energy efficiency. The increment of value from energy efficiency could possibly serve as the basis for refinancing at a more attractive rate.

The conditions of the simplified scenario outlined above can be summarized in the following equations.

For an energy-efficiency investment with initial cost C and simple payback time SPT, annual expected energy savings S, capitalization rate R = 0.10, the incremental asset value V of the expected energy savings can be expressed as follows:

$$V = \frac{S}{R} = \frac{S}{0.1} = 10 * \frac{C}{SPT}$$

For a loan L equal to eighty percent of the incremental asset value,

$$L = 0.8 * V = \frac{0.8 * S}{R} = \frac{0.8 * S}{0.1} = 8 * \frac{C}{SPT}$$

From the equations it is apparent that where expected energy savings are reflected in the present asset value of the building, incremental resale value will balance the initial cost of any energy-efficiency investments with a simple payback time of less than ten years. Where the building is refinanced at a loan-to-value ratio of 80 percent, the owner could receive an immediate net cash-flow increase from energy-efficiency investments with a payback of eight years.

Necessary conditions for successful implementation of performance documentation

A number of factors will have to fall into proper alignment if this hypothetical case, with its considerable market-transformation implications, is to be realized. Most importantly, if appraisers and lenders are to accept performance documentation as a basis for acknowledging energy-related value,

they will require some reassurance about the quality of data and the legitimacy of data analysis tools. Financial markets may require some standardization of procedures, in order that energy costs might be comparable across different properties. Appraisers may also need some formal protection from liability in the event of "lost" value through use of errant performance data.

Assurance of data quality and analytic integrity through consensus specifications

Data quality depends on numerous factors: types of data; accuracy and precision of measuring instruments; installation and calibration of instruments; frequency of data collection; reliability of data recording and archiving; and so on. Available service packages of continuous commissioning and diagnostics cover quite a broad range of these variables. Moreover, there exist several analytic methods for transforming collected data into savings estimates or normalized performance indices. Consensus protocols for data collection and analysis, probably with some formal acceptance by professional groups of appraisers and financial institutions, will likely be necessary if energy-related value is to be recognized in the marketplace.

The International Performance Measurement and Verification Protocol (IPMVP), which establishes standard methodologies for measuring and verifying energy savings, would be a logical starting point for specifications for energy-cost data to be used in appraisals. For appraisal purposes, the content of IPMVP might have to be expanded to define specific accepted practices in diagnostics, continuous commissioning, and maintenance.

Certification of service providers and their methods

Providers of performance documentation to appraisers, whether building managers or outside energy-service contractors, may themselves need to have their qualifications certified in some manner. We imagine that providers might apply for listing in an official registry, much as home energy raters do.

Standardization

Though financial markets may tolerate some variety in service packages and documentation methods, standardization could hold several advantages. It would facilitate comparisons among different buildings with different features. Standardization would also help breed familiarity with performance documents, limit confusion among different systems, and help to lighten the load of training and added work for appraisers and service providers.

Regulation

Taken to their logical conclusion, specifications, certification, and standardization of performance-documentation practices may fit together in a regulatory scheme of third-party oversight. A government agency would receive a legislative mandate to approve procedures, register and certify providers, issue standards, address grievances, and levy sanctions as necessary. Such an arrangement could help to raise market confidence in the legitimacy of energy performance documentation. It could also shield appraisers and service providers from liability claims, by giving them clearly defined rules

and regulations with which to comply. Funding for regulatory oversight could be collected through licensing fees, filing fees, or other mechanisms.

Conclusion

Many appraisers with whom we have had contact know that energy costs do affect value, and that energy efficiency affects it positively, but still they remain reluctant to make definitive statements about what that effect on value is. Lacking expertise and reliable documentation, they often make only the roughest estimates of energy costs, effectively treating low-energy buildings as if they had the same operating cost regimes as heavy energy consumers. But we believe that this market failure can be remedied through the creation of new informational tools, which would be a logical extension (and useful enhancement) of existing energy services for buildings.

Successful implementation of such information-delivery mechanisms would mean increased recognition of the value of energy efficiency, and significantly, would dramatically abbreviate the time horizon in which building owners would see payback from energy efficiency. Instead of having to wait for gradual savings spread out over future time, owners would have the opportunity for immediate payback from enhanced resale value or financing. Thus, without changing the decision criteria of owners, new appraisal methods could greatly increase the financial attractiveness of energy-efficiency investment.

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