

**RECOGNITION AND USE BY APPRAISERS
OF ENERGY-PERFORMANCE BENCHMARKING TOOLS
FOR COMMERCIAL BUILDINGS**

New York State Energy Research and Development Authority (NYSERDA)

prepared by the

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Since September 1999, the New York State Energy Research and Development Authority (NYSERDA) has supported a project, implemented by the Institute for Market Transformation (IMT), to encourage commercial property appraisers to account more rigorously for building energy performance as a factor affecting cash flow and value in buildings. One focus of our work has been to enhance coordination and mutual understanding among appraisers and developers of energy-performance benchmarking tools. This paper briefly describes the most prominent existing benchmarking resources and summarizes current practices and priorities regarding benchmarking among appraisers in New York state. It also presents our general commentary and recommendations on maximizing the usefulness to appraisers of existing benchmarking tools, and raises the possibility of developing new tools and databases for use by appraisers and other stakeholders in commercial real estate.

Background

Property appraisers widely employ “comps” (comparisons with known data for similar buildings) as points of reference for their estimates of market value of buildings. They may also use comps for individual line items in their cash flow calculations, including energy costs. In the energy-efficiency community, assessing a building’s relative energy performance by comparing it to that of other known buildings is known as benchmarking. Benchmarking building energy use involves compiling data for the subject building, locating analogous data for similar buildings (often by performing a query to generate an appropriate subset of a large existing database), and comparing the two sets of data.

When we have told appraisers about energy-related databases and benchmarking tools, they are invariably strongly interested — and usually, surprised to discover that these resources exist. In short, appraisers and energy-efficiency professionals have significant common interests regarding benchmarking — but little awareness of each other. One simple objective of our project, therefore, has been to bridge this lack of awareness in both directions, by informing appraisers about existing benchmarking tools and encouraging their use, and sharing appraisers’ needs and interests with technical professionals working on benchmarking tools and programs.

Toward this goal, NYSERDA has supported the development of printed and online guidance material for appraisers, with a special section on benchmarking tools and procedures. NYSERDA has also supported the development and delivery of the first accredited continuing-education seminar on energy issues in New York for appraisers and brokers. This seminar, which has been run four times with a total of about 90 participants, also included specific content on benchmarking, including one presentation by Stuart Brodsky, Program Manager for the ENERGY STAR[®] Building Label program at the U.S. Environmental Protection Agency (EPA).

We have also sought periodically to brief program staff at various agencies, including EPA and the U.S. Department of Energy (DOE) about appraisers’ interest in benchmarking tools, and factors that affect the accessibility and usefulness of these tools for use in appraisal. This paper contains our updated perspectives and recommendations in this area.

CBECS, Portfolio Manager, and Other Existing Benchmarking Resources

The **Commercial Building Energy Consumption Survey (CBECS)** is the only source of a comprehensive national database on commercial buildings, their energy-related features, and their energy consumption and associated costs. The database is collected quadrennially and maintained by DOE's Energy Information Administration (EIA). The 1999 CBECS survey data were collected via telephone interviews for over 5,000 commercial buildings, each with over 1,000 square feet of floor space. The sample was then weighted to represent several million commercial buildings nationwide.

Raw CBECS data are available via the EIA website, but are relatively difficult to understand and use. In this light, DOE has developed its own online query tool (the **CBECS Web Gadget**, available at <http://analysis.eren.doe.gov/webcbecs/cbecs.htm>), which allows users to define a set of buildings by principal activity, size, vintage, region (Northeast, South, West, Midwest), climate zone (based on heating- and cooling-degree days), and fuels, and then view average energy consumption and expenditures in tabular format, for corresponding CBECS buildings.

Portfolio Manager and the ENERGY STAR[®] Building Label

The most prominent application for energy-related benchmarking is **Portfolio Manager**, the benchmarking tool used to assess qualification for the ENERGY STAR[®] Building Label, developed by EPA. Portfolio Manager calculates normalized energy consumption levels for a building, based on user-specified data for location, space type, occupancy, hours of operation, number of personal computers, and metered energy use for electricity and various fuel types. The tool then generates a rating score on a 1 to 100 scale, using the CBECS database as the basis for comparison. Office buildings, K-12 schools, hotels, hospitals, and supermarkets and grocery stores that are among the top 25 percent nationwide in terms of energy performance (earning a benchmarking score of 75 or greater) and maintain an indoor environment that conforms to industry standards can qualify to receive the ENERGY STAR[®] label.

Portfolio Manager also generates a Statement of Energy Performance, a one-page summary sheet showing key input and output data, including normalized annual energy consumption and costs, associated airborne emissions, as well as the building's rating score itself.

Other tools

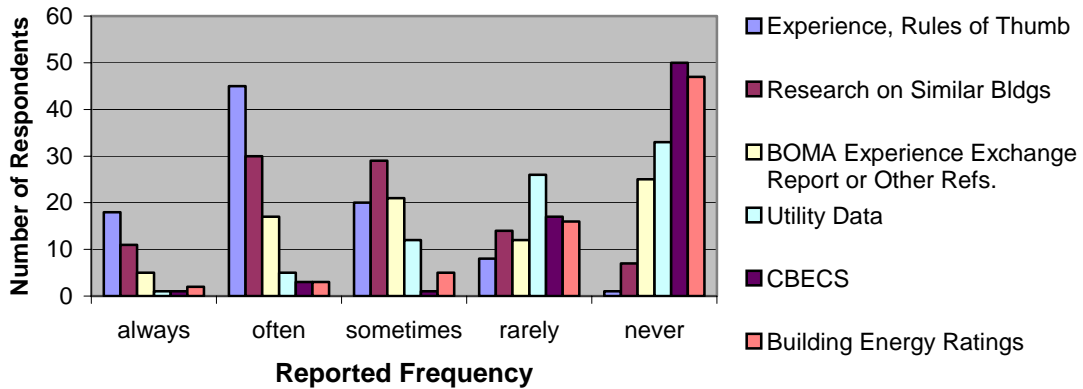
A third web-based tool that uses the CBECS database has been developed by EMCOR, a private energy-consulting company. EMCOR's Energy Edge service (www.emcor-energy-edge.com) prompts users to enter data on building floor area, electricity consumption, fuel use, location, and building type, into an online form. EMCOR's benchmarking tool then generates a comparison with analogous buildings from the CBECS database, showing the energy-consumption percentile of the subject building. EMCOR's energy-performance benchmarking tool is free. It also serves as the initial step in a process that leads into audit services, for which a fee is charged.

Various other benchmarking tools are under development, including ones that employ utility data instead of CBECS. At present, however, these tools are not currently available to appraisers in New York state or to the general public.

Use and Recognition of Existing Tools by Appraisers in New York State

In November 2002, IMT conducted a survey of certified general appraisers in the state of New York. One question in this survey asked, “In commercial or multifamily residential appraisals, how often do you use the following approaches to determine the energy-related features or energy costs of comparable properties?” We listed a number of known approaches for energy-related “comps”, and for each approach, asked respondents to check one of five boxes representing a level of frequency, from “always” to “never.” The full distribution of responses is shown in Figure 1.

Figure 1. Frequency of Use of Various Approaches for Assessing Energy-Related Features or Energy Costs of Comparable Properties



The data show that appraisers most commonly use their own experience and rules of thumb, and to a lesser extent, research on similar buildings and standard references such as the BOMA Experience Exchange Report. Use of CBECS or rating systems is exceedingly rare.

We also inquired specifically about respondents’ experience with the ENERGY STAR[®] Building Label and rating score; 12 of 108 respondents wrote that they had encountered an ENERGY STAR[®] Building Label or rating score in their appraisals of commercial buildings. This proportion was not significantly different from results from the identical question, administered to a similar sample in a survey conducted by IMT in 1999 (10 of 108). Taken at face value, these responses indicate rather slow exposure of appraisers to the label. It is also possible that respondents did not fully understand the question, confusing the Building Label with the ENERGY STAR[®] label for homes or equipment; this misunderstanding could have inflated the “yes” numbers especially in the earlier survey, given that the ENERGY STAR[®] Building Label was still in its early stages as a program at the time.

Notably, however, a significantly larger proportion of our 2002 sample reported that they *would* “recognize the label/rating as a factor affecting value in [their] appraisal,” relative to the 1999 sample (28 responding yes out of 107 total respondents in 2002; 10 of 98 in 1999; X^2 probability = 0.001).

Our informal discussions, including exchanges with participants in our continuing-education seminars, support the finding that appraisers are widely interested in Portfolio Manager, the ENERGY STAR[®] rating for commercial buildings, and the CBECS Web Gadget. Our earlier research also provides corroboration: the October 1999 survey indicated that appraisers would welcome enhanced database information on energy costs and energy-related features in buildings, significantly more so than any other energy-related tool or training listed.

Opportunities for Expansion of Appraisal-Related Benchmarking Applications

Given the signs of demand among appraisers for energy-related benchmarking tools, we believe that continued promotion of the CBECS Web Gadget and Portfolio Manager could steadily increase appraisers’ recognition and use of these tools. Especially with Portfolio Manager and the ENERGY STAR Building Label, promotion among appraisers could work in synergy with promotion among building owners. Thus, as ENERGY STAR becomes more and more widely known among owners, appraisers will be poised to recognize the label and the Statement of Energy Performance, magnifying value to owners and helping stimulate further program expansion.

At the same time, certain features inherent to CBECS and Portfolio Manager limit the usefulness of these tools to appraisers. The major limitation is geographic resolution; while the Web Gadget defines a mere four regional categories for the whole United States, and Portfolio Manager sorts CBECS data into any of nine regional categories, most appraisers expect to be able to get comps for buildings within the immediate vicinity — in the same city or part of a city, or in a small radius encompassing several towns. Indeed, so great is the priority of geographic specificity that many appraisers are likely to prefer to rely on their own intuition or experience about local energy cost levels, instead of using CBECS data. It is uncertain whether it would be practical to add geographic resolution to CBECS and Portfolio Manager to address this issue, but if desired, it seems possible at least in theory to do so, by changing location fields in future versions of CBECS itself, or by merging CBECS with other datasets, or by applying logical criteria to individual database entries to pinpoint their likely specific location.

Both the ENERGY STAR Statement of Energy Performance and the output from the CBECS Web Gadget prominently feature the key figures desired by appraisers for cash-flow calculations: total energy costs, and energy costs per square foot of floor area. We believe that this will be enough for most appraisers. But it may also be useful — not only for appraisers but also for brokers, tenants, and prospective buyers — to show what assumptions for energy prices and weather conditions underlie the energy-cost figures. It would be more useful still (and technically rather straightforward) to generate graphs or tables showing how calculated energy costs vary as a result of changing inputs for energy prices and weather. In printed versions, an

extra page or two would likely be needed, but we believe that the value of the extra information would quite possibly compensate for the sacrifice of compactness and brevity.

Enhanced Databases

Given the limitations of CBECS and the uncertain practicality of enhancing its geographic resolution, it may be useful to envision how one might assemble wholly new databases for benchmarking use. In one idealized scenario, regional databases for energy-related benchmarking would draw upon utility billing records, aggregated and purged of ratepayer names and addresses in order to protect confidentiality. We imagine that a user might gain access to this information via an online query tool, submitting an address and obtaining aggregated, normalized data for similar nearby properties.

A separate alternative might involve new reporting systems by which energy-cost information gathered in appraisals or otherwise reported in commercial real-estate transactions could be routinely entered into a central database, possibly by appraisers themselves; the collected data could then be stripped of specific identifying information, aggregated, and used to generate comps via online queries with user-specified categories.

The first step toward creation of more useful energy-related databases would be further research, including discussions with utility representatives, database operators, registrars of deeds and mortgages, as well as appraisers, brokers, and bankers. This research would identify the most promising technical opportunities, clarify legal requirements and constraints, and determine the extent to which public support would be required to bring the databases to market.

Design-based energy-performance benchmarking and rating systems

During its NYSERDA-sponsored work, IMT has steered clear of making any methodological commentary on the ENERGY STAR benchmarking approach, which involves the normalization of energy bills and comparison to the CBECS database, but does not directly consider the design or materials of the building. At the same time, IMT has actively promoted the notion that design-based assessment methods also may be used as a basis for benchmarking buildings (for example, by calculating and/or measuring by what percent a building exceeds performance-based code requirements).

There are many easy-to-use design-based energy simulation tools in the marketplace, reflecting highly advanced building science, including VisualDOE and several other commercial products and services based on the DOE-2 calculation engine. To date, however, market applications of such tools for benchmarking have been inadequately developed and promoted. We believe that there is a significant opportunity to expand use of design-based benchmarking and rating schemes, especially if leading federal, state, or regional agencies actively promote them, and if benchmarking is linked to the most common existing applications of design-based energy simulations, including code compliance and engineering assessments of proposed upgrades. Existing simulation programs and methods under development (including one under development by the New Buildings Institute) could likely serve as the basis for benchmarking

and rating systems applicable in New York and elsewhere, with relatively little technical modification.

Conclusion and Summary

Energy performance benchmarking and property valuation are a natural match. Surveys and informal contacts confirm that appraisers in the state of New York are strongly interested in “comps” for energy. Despite, this evident interest, however, appraisers are still largely unaware of the most advanced and most widely used benchmarking tools. We believe that further promotion and technical development can further enhance this linkage, increasing the use of existing tools and broadly enhancing their value to building owners. In particular, we note the following findings and observations.

- Appraisers are significantly more willing to recognize the ENERGY STAR[®] building label and rating in 2002 than in 1999.
- Portfolio Manager, the CBECS Web Gadget, and other existing tools that draw on CBECS as the basis for comparison have strong potential appeal among appraisers in several respects, including ease and accessibility of use, the delivery of key financial parameters, and the sheer size and comprehensiveness of CBECS.
- CBECS’ inherent lack of geographic resolution is its most significant drawback to appraisers. Remedying this drawback may be impractical, though it is probably technically possible if deemed a high priority. Addition of sensitivity analyses regarding price and weather assumptions could also enhance the usefulness to appraisers of the CBECS-based tools.
- Beyond existing tools, we see potential for the development of new databases for benchmarking, drawing on utility data or information submitted upon transfer of building ownership. We also believe that existing design-based energy-modeling programs, if modified and promoted, could also win significant recognition and use by appraisers.