



FRIENDS OF BENCHMARKING

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SECOND YEAR WHITE PAPER

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Building Energy Performance Disclosure: So What, and What's Next?

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Key to the Bloomberg Administration's PlaNYC goal of cutting carbon emissions in New York City 30% by 2030 are the Greener, Greater Buildings laws of 2009. Given that building operations create 75% of the City's carbon emissions, and the vast majority of buildings that will be consuming energy and emitting carbon in 2030 have already been built, it is critical that progress be made in improving the energy performance of existing buildings. The Benchmarking Law, one part of the 2009 package, is a necessary first step to achieving the overall plan that will be a multi-year, multi-Mayor undertaking.

Our first "Friends of Benchmarking" White Paper addressed the background and issues involved with Local Law 84 ("LL84"), which requires annual benchmarking and disclosure of energy and water performance of all large buildings in the City. The nearly 20,000 structures in this category represent about 2% of buildings but 50% of the city's floor area. In 2012, most non-residential building data was made public. In 2013, building owners reported their third year of performance, and soon the full set of covered buildings' performance will be posted on-line. Since the current administration will soon turn over reins to new City leaders, it is worth taking stock to see what has been learned to date through energy performance disclosure, and what challenges remain.

How has public understanding evolved to date?

Among building energy efficiency policy wonks (the authors and most "Friends of Benchmarking" included), there was an expectation that the disclosure of the benchmark data would quickly elevate the debate about energy efficiency opportunities and turn attention to the tremendous amount of "low-hanging fruit" with very cost-effective returns. It appears these expectations were over-optimistic, but why is that? First, with typical energy costs of \$3-\$5 per square foot being a small portion of the overall real estate economic equation, during a period of general and sector-specific economic recession, the level of interest and coverage in the general business and real estate trade press has just not been that high. What coverage there has been reflects the general difficulty in understanding and interpreting the data.

Second, some building energy efficiency experts and real estate stakeholders have raised concerns about the accuracy and reliability of the benchmarking data, all self-submitted without any real auditing or fact-checking done by the City. While there are some valid

concerns about “outliers” in the data, for the most part, building submissions have been in the expected ranges. With outliers removed, the data shows what energy professionals have repeatedly seen: that there is a wide range of energy performance among similar buildings. As intended by the benchmarking law, this wide range has drawn attention to the drivers of such difference. But equally, it has raised discussion of what is meant by “similar,” as we will discuss further below.

Third, difficulties in the public’s grasp of the information show up in media coverage. *New York Times* reporter Mireya Navarro focused on the relatively low scores of some of the prominent LEED-labeled buildings that have been featured as architectural success stories, particularly in comparison with older “venerated show horses from the 1930s” like the Chrysler Building and the Empire State Building. Her article <http://www.nytimes.com/2012/12/25/science/earth/new-york-citys-effort-to-track-energy-efficiency-yields-some-surprises.html> also pointed out how variations among tenants can have big impacts on building energy use. But even with this recognition, the implication persists that the higher energy-use intensity (EUI) of newer high-end buildings is a problem of the building rather than of the uses within it. Subsequent stories <http://www.newrepublic.com/article/113942/bank-america-tower-and-leed-ratings-racket> have followed this theme, one which is familiar to energy and environmental design professionals from the long-standing industry debate around the energy performance of LEED buildings. We still do not really understand the balance of numerous performance factors. Finger-pointing at some high profile buildings may make headlines but rarely advances public understanding. The intent of benchmarking and disclosure is to answer the question: “Is this building ‘high performance’?” While the question is simple — and significant — the answers are not.

What are the “right” metrics to measure building performance?

Green advocates want to provide a broad view of buildings’ environmental impacts. The US Green Building Council’s LEED system provides such a multi-dimensional rating tool, in which energy and carbon emissions are one rating element among many. The New York City Greener Greater Buildings Laws were written with a narrower focus on building energy consumption, the associated greenhouse gas emissions from that consumption and water use.

When drafting LL84, the Energy Use Intensity, or “EUI,” became the metric for ranking a building’s performance and comparing it with similar-type buildings, by virtue of using the Energy Star rating system. Realistically, the US EPA’s Energy Star Portfolio Manager rating system is the only widely available and regularly used system for building energy benchmarking and the City was right to choose it. This system had been available, with regular updates, since the late 1990s, and most commercial building owners in New York

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City were at least reasonably familiar with the Portfolio Manager system. Let's look at how it works and what its limitations are.

The Energy Star system normalizes energy performance for many non-residential building types, taking into account such factors as climate, type of occupancy, hours of operation, number of occupants and personal computers, to convert the calculated energy use per square foot per year, or EUI, into a simple, normalized 1 to 100 score where 100 is the best energy performer, and the top quartile nationally are eligible to be recognized as "Energy Star Buildings". While the inner workings of the system may be obscure to the non-specialist, the outcome is clear, a simple score for energy use.

But "building performance" means vastly different things to specific audiences. While energy efficiency practitioners and those concerned with greenhouse gas emissions focus on energy or carbon improvement, other stakeholders perceive "performance" quite differently. In order to communicate across industry groups, and generate broader support for the importance of efficiency, energy efficiency advocates need to be sensitive to and address these other performance perspectives.

For most property investors — who are arguably the single most important decision makers for the sector — "building performance" refers primarily to financial benefits, such as return on investment (ROI). Energy efficiency is only considered to be contributing to building performance insofar as it can be demonstrated to be generating direct financial benefits. This is typically through a higher ROI or lower asset risk.

From an investment performance perspective, the value of an energy-efficient building is as a financial asset and the logical goal is to maximize this value. Although a building only occupied for a few hours each day will consume less energy than a similarly used (e.g., both offices) building that is filled with occupants or customers all day long, to an investor the under-utilized building probably has a lower economic value. In this respect, building performance must balance the level of economic activity with energy performance; a very energy-intensive building may still be considered to be "high performance" if it generates sufficient rent and maintains a low vacancy rate. High-end office buildings with on-site data centers may thus be "high-performing" even though their energy use is high. Research suggests that Energy Star buildings do achieve rent premiums ^[1] but as with all correlational studies, there is room for varying interpretation of this finding.

Taking a building's economic activity into account also reminds us that the EUI is **not** a true measure of Energy **Efficiency**. "Efficiency", strictly speaking, is a measure of output divided by input,

$$\text{Efficiency (\%)} = \text{output} / \text{input} \times 100.$$

EUI represents only energy input. We might assume that some “acceptable level” of heating, cooling, ventilation and lighting are the outputs. If we were only evaluating the HVAC and lighting systems, this might be correct. But a building’s total outputs are actually much more complex, an aggregation of all the activities conducted in the building. Thus, the activities in certain buildings may make them high energy users but not necessarily “inefficient.” This is a line of argument taken, with substantial justification, by high-end commercial office buildings when their rankings are poor against the total population of commercial office buildings.

Some analysts in NYC have begun utilizing the available LL84 data to link building energy performance to the economic activity in a building as a way to further “normalize” the relative activity intensity in office buildings. This work, which will be published later in 2013, links the level of economic activity based on the types of firms and employees working in a building, and then establishes a “Building Economic Energy Coefficient,” quantifying the relative economic contribution of a building per unit of energy consumption. Compared to EUI, this is an output/input ratio, more like a true efficiency.

This said, virtually all informed real estate practitioners agree that building energy performance can be improved in almost all of our buildings. So long as we keep clear what we are measuring, the EUI provides a fine metric for understanding energy reduction “targets”. Using it longitudinally — from year to year — we can use the benchmark to track progress for an individual building and, applied more broadly, to determine whether we are making the desired progress toward PlaNYC goals of 30% reduction.

What can we learn from the metrics we have?

The first year LL84 benchmarking report issued by the Mayor’s Office of Long Term Planning and Sustainability (OLTPS) in August 2012 provides a wealth of detail about the energy performance of buildings in New York City. Information is great to have but is of value only when it becomes “actionable”, able to lead to specific actions. Do the first year’s data do that? We believe the answer is “Yes”.

For example, the detailed first year report showed “tiers” of performers and suggested that by bringing the lowest 25% tier of performers up to the performance level of the highest 25%, the city would save more than 30% of its energy use. The logic of this energy policy is that making improvement in the lowest performing tiers is worth much more than rewarding those in the highest tiers. A building at the 70th percentile could quite conceivably and easily make cost-effective changes to get itself a “75” and earn an Energy Star plaque. In contrast, a building in the 30th percentile probably has too far to go to consider an award without major infrastructural changes. Yet it is precisely these buildings where the greatest opportunities for improvement lie.

For example, IBM, working with the NYC Department of Education and the CUNY Building Performance Lab, created a representation as part of its prototype dashboard for multiple building data-sets that combines the total energy use of a building along with energy intensity. The combination of total energy use and annual rate of usage (EUI) enables us to estimate a site's reduction potential. While it will not always hold true, a building of given characteristics can be hypothetically capable of performing at a rate of use similar to “best in class” performance as set by other buildings in its class. By projecting an improved energy intensity (reduced rate of use) against the total usage, the reduction potential can be estimated.

For each of the over 1,100 school buildings in the system, the size of the circle represents how much energy is used by a school while the color represents its EUI range. A big energy user is a big target; a building with a high EUI might have many opportunities. The combination of these two key characteristics — absolute quantity and rate of energy use — can be captured from benchmarking data and used to (in this case literally) map priority energy reduction targets. (FIGURE 1)

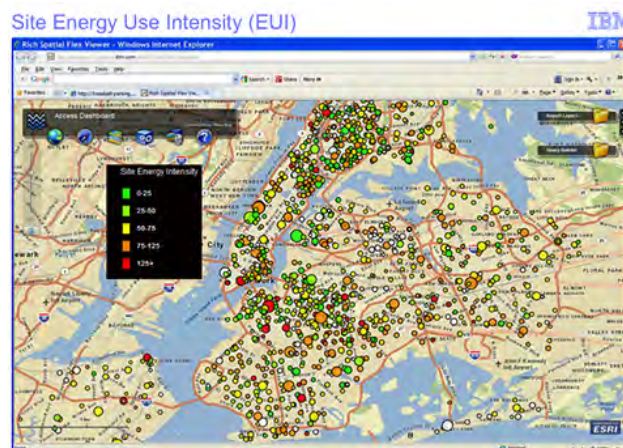


FIGURE 1

For example, a City College student mapped sites that had requested help and shared his data with the Benchmarking Help Center at the CUNY Building Performance Lab. As with the IBM prototype dashboard, he represented absolute use and usage rate. He mapped these sites against census tract income data. For this sample of several hundred buildings, mostly multifamily, he thus identified, buildings that might best be targeted as a matter of public policy for support in improvements. (FIGURE 2)

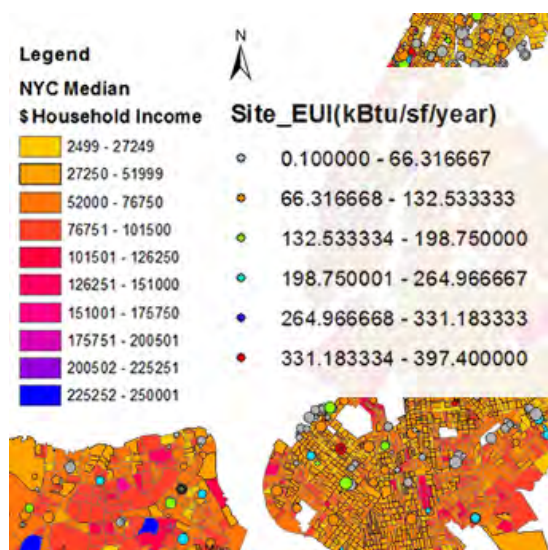


FIGURE 2

These cases suggest that with proper attention, we can use our initial benchmarking data to strategically facilitate and drive improvement measures.

What are next steps for more actionable metrics?

More granular peer grouping. We know that people are strongly motivated by peer comparison. But they can have adverse reactions to comparisons when they feel that the peer grouping is not right. We have witnessed this in the real estate industry and are concerned that it may prove to be a barrier to improved energy efficiency.

As noted earlier, lumping all buildings together, assuming that they should all demonstrate similar energy performance, is likely an over-simplification of real-world facts. Office buildings with substantial data centers or trading floors have very different energy needs than a simple advertising agency or non-profit office where there is not nearly as much electronic equipment in use.

Better “peer” groupings of buildings with similar occupancy and amenity characteristics will allow for a much better understanding of both which buildings are “energy hogs” and what the city-wide energy reduction potential might be. While that refinement was not part of the OLTPS first annual benchmarking report, there is a wealth of data that can be mined from the reporting of individual building energy and water performance, especially if it is linked with other data sources such as age of building, and more importantly, the tenancies and uses in the building. This would provide better information about the use and occupancy of buildings and allow for more accurate comparison and analysis. We urge the incoming City administration to embrace this challenge.

The special case of multifamily buildings. For more than three-quarters of the buildings covered by LL84, primarily multifamily residential buildings, there is not yet any Energy Star score available, so the only “metric” that can be reported and disclosed is the EUI, a simple measure of the total energy consumed in the building in a year divided by the building floor area. This engineering metric, expressed in “kBtu/sf-yr” is meaningless to most practitioners and decision-makers. *There is an urgent need to normalize the relatively meaningless raw EUI numbers into a more useful metric like the 1-100 ranking as the Energy Star system does for commercial buildings.* NYSERDA’s Multifamily Performance Partners program has a benchmark score based on New York State buildings but it is only available to buildings when they have chosen to enter the program. At a minimum, we need to create a simple way to assign different types of multifamily buildings into their own “baskets” of comparables, for which EUI ranges can be established; this would provide the necessary context for what a building’s EUI number means. Helpful interpretive “cheat sheets” would be relatively easy to produce and distribute to building professionals and the public.

Energy Star’s national effort to create a multifamily ranking and score remains mired in complex discussions of the widely varying building stock across the country. But NYC now

has a sufficient database from which to create its own multi-family building ranking system and it should make use of it to move forward, coordinating with NYSERDA to have a single score, continuing with what we understand is under discussion.

This task is particularly important since the initial benchmarking data show a very large range of performance for ostensibly similar multifamily buildings, suggesting real potential for improvement. Moreover, much of the multifamily stock houses lower and lower-middle income populations under rent regulation, constraining the ability to internally finance improvements. Without government support, the greatest part of the opportunities in this sector will not be realized.

Confronting Split Incentives: Could separate landlord vs tenant ratings drive more action?

Building owners have argued that they are being made responsible, and held accountable, for the energy use in their buildings, yet a large portion of that energy use is driven, directly or indirectly, by their tenants. Since owners cannot control that use, they say they should not be responsible for cutting it down. Put another way, with current lease arrangements, tenants may not see rent reduction benefits from energy efficiency gains in their buildings. This mutual lack of control and benefit has led to discussion about the potential for separate landlord -tenant energy ratings.

Separate landlord and tenant ratings exist in Australia, and are being developed in the UK, pushed by the building owner community in London. The system seems to work in Australia, where the building stock is relatively new and homogeneous, and where there is clear understanding of where “landlord services” start and stop, and what tenants are responsible for. This clear demarcation does not exist in New York City or the US, so the issue is much more complicated. Over the long term, moves toward “green leases” may be helpful, but in the near term it is worth exploring other options.

A new “Tenant Star” rating and label has been proposed for the US as part of recent legislation introduced in the House and Senate, which would create a new Tenant Star certification modeled after the broader Energy Star rating, providing an opportunity to certify and recognize tenants that operate energy efficient leased spaces. It is not clear at this point what the chances are for passage of this bill or what the details might stipulate in its final legislative form.

Nevertheless, New York City already has concrete opportunities for better collaboration between landlords and tenants in reducing building energy consumption. The disclosure of some buildings’ high energy consumption through LL84 is already driving more collaboration, and there will likely be additional tools developed in the coming years to increase these efforts.

What's needed to focus attention and raise awareness?

First, it is important to acknowledge that for most real estate practitioners, energy performance is not a top priority. Far less than a majority of stakeholders and consumers are interested in the energy/environmental performance of their buildings, and even fewer are willing or give priority to doing something to improve that performance. It is the function of public policy, in this instance LL 84, to prioritize energy efficiency, which the marketplace might otherwise neglect.

The field of behavioral economics offers other insights into how to make energy efficiency matter. As one architect mentioned at a Friends of Benchmarking meeting, the way to increase attention is to find another very high profile building, like the Empire State Building, which could very cost-effectively improve its Energy Star score from a 40 up to a 75, and earn bragging rights with their peers. Still, we remain doubtful whether that motive will make a difference on an industry-wide scale.

To amplify this “peer bragging” effect, it will be important to have more visually compelling depictions of the data that have been assembled. The City release of a large Excel spreadsheet with all of the data did not invite a closer look from any beyond the most interested. Instead of relying on wonks with a passion for poring over spreadsheets, it must post clear narratives and effective infographics that show the relative performance of different buildings that could go a long way to engaging broader interest. The first Benchmarking Annual Report was a very good beginning, but the City is not obligated to do more than three such publications.

An example of how much information one picture can convey, consider the skyline view shown below, created by an analyst at the environmental design consulting firm Atelier Ten. It shows the Energy Star score, along with the site and source EUIs for various buildings, with color codes of whether they are good or poor performers.



For the future success of this public energy disclosure policy, it will be critical for the new administration to provide adequate funding for staff at the Department of Buildings (DOB) to administer LL84, with periodic quality audits of outliers or other buildings that look wrong.

In addition, it will be important to design and sustain a coordinated information campaign about what the benchmark data means — particularly for multifamily buildings that do not have a 1–100 score. As we have argued, just having the EUI is not enough to inform decision makers. Energy awareness, access to information and educational interpretation campaigns are not, however, only the responsibility of government. Business, professional, academic and advocacy groups all have a vital role to play in establishing the new normal for energy efficiency in the urban built environment.

To Conclude

It is clear that LL84 has already made a deep impact even as it discovers its current limits and challenges ahead. For its full promise to be kept, much work remains. With the coming change of administration, there is a need to keep a high priority on transparency; the LL84 policy will only work if stakeholders consider the data reliable and useful. City resources will be required to monitor and communicate actionable results.

Today, building energy performance reporting and disclosure is becoming more widely recognized as an innovative policy tool to improve building efficiency, yet it is only one part of a comprehensive policy package. Still, it is worth repeating that benchmarking by itself does not improve efficiency; it is a data disclosure law that generates needed information to enable other policies to be effective. Put simply, building energy rating is critical “infrastructure” to enable other policies to take place, and then the effectiveness of the policies monitored.

The international community is now looking closely at building energy rating as a policy tool. The International Partnership for Energy Efficiency Cooperation has recently formed a Building Energy Efficiency Task Group, whose first project is looking into the State of Play around the world on building energy rating schemes. A new World Bank/Global Environment Facility project in China has a major component on urban building energy benchmarking and disclosure. These developments mean that what happens in New York City matters to cities everywhere. What happens here won't stay here and we know it. That's why, as Friends of Benchmarking, we offer this nuanced assessment and proposals for forging ahead.

[i] See for example, Eichholtz, Piet, Nils Kok, and John M. Quigley, 2010. “Doing Well by Doing Good? Green Office Buildings”, *American Economic Review*, 100(5): 2492-2509; IBER Fisher Center for Real Estate and Urban Economics, University of California-Berkeley, Working Paper No. W08-001; Fuerst, Franz and Patrick McAllister, 2010, “What Is the Effect of Eco-Labeling on Office Occupancy Rates in the USA”, University of Reading, Whiteknights, Reading, *Findings in Built and Rural Environments*; Miller, Norm Jay Spivey, and Andrew Florance, 2008, “Does Green Pay Off?” *Journal of Real Estate Portfolio Management*. 14, 4 (October-December): 385-399; CoStar: 2008, “CoStar Study Finds Energy Star, LEED Buildings Outperform Peers”, March 26, <http://www.costar.com/News/Article.aspx?id=D968F1E0DCF73712B03A099E0E99C679>

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