Decoding the Data

Opportunities and Barriers to Bringing Building Energy Performance Data to the Market

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CBEI CONSORTIUM for BUILDING ENERGY INNOVATION

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About IMT: The Institute for Market Transformation (IMT) is a Washington, DC-based nonprofit organization promoting energy efficiency, green building, and environmental protection in the United States and abroad. IMT's work addresses market failures that inhibit investment in energy efficiency and sustainability in the building sector. For more information, visit imt.org.

About Rutgers Center for Green Building: Housed at the Edward J. Bloustein School of Planning and Public Policy at Rutgers University, the Rutgers Center for Green Building promotes green building through research, education and training, and partnerships with industry, government, and not-for-profit agencies. The Center for Green Building provides a common umbrella for initiatives under the Bloustein School, the School of Environmental and Biological Sciences, the School of Engineering, and other Rutgers units that are integral to developing and implementing green building strategies. For more information, visit rcgb.rutgers.edu.

About CBEI: The Consortium for Building Energy Innovation (CBEI) brings together 14 organizations including major research universities, global industrial firms, and national laboratories from across the United States. CBEI is dedicated to creating pathways to 50% energy reduction in existing buildings by 2030. Located at The Navy Yard in Philadelphia, CBEI develops and demonstrates systems solutions in a real-world regional context for future national deployment. For more information, visit http://www.cbei.psu.edu/.

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PROJECT BACKGROUND AND OVERVIEW

Over the past decade, local and national governments globally have begun unlocking vast amounts of data on the energy performance of buildings. More than 30 nations now have laws requiring the assessment and reporting of building energy efficiency. In the United States, more than 6 billion square feet of property is impacted annually by such policies at the state and local levels in major real estate markets including New York City, Chicago, San Francisco, Philadelphia, the District of Columbia, and others.[1] More than a dozen other North American cities are either considering or investigating similar policies.[2]

Most U.S. benchmarking regulations have only been operational for a few years, and it may take many years for trends to demonstrate the achievement of policy goals. At this early stage, policy implementers are interested in identifying the most effective ways to promote the use of

1. U.S. Commercial Building Policy Comparison Matrix (Cities), http://www.buildingrating.org/graphic/us-commercial-building-policy-comparison-matrix-cities

2. IMT is advising many of these jurisdictions on policy design and development.

Figure 1. U.S. Building Benchmarking and Transparency Policies

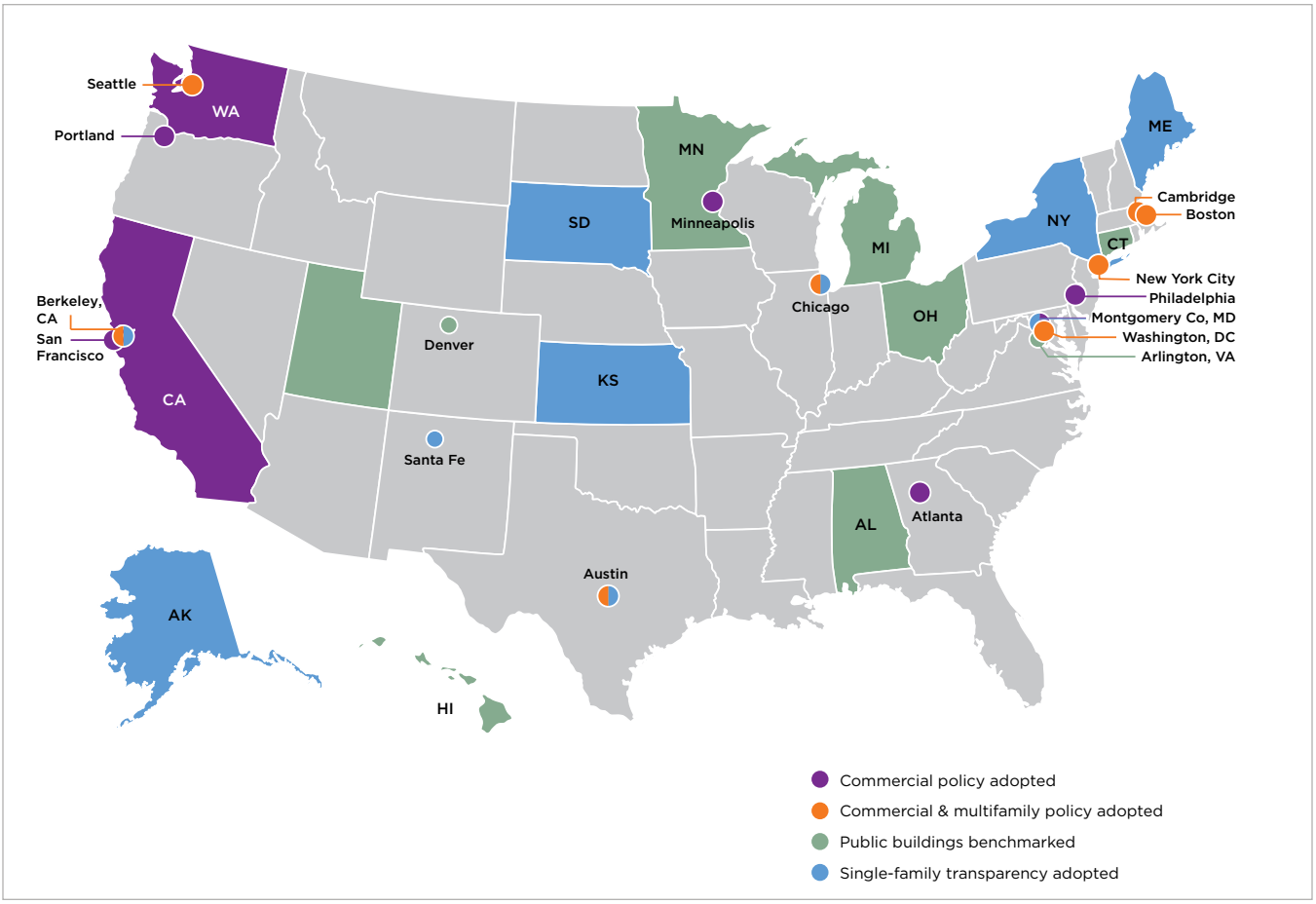
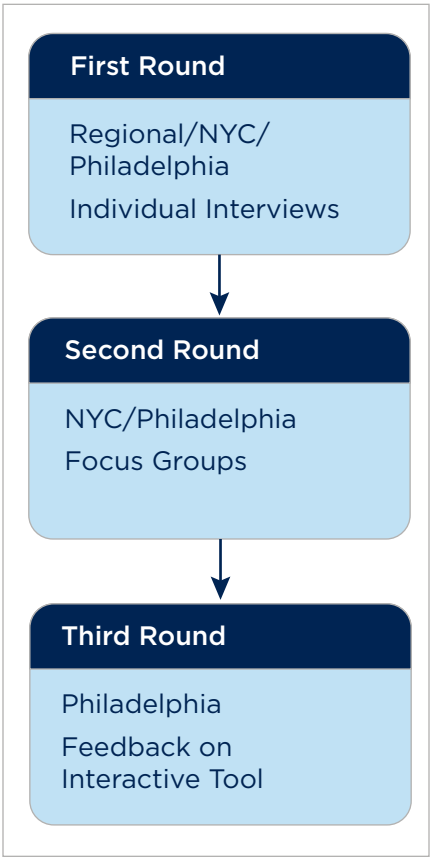


Figure 2. Project Methods and Progression



benchmarking data in order to (a) add relevance to energy data in real estate transactions, and (b) increase investments into energy efficient building retrofits. The relevance, accuracy, availability, and general understanding of the data are crucial to increasing data use by the various actors in real estate transactions.

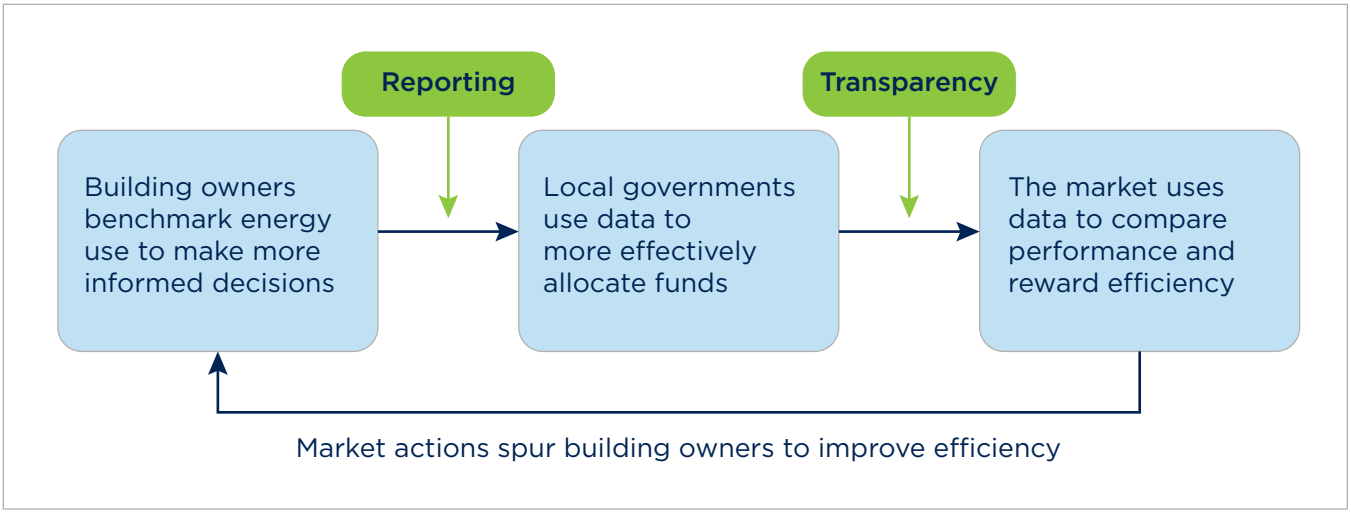
Supported by the U.S. Department of Energy, Rutgers University, the Institute for Market Transformation (IMT), and the Pennsylvania State University Consortium for Building Energy Innovation (CBEI) embarked on a project to understand how publicly available energy performance data might gain greater uptake into real estate transaction and management processes. Between June 2014 and March 2015, representatives of more than 21 organizations operating in the Philadelphia, New York City, regional, and national markets provided feedback on the benefits and usability of public energy benchmarking data. Figure 2 provides a snapshot of the progression and methods for gathering private market stakeholder feedback to improve the usability of energy performance data. The project identified a number of key points for inquiry, opportunities for the use of energy data, barriers to diffusion of these opportunities through the market, and strategies for encouraging greater use of energy data in existing transactions.

This paper illustrates the current use of building energy performance data from the perspectives of a variety of real estate market actors, presents insight into market energy data needs, and offers suggestions for data presentation and communication to increase usability and relevance to a broad range of market interests.

WHAT IS ENERGY BENCHMARKING?

Benchmarking is the process of measuring a building's energy use over time. This data allows owners and occupants to understand their building's energy performance relative to similar buildings and helps to identify opportunities to cut energy waste. At their core, benchmarking and transparency policies consist of three components: 1) annual benchmarking of a building's energy use; 2) reporting that information to a city or state entity; and 3) typically sharing some of that benchmarking information with the public. Similar to miles-per-gallon fuel efficiency ratings on cars and nutrition labels on food, publicly available benchmarking data can allow the market, as well as local governments, to make smarter investment decisions, reward efficiency, and drive wide-spread, continuous improvement.

Figure 3. How Benchmarking Transforms the Market



WHAT ARE THE BARRIERS TO IMPACT OF BENCHMARKING AND TRANSPARENCY POLICIES?

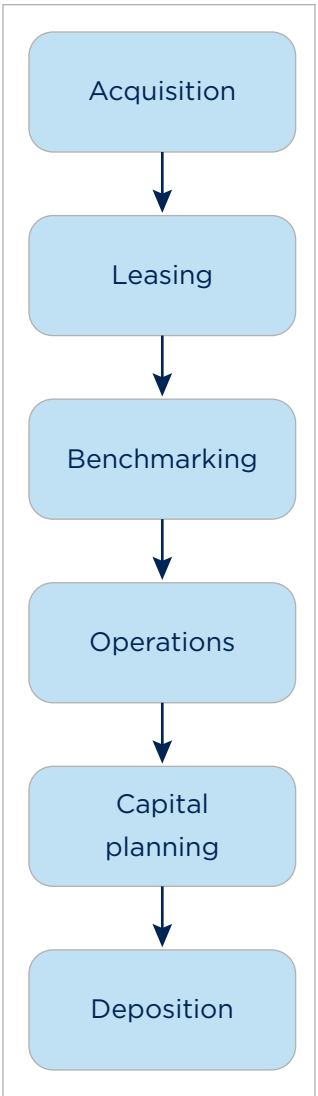
A number of barriers exist that reduce the ability of energy benchmarking and transparency policies to impact real estate markets and achieve energy efficiency goals:

The real estate market is extremely complex. The largest property sectors—commercial, multifamily, and single-family residential—have fundamental differences in investor profiles, financing, tenancy, and market dynamics. The real estate ecosystem consists of a wide array of actors with a variety of roles and motivations, and includes property managers, facilities engineers, tenants, banks, utilities, and energy consultants, all of which may have some degree of influence on energy efficiency investment decisions.

Building energy performance is viewed as less important than other property characteristics. Even when stakeholders feel that energy is important for public relations or as a tool for cost reduction, negotiations on taxes, rent, and other asset characteristics often play a larger role in discussions and negotiations.

Building energy information is not commonly included in commercial real estate information sources. Stakeholders rely on these sources to gather property-level and market-level intelligence that informs buying, leasing, and valuation decisions. However, while large commercial service firms sometimes provide high level statistics or targeted studies related to "sustainable" or "green" market characteristics, this information is seen as supplementary, not fundamental.

Figure 4. Real Estate Transaction Lifecycle



Broker: "As an advisor, [energy information] makes us smarter and more informed."

There are uncertainties about the quality of energy benchmarking data. In order to incorporate benchmarking information into real estate decisions, stakeholders must be confident that the information is accurate. While cities administering benchmarking requirements have some data quality checks in place, many real estate stakeholders feel that these must become more robust.

Many real estate stakeholders know little about benchmarking laws. While building owners are becoming familiar with benchmarking laws (in which owners are typically responsible for compliance), other real estate segments, such as brokers and tenants, appear to have much less familiarity. For policies to have maximum effect, these important stakeholders must become more aware of the availability of benchmarking information and how it can contribute to their objectives, and they must begin asking for it as part of normal real estate inquiries.

REAL ESTATE STAKEHOLDER ROLES AND PERSPECTIVES

Transactions within the real estate market vary greatly depending on market sector and type of transaction in play, as well as the roles, objectives, and motivations of the stakeholders involved. Various stakeholders will therefore have vastly different perspectives on the importance of energy information in those transactions. The following profiles developed from discussions with study participants characterize prominent stakeholder roles and perspectives on energy performance data, and opportunities and barriers to incorporating that information into real estate transactions.

Brokers

Real estate brokers facilitate the exchange of real property between a property owner and a prospective buyer, or between a lessee and lessor.[3] Interview data indicated that:

- Brokers will likely play a critical role in conveying energy performance information into the lexicon of marketable building characteristics.
- Brokers who understand energy performance information can provide context for a potential buyer or lessor and help clients understand how it may impact tenant costs or help meet other sustainability goals.
- Currently, energy data is a very low priority for many brokers.

Occupiers/Tenants

Buildings can be occupied by the owner or by one or more tenants (or lessees) who rent space from the owner. Stakeholders reported that:

3. Miles, M.; Berens, G.; Eppli, M.; & Weiss, M. (2007). *Real Estate Development* (4th ed.) Washington, District of Columbia: by Urban Land Institute

- Energy information has the potential to result in increased demand for high performance buildings from tenants—which would be a powerful market driver.
- Improved energy performance of a building can benefit tenants through lower rental costs or the ability to help meet corporate sustainability goals.
- Tenants' access to energy use data can be limited by the lack of individual sub-meters.
- Occupiers who have access to their own energy data have a greater opportunity to understand their energy use and its potential role in cost control.

Tenant: "We wanted a seat at the table and a choice to make a wise decision to do a payback analysis . . . a breakdown of costs for lighting, HVAC, and plug loads."

Owners

Owners of real estate are a diverse group, ranging from individuals holding one property, to diversified corporations with large portfolios of properties, to institutional investment ownership structures. Ways benchmarking may affect owners include:

- Where benchmarking is required, owners are typically but not always the party legally responsible for reporting.
- Ease of access to energy performance information benefits owners looking to incorporate energy data into operations.
- Institutional investors are increasingly using sustainability metrics to evaluate investment decisions, a finding from interviews as well as from earlier reports.[4]

Building Owner: "Public disclosure can help [motivate action] if your building is close [to certification]."

Property Managers

The property manager typically serves as on-site personnel on behalf of the owner and has responsibilities that range from tenant relationship management to controlling the operating and capital budgets for the property. When asked about their role in energy management, respondents noted:

- Property managers are often responsible for activities related to reporting and complying with energy benchmarking requirements.
- Property managers often have many high-priority responsibilities competing with (and usually out-ranking) energy management. Despite this, they have a primary role in determining a building's energy management practices, and are therefore a crucial target audience for energy performance information.

Property Manager: "[A rating] is a proxy, connotes good management, and shows a building that puts more effort into day-to-day management."

4. Cleavland, Rick and Eric Duchon, *US Inventory Survey: The Ownership View of Sustainable Real Estate* (Cushman & Wakefield, 2013), accessed July 30, 2014 at http://www.cushmanwakefield.com/en/research-andinsight/2013/investor

Utility/Energy Supplier: "[In order to provide whole-building energy data] we need authorization, or we may only provide data on partial building if some tenants don't participate."

Utilities

Utilities can help streamline compliance with benchmarking requirements by providing aggregated, whole-building energy data to building owners. Potential challenges and opportunities include:

- Utilities have not traditionally tracked energy use by building, but by meter or account. As such, the whole-building level of data gathering can be completely novel for a utility, often requiring an update to internal systems.
- Benchmarking can help utilities more effectively target their efficiency programs to those buildings with the greatest potential for improvement.

Energy Services Company: "[Data transparency] can help brokers negotiate for better lease terms and allow tenants to understand what they can negotiate for."

Energy Services Company

Energy Service Providers offer a range of services to building owners and managers, including energy use monitoring, auditing, retro-commissioning and retrofitting, recommendations for design and implementation of energy conservation measures (ECMs), and other performance improvement and reporting services.

- Publicly available energy performance data provides energy service companies with a valuable marketing tool for targeting new customers, especially poor energy performers, who are most likely to have the greatest opportunity for improvement.

Data Conveyer: "We're trying to work with participants to link energy performance and value for office buildings. The further along in the process participants are, the more thoughtful they can be about what the data is telling them."

Data Conveyer: "Trends in each market will depend on how long [the benchmarking and transparency law] has been in effect. Data becomes more dependable with time."

Data Conveyer

Data conveyers are organizations that compile and manage large repositories of information on individual real estate properties.

Comments explained that:

- Information on energy performance, if included at all, comprises only a small number of data fields among the many available in real estate databases.
- Property-specific information related to energy use may include age, square footage, energy use intensity (EUI), type of energy-demand uses in the building, trends over time, patterns of performance, and any certifications or ratings (such as LEED or ENERGY STAR) a building has earned.
- Typically, the information held by data conveyers is available by membership or subscription only.

Real Estate Service Provider

Professional real estate service providers may act as owner, tenant, manager, or energy services provider. Those interviewed reported:

- There is significant overlap between the roles of different building stakeholders and how they use energy data.
- Professional service providers may operate at the local, regional, or national level.
- The multi-faceted nature of the real estate service provider role allows their work with energy data to be particularly influential. Internally, it can help to guide corporate policy and operations. Externally, visible compliance with benchmarking requirements and use of energy data to meet corporate responsibility and energy performance objectives can influence the larger market.

Real Estate Service Provider: "I see more and more tenants interested in energy. Young start-ups will be interested, but do they know what they are asking?"

Real Estate Service Provider: "When information becomes public, there will be a buzz."

OVERVIEW OF FINDINGS

Real estate market actors are paying increasing attention to energy data. Such information is seen as useful in narrowing the scope of buildings for consideration in a site search or portfolio acquisition and for providing a high-level indicator of asset quality. However, building energy performance is only one of many characteristics that stakeholders may consider during a real estate transaction, and even when energy data is considered, decisions are ultimately made based on traditional real estate transaction and leasing fundamentals, not energy information. The following findings provide an overview of current perceptions of energy performance information, and opportunities for improving dissemination and communication to the market:

Institutional Investor/Owner: "The measure can be very helpful to those that are just starting to focus on energy in their portfolio."

Building energy performance data is beginning to permeate real estate transactions at a high level.

- The availability of property-level energy data is increasing awareness and broadening conversations about energy performance in buildings among those new to building energy benchmarking.
- Market actors perceive energy-related certifications and ratings as indicators of effective management, smart building investments, and lower-risk properties.
- The availability of independent, publicly available benchmarking data allows transaction participants to access energy performance data before entering into negotiations, and to validate information provided by owners and owners' representatives (i.e. property managers, brokers, etc.) during a negotiation.
- Publicly available data can help facilitate comparisons of energy performance between individual buildings at the local level.

Broker: "ENERGY STAR helps me understand the quality of management. [It can indicate that] they are knowledgeable, the building is clean, and basic services are provided."

Real Estate Service Provider: "The information gives people talking points. If I am challenged [on my information], I can address it."

Building owner: "Is there something that could be a proxy for cost savings? It would be one more piece of context that would give the perception the data is valid and vetted by a government organization."

Property manager: "When brokers are presenting wrong information, [you need] a quantifiable tool that takes all of the guess work into consideration."

Energy Services Company: "Most people won't use the data, but they will look at reports."

Institutional Investor/ Owner: "ENERGY STAR data serves as a good high-level and well-recognized level of efficiency across a real estate portfolio."

Institutional Investor/Owner: "It's hard to compete in the market in New York without having LEED or ENERGY STAR scoring. Tenants have [corporate social responsibility] policies to adhere to, and given the number of headquarters located in New York, it is important for them to be able to demonstrate their commitment to those policies."

- Required audit provisions add another layer of energy performance information and opportunity. In New York City, several real estate sector representatives were eager for the release of information from the audit reports, which are anticipated to provide additional insight into existing efficiency opportunities, as well as validation of benchmarking data.

More effective communication of benchmarking data to the market will involve improved data quality, more contextual information, and additional metrics.

- Additional checks and quality assurance would improve the perceived validity of benchmarking data.
- The addition of contextual information, including space types, building class, and submarket information, can add value to energy performance numbers.
- Additional metrics, especially cost per square foot, would increase the relevance of energy performance information—though this information is generally considered to be private.
- Prepared analyses and reports, such as those published by New York, Philadelphia, and Chicago, are typically seen as more useful than access to spreadsheets of raw data.

There are a growing number of reasons why real estate stakeholders are paying more attention to building performance information.

- Institutional investors are developing increased capacity and demand for understanding and evaluating energy data.
- Benchmarking and tracking of energy performance are becoming common practice for corporate responsibility reporting requirements.
- Incentives and access to energy efficiency financing often require verification of improvement before and after benchmarking.
- LEED and ENERGY STAR certification are perceived as indicative of asset and management quality for potential purchasers and lessors.
- Failure to meet reporting obligations can be detrimental to timely closing of transactions.

RECOMMENDATIONS FOR INCREASING MARKET USE OF BUILDING PERFORMANCE INFORMATION

Provide information, not just data. Across stakeholder groups, most respondents suggested that data alone, with no context or analysis, provided little value or incentive to enhance the use of the energy information. In those cases where the data was used to tell a story (e.g. New York City's Annual Local Law 84 Benchmarking Reports[5], Philadelphia Benchmarking Visualization Tool[6]), stakeholders found the information to be more understandable and usable.

5. http://www.nyc.gov/html/gbee/html/plan/ll84_scores.shtml

6. http://visualization.phillybuildingbenchmarking.com

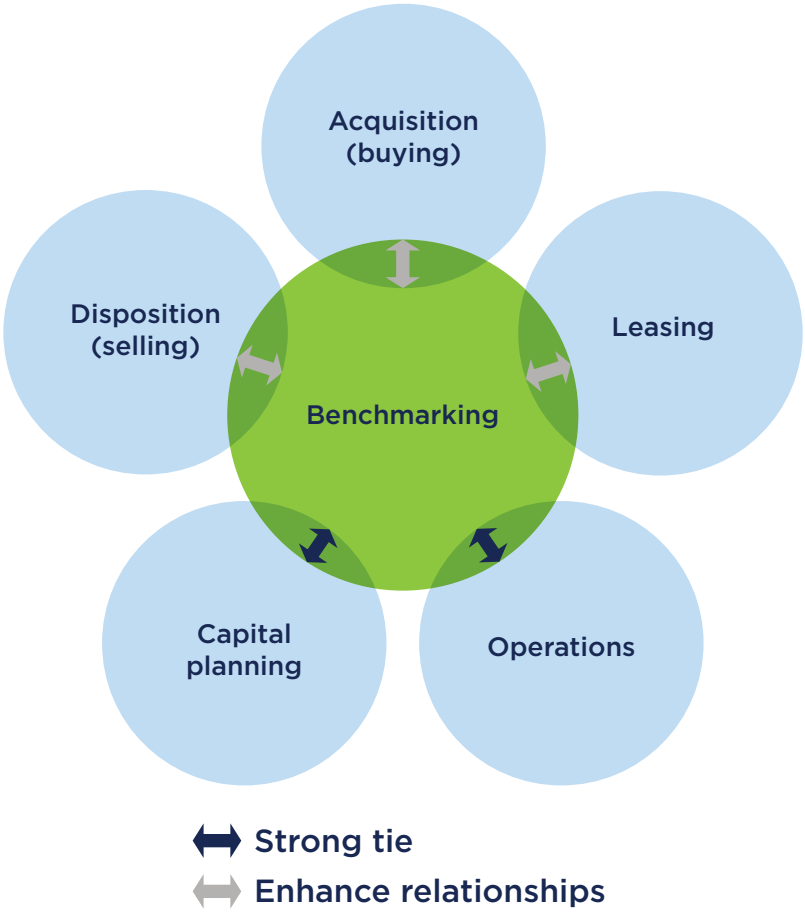
Figure 5. Opportunities for Enhancing the Relationship Between Real Estate Lifecycle Transactions and Energy Benchmarking

Acquisition: "[We are] trying to build energy benchmarking into the acquisition process." —Institutional Investor/Owner

Leasing: "When leases come due is the prime opportunity to have the conversation about energy efficiency." —Owner/Manager

Benchmarking: "We are always looking for targets against which we can measure our portfolio. We want to be able to meet or beat the national median". —Institutional Investor/Owner

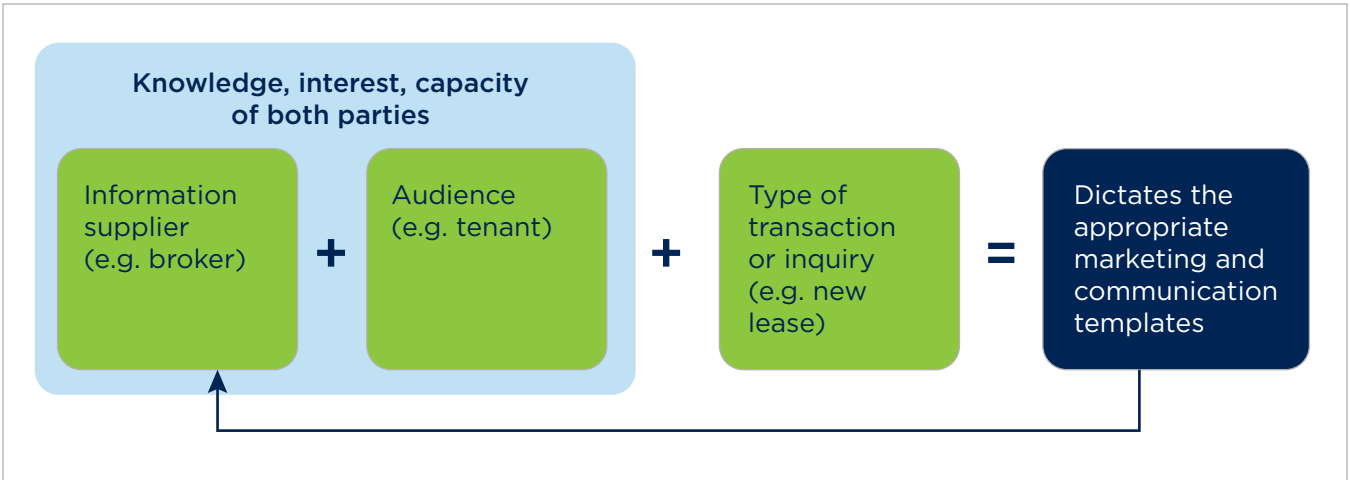
Operations: "How much are we spending is on utility bills, where we can achieve the greatest savings in kWh, and what equipment could we be buying?" —Tenant



Capital Planning: "EUI is a critical part of our capital planning process and we use it for prioritization." —Institutional Investor/Owner

Disposition: "All ENERGY STAR information is conveyed to the new owners when the property is sold." —Institutional Investor/Owner

Figure 6. Characteristics to Consider when Determining Communication Strategies for Energy Data



Building Owner: "A local perspective is needed, but I would hate to see every city adopt a totally different tool."

Energy performance data must relate and be comparable to other types of data used in transaction decisions.

- Include common data fields across markets. Submarket geography, property class, building use, energy cost estimates, and other amenities are used to determine "comparable" buildings for each transaction.
- Local markets may have different priorities and parameters for peer comparisons relevant to transactions.
- Accommodating these different needs requires capabilities for tools and visualization that go beyond that which are currently available in most energy benchmarking initiatives.
- Self-selection of properties for direct peer comparison is an important function.

Recognize the different needs and capabilities of stakeholders.
There is no one-size-fits-all approach to the use and presentation of energy performance data. Templates provided in the appendix are intended to provide examples of how energy information might be fashioned to be more easily integrated into real estate transaction decision making. To encourage broader use of energy data and overcome complexity, communication strategies should take into account:

- Who the information creators and information consumers are;
- The context specific use of the information; and
- The range of capabilities of each stakeholder involved.

SUMMARY AND CONCLUSIONS

The intent of this project was to elicit perceptions of the impact of publicly available building performance information on the market from a variety of real estate stakeholders. The goal was to determine whether and how this information is currently being used, what barriers exist to its further use, and what can be done to help foster greater uptake and impact of this information in real estate transactions. This project found that the development of an effective strategy for getting information into the market (and useful tools and templates to do so) requires an understanding of the parties involved, their level of experience with energy information, and appropriate timing of the communication.

There are 13 cities, one county, and two states (as of April 30, 2015) in the U.S. that have enacted benchmarking and transparency requirements. These localities share many of the same goals: increased energy efficiency and health of their building stock, less waste and fewer dollars leaving their jurisdictions to pay for energy, and better air quality and health for their citizens. For these cities, benchmarking and transparency requirements were a crucial first step on the road to enabling the market to better value high-performing buildings. This project briefing aims to help guide the next step toward that goal, by beginning to map out how to get the resulting information into the market. As these policies continue to mature, so will these strategies.

APPENDIX A: PROPERTY TEMPLATE

Property Template

Property | Year

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Summary
This section summarizes the critical amenities and information the owner or broker wishes to provide to a prospective tenant.

Building Amenities and Operations
Describes the equipment and operations policies that are used for sustainable investment and operations. Should include:

- Fixtures and Equipment
- Operations policies
- Participation in special programs or incentives

Discussion of results may follow after, using the figures herein as references for improvement related to the performance of the market as a whole.

Scheduled Improvements
Provides information on future development of energy efficiency measures. Should include:

- Fixtures and Equipment
- Operations policies
- Participation in special programs or incentives

Terminology
Energy Use Intensity (EUI): expressed as energy per square foot per year. It's calculated by dividing the total energy consumed by the building in one year (measured in kBtu or GJ) by the total gross floor area of the building.
Energy Star Score: A 1-100 score for energy performance. A score of 50 represents median energy performance, while a score of 75 or better indicates your building is a top performer — and may be eligible for ENERGY STAR certification. See more here: (LINK)
Rentable Square Feet: Floorspace that may be rented to tenants, generally excluding common areas and space devoted to HVAC and other equipment.

3+ Year Consumption

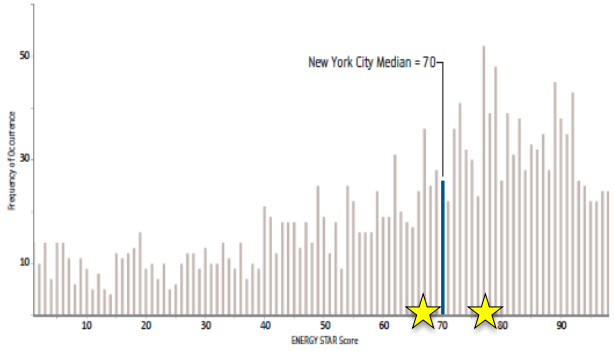
- **Electricity**
- **Fuels**

Energy $/RSF Trend

Energy Use Intensity Trend

Energy Star Score

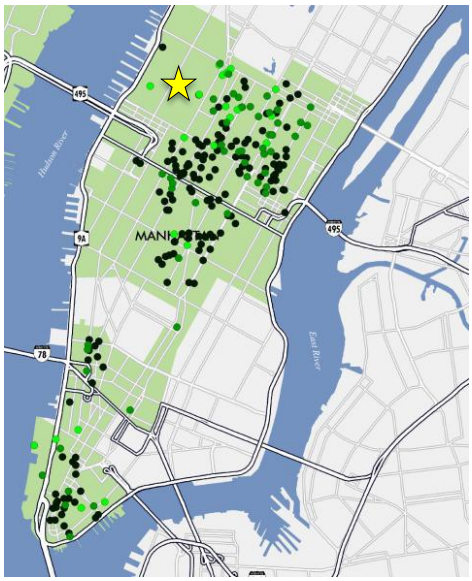
Class–Type (Metro / Neighborhood / Zip)



Source: NYU and NYC Mayor's Office

Comparable Properties

Class–Type (Metro / Neighborhood / Zip)



Note: This original sample template draws on charts, tables, images, and information developed by the CBRE National Green Building Adoption Index (2014) and OLTPS New York City Local Law 84 Benchmarking Report (2014). The information is presented for discussion purposes only.

APPENDIX B: ENERGY MARKET SUMMARY TEMPLATE

Energy Market Summary

Municipality | Year

RUTGERS Center for GREENBUILDING

Headline: Annual Statement of Market Performance

Summary
This section summarized the conditions of the market.

Market conditions
Describes the critical events and statistics from the market the year prior to determine the state of the market and performance. Should include:

- Regulatory Update
- Asset highlights
- Changes in labels and certifications
- Improvement in overall EUI
- Analysis of anomalies including the potential increases in data centers or other characteristics of the market that may be driving performance
- Should provide a summary of climate indicators or other critical external measures for reference in the region (e.g. weather)
- Speaks in terms of real estate sub-markets

Outlook
Provides information on future development of energy efficiency measures within the reporting area and discusses their implications for tenants seeking space in the market.

- Neighborhoods with concentrations of new product
- Improvements in energy efficiency within assets or in certain neighborhoods
- For Occupiers
- For Owners

# of Buildings
Rentable Square Feet

# of Buildings
Rentable Square Feet
Median Score
Median EUI

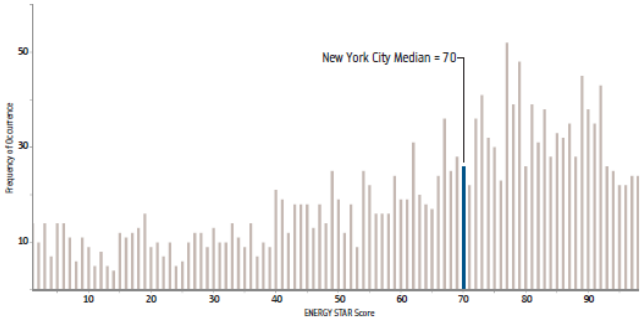
3+ Year Consumption

- **Electricity**
- **Fuels**

Energy $/RSF Trend
Energy Use Intensity Trend

Energy Star Score
Class–Type (Metro / Neighborhood / Zip)

[Fig. 17] New York City Benchmarked Buildings Median ENERGY STAR Score



Source: NYU and NYC Mayor's Office

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1

Energy Market Summary

Municipality | Year

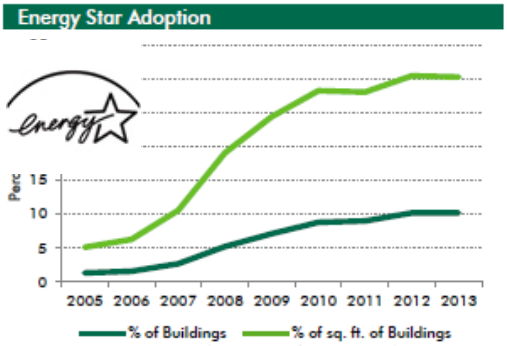
RUTGERS Center for GREENBUILDING

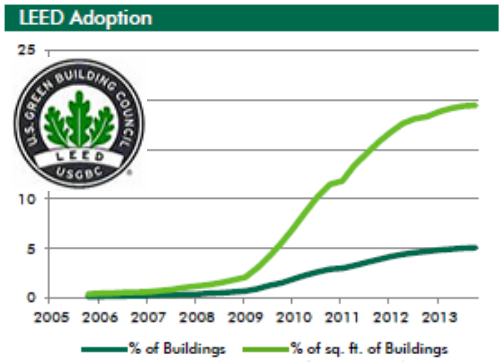
Market Highlights and Trends

Notable Market Events

Describes the individual market events below and the initiatives the contributed to their attainment. Events might include:

- New Buildings
- Retrofits
- Utilization of rebates and incentives
- Etc.





Notable Market Events							
Building	**Submarket**	**SF**	**Space Types**	**Change in Energy Star Score**	**Change in EUI**	**LEED Certification Achieved**	**Initiatives leading to improvement**
A	Downtown	69,420					
B	Midtown East	60,000					
C	Midtown West	45,078					
D	Midtown West	41,524					
E	Midtown West	29,000					

2

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