GREENOVATE BOSTON

Benchmarking and Disclosure:

Lessons from Leading Cities

BOSTON Green Ribbon COMMISSION

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I. EXECUTIVE SUMMARY

The 2010 Boston Climate Action Plan committed the City of Boston to implementing a building energy benchmarking and disclosure policy. A number of large cities across the United States are currently implementing these innovative, market transforming programs including: New York City, Seattle, San Francisco, Austin and Washington, D.C. Under these initiatives, building owners submit energy performance data about their properties to local governments on an annual basis. For many benchmarking and disclosure programs, municipalities will publicly disclose the energy performance of all reporting properties on a public website. The intent of these initiatives is to create market transparency that drives building owners to improve the energy performance of their properties. Many studies have shown that buildings with above average energy performance have higher occupancy, command higher rents and are sold at a premium when compared to properties with poor energy performance.

The following report summarizes lessons learned from a number of the first U.S. cities to implement benchmarking and disclosure programs. Many of these cities have had common experiences implementing policies and the lessons learned from these early adopters may prove valuable to Boston's commercial real estate community and city policy makers as Boston explores its own benchmarking policy. Key findings of from the report include:

- Energy Star Portfolio Manager is the industry standard benchmarking tool and has been the basis for all city benchmarking programs;
- Significant and sustained outreach and education of property owners is key to ensuring that reporting deadlines are met ;
- Partnerships with leading business and trade associations are a critical part of any benchmarking policy;
- Easily accessible utility data is a necessary component for any benchmarking policy and early engagement with utility partners is a key factor to program success;
- Program implementation requires dedicated staff and significant resources;
- Building size thresholds should be carefully considered as many smaller building owners may not have the resources to comply with city reporting requirements.

Representatives from a number of cities, as well as the federal government, were interviewed for this report. In general, city officials found that the real estate communities in their jurisdictions were eager to be actively engaged in both the policy development process and in supporting the implementation of these programs. Additionally, these city representatives stressed the importance of working with the local real estate community to develop the regulatory framework for any building benchmarking policy. The Boston Green Ribbon Commission represents some of the largest property owners, building mangers and tenants in the City and has been actively engaged in support of the Mayor Menino's climate action plan. This group is ready to support the city in its future efforts to design and implement a nation-leading building benchmarking initiative.

II. INTRODUCTION

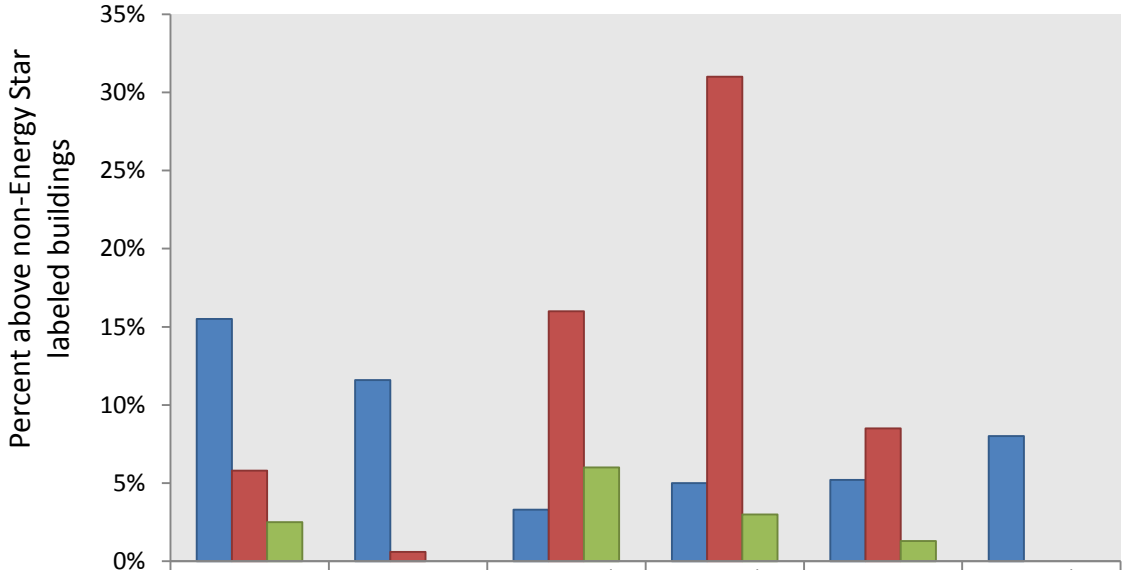
The 2010 Boston Climate Action Plan detailed a roadmap of policies and programs that, when implemented, will reduce Boston's community greenhouse gas emissions 25 percent by 2020. As Table 1 illustrates, the action plan recommends a range of mitigation activities for each of the City's major sectors, from home retrofits and energy conservation ordinances, to updated building codes and bike share initiatives. One of the major recommended policies that will directly impact the City's commercial real estate sector is a building energy benchmarking and disclosure program. Specifically, the Climate Action Plan recommended that the city, "[b]ase labeling requirements on Energy Star Portfolio Manager or another nationally used standard, require bi-annual updating of ratings, require that tenants make utility data available to building owners, and work with utilities to enable automatic transfer of energy data to the rating tool."

Table 1 Boston Climate Action Plan mitigation strategies

Sector	Strategy	Annual Tons of CO_2 Mitigated in 2020
Buildings	Renewable Portfolio Standard	246,000
Buildings	Utility Energy Efficiency Programs (Electric)	522,000
Buildings	Utility Energy Efficiency Programs (Gas)	151,500
Buildings	Building Codes	40,100
Buildings	Appliance Standards	109,400
Buildings	Stretch Building Code	20,100
Buildings	**Benchmarking and Labeling**	**46,700**
Buildings	Energy Efficiency Retrofit Ordinances	140,100
Buildings	Oil Heat Efficiency Program	65,00
Buildings	Cool Roofs	8,100
Buildings	LCFS For Heating Fuels	41,300
Buildings	Behavior Change (buildings)	67,200
Transportation	Federal CAFE Standard	294,100
Transportation	Low-Carbon Fuel Standard (gasoline)	81,500
Transportation	Low Carbon Fuel Standard (diesel)	17,400
Transportation	Vehicle Mile Traveled Reduction Strategies	162,300
Transportation	Anti-Idling	3,500
Transportation	Behavior Change (transportation)	92,00
Waste	Residential Solid Waste Reduction	15,500
Waste	Commercial Solid Waste Reduction	42,500

Several major U.S. cities are currently implementing building benchmarking and disclosure policies including: New York, Washington, D.C., Seattle, San Francisco, and Austin Texas. Additionally, it has been reported that similar programs are currently under consideration in Philadelphia and Chicago. Under these initiatives, building owners are required to submit information about the energy performance of their properties to state or local governments. For the majority of these programs, building energy benchmarking scores are published online. The intent of benchmarking and disclosure initiatives is to ensure that real estate market participants, from building owners and managers, to tenants and design professionals, are fully informed about the energy performance of commercial buildings. A number of

market studies have shown that buildings with above average energy performance have higher occupancy rates, command higher rents and sell at a premium when compared to similar buildings. Figure 1 below summarizes the results of several statistical studies evaluating the market value of high efficiency commercial buildings. Building energy benchmarking and disclosure policies leverage this effect to drive energy efficiency investment by creating market transparency that rewards building owners with better performing properties.



	CoStar Group/USD	CBRE/USD	Eichholtz / Kok / Quigley	Fuerst / McCallister	Pivo/Fisher	Wiley / Johnson
Rental Rate Premium	16%	12%	3%	5%	5%	8%
Sale Price Premium	6%	1%	16%	31%	9%	0%
Occupancy Premium	3%	0%	6%	3%	1%	0%

Figure 1 Studies evaluating the added market value of Energy Star labeled buildings.[1]

This report is an effort to develop lessons learned informed by the implementation of benchmarking and disclosure policies in other U.S. cities. It was developed with the intent of informing the development of future regulations in the City of Boston. Representatives from the U.S. Environmental Protection Agency (U.S. EPA), the U.S. Department of Energy (U.S. DOE), and the Institute for Market Transformation (IMT) were interviewed along with city staff from D.C., New York, Seattle and San Francisco. Section II of this report describes many of the on-the-ground lessons learned from program implementation in these cities. The final section of this report provides an in-depth description of several city benchmarking and disclosure programs. This report is not intended to provide a comprehensive review of the theory and practice of building benchmarking and disclosure policies. Readers seeking an extensive treatment of the topic should consult *Building Energy Transparency: a Framework for Implementing U.S. Commercial Building Rating & Disclosure Policy* published by the IMT.

[1] Adapted from the Institute for Market Transformation: http://www.imt.org/files/FileUpload/files/Added%20Value%20of%20Greener%20Buildings%20-%20Combined.pdf

III. LESSONS LEARNED

This section details a number of common themes and lessons learned from cities currently implementing building benchmarking and disclosure programs. These lessons learned are structured around three thematic areas: data access, reporting and management; outreach and stakeholder engagement; and program design and management.

A. Program Design and Management Considerations

City staff reported several lessons learned related to policy design and program management. These are discussed briefly below.

Compliance Size Threshold

Cities interviewed for this report have different compliance size thresholds, with some requiring all buildings 10,000 square feet and above to report energy ratings, while others have set a 50,000 square foot threshold. Interviewees suggested that a threshold as low as 10,000 square feet significantly increases program complexity, as building owners in this size class are less familiar with energy performance benchmarking. Additionally, the number of buildings needing to comply with the policy increases significantly as the threshold is lowered.[2] One interviewee mentioned that some owners of smaller buildings have reported that they do not have access to email or the internet, resulting in significant compliance challenges.[3]

Program Management Costs and Ongoing Support

According to interviewees, implementation of benchmarking and disclosure policies requires a minimum of one full-time employee to manage initial implementation and provide ongoing program support. Depending on the number of buildings affected by the policy, more full-time staff support may be necessary.[4]

To date, many cities have used foundation support to staff their programs and provide resources for outreach and other program cost. The Institute for Market Innovation (IMT) and the Kresge Foundation have provided significant support to cities implementing benchmarking initiatives. Several cities interviewed commented that future funding was an open question and that efforts to identify new resources were ongoing. One interviewee estimated that full cost of implementing its benchmarking and disclosure program totaled $500,000.[5] Another city representative suggested that non-compliance fines were a potential source for ongoing program support, but that this was viewed as a non-ideal funding source, as the goal of the program was to have all buildings in compliance.

Initiative Roll-out Timing

Interviewees stressed the importance of ensuring that regulatory timelines provide enough time to educate building owners about their compliance obligations. Additionally, several of the cities interviewed have implemented their programs such that information reported for the first

[2] A review of the Boston Assessor's Database shows 1,060 commercial or industrial buildings larger than 50,000 square feet, while there are 3,373 buildings larger than 10,000 square feet.

[3] Portfolio Manager has a number of building size and occupancy limits that may limit the tool's applicability for buildings below 5,000 square feet or buildings with limited usage. A complete list of Portfolio Manager minimum thresholds can be found at:
http://www.energystar.gov/ia/business/evaluate_performance/OperatingCharacteristics.pdf?1bdc-6321

[4] New York City, with 16,000 buildings reporting, has had up to three full-time employees staffing its program.

[5] This included only city costs such as staff time, IT support and marketing, but did not include building owner's costs to comply with the program.

benchmarking deadline is not immediately made public. This gives building owners an opportunity to improve the energy performance of their buildings before the second, public, benchmarking deadline.

Some cities have also chosen to phase in their programs based on building sizes. Under this strategy, the largest buildings are required to report first, with small buildings meeting later compliance deadlines. In theory, many large building owners are familiar with Portfolio Manager and already likely to be using the tool. This strategy gives small building owners a better opportunity to become fully informed about their obligations, leading to better reporting compliance rates.

Compliance and Enforcement

Regulations for each of the cities reviewed for this report include non-compliance fines. In Seattle, non-compliant buildings owners may be subject to a $500 per day fine, while in San Francisco and Washington, fines are set at a maximum of $100 per day. New York's enforcement mechanism includes a fine of up to $500 per calendar quarter. One interviewee noted that a review of first-year compliance rates showed that certain market sub-sectors had significantly higher non-compliance rates than others.[6]

B. Data Access, Reporting and Management

U.S. Environmental Protection Agency Portfolio Manager

All of the cities surveyed for this report used the U.S. EPA's Portfolio Manager energy benchmarking tool as the foundation for developing building performance ratings. This free, online software tool has been available from the federal government for nearly a decade and has been adopted as the industry standard for energy performance benchmarking by the commercial real estate community.[7] Portfolio Manager takes user-provided information about annual building energy consumption, occupancy, square footage and other factors to develop a 1-to-100 building energy performance score. Scores are based on a national database of similar building types.[8] Building scores are normalized for several factors, including occupancy and weather, allowing for year-over-year performance comparisons. U.S. EPA provides free training webinars and has developed a robust support infrastructure for Portfolio Manager. U.S. EPA also provides direct, no-cost technical support to municipalities using Portfolio Manager for their benchmarking programs. Portfolio Manager is scheduled to undergo a major upgrade in the spring of 2013, and U.S. EPA intends to improve the user experience by creating a "Turbo-tax like" interface which guides users through the benchmarking process.

The Portfolio Manager tool is designed to allow building owners to share selected data fields about their properties with municipal governments or other third party entities. Cities interviewed as part of this report have implemented their initiatives by creating city-specific reports that building owners auto-

[6] Non-profits and industrial properties were reported to have lower than average compliance rates, suggesting that more outreach to these building classes could be critical.

[7] A recent survey more than 20 Class A Office towers in Boston by Waypoint Building Group found that all used EPA's Portfolio Manager software to benchmark the energy performance of their buildings.

[8] Portfolio Manager currently awards 1-100 scores for the following building types: bank/financial institution, courthouses, data centers, hospital (general medical and surgical), hotels, house of worship, K–12 schools, medical offices, municipal water treatment plants, office buildings, residences halls/dormitories, retail stores, senior care facilities, supermarkets, warehouses (refrigerated and non-refrigerated).The program intends to release a performance score for multi-family buildings in the near term.

populate with information from their Portfolio Manager building accounts.[9] This streamlining feature significantly reduces reporting complexity and data management.

Utility Data Aggregation

Each of the stakeholders interviewed for this report stressed the importance of having utilities provide aggregated building energy consumption data to property owners for upload into Portfolio Manager. In many multi-tenant buildings, where tenants are individually metered by the utility, owners may not have access to tenant energy consumption data. This has presented a significant compliance barrier for commercial building owners in cities with benchmarking and disclosure policies. In New York, both Consolidated Edison and National Grid, the local regulated electric and gas utilities, provide property owners with building-level energy consumption data, significantly streamlining the compliance process.[10] These utilities have an approved regulatory tariff to provide this data aggregation service when requested by building owners.[11] Stakeholders reported compliance with the New York City law improved dramatically after Con Edison and National Grid began offering this service.[12] Similarly, utilities in Seattle and San Francisco offer automated benchmarking services through Portfolio Manager that allow building owners to streamline whole-building data access. Additionally, several stakeholders suggested that any city benchmarking ordinance should not include multi-family buildings unless local utilities have agreed to provide building-level energy consumption data as data collection in multi-family buildings is prohibitively difficult.

U.S. Department of Energy SEED Platform

Data management requirements can be a challenge for city governments with benchmarking and disclosure programs. In order to lower program implementation IT costs, the U.S. Department of Energy (U.S. DOE) has developed a common no-cost database platform that is being adopted by many of the cities interviewed for this report. The Standard Energy Efficiency Data Platform (SEED) was developed with the intent of creating a nation-wide standard for building benchmarking data collection and management. Representatives from one city reported that the SEED Platform would have saved between $75,000 and $100,000 in software development costs had it been available during the initial roll-out of their initiative. The U.S. DOE intends for selected data stored within SEED to be easily accessible through Application Program Interfaces (APIs). This feature will allow third party real estate websites (ie. CoStar) to access publicly disclosed rating information, greatly improving building energy performance data accessibility. Interviews with U.S. DOE indicated that the SEED Platform will be able to hold and organize data about building energy audits, savings estimates and other building specific data. SEED is also anticipated to be able to mange residential building performance data through its Home Energy Saver Platform and may, in the near term, have the ability to integrate utility Green Button data.

Quality Assurance and Data Analysis

Data quality assurance was an ongoing concern for each of the cities interviewed. Due to the high volume of self-reported data, existing programs have not implemented independent benchmarking

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9 http://www.nyc.gov/html/planyc2030/downloads/pdf/120319_Instructions%20for%20submitting%20template_dh.pdf

10 EPA Portfolio Manager provides an automated benchmarking interface that allows utilities to upload information directly into the software tool. NSTAR and National Grid do not currently provide this service in Boston.

11 http://www.coned.com/energyefficiency/city_benchmarking.asp

12 ConEdison provides aggregated building data for a $102.50 per building fee. National Grid provides energy data to building owners at no cost.

score verification requirements as these could significantly increase compliance costs. Several interviewees suggested that local universities may be able to provide cities with data analysis and quality assurance support. Cities could also implement random quality assurance check provided by local engineering firms or could require that all buildings submit independent verification of their benchmarking results.[13] This approach, however, would add to the compliance costs of any regulation.

C. Outreach and Stakeholder Engagement

All the individuals interviewed for this report stressed the need for effective stakeholder outreach and education prior to implementing a benchmarking and disclosure program. The following section describes some of the lessons learned from these leading cities.

Establish a Clear Understanding of the City's Building Stock

Interviewees highlighted the need to develop an in-depth understanding of a city's building stock and establish definitive lists of buildings that will need to comply with any disclosure regulations. Several cities noted that assessor's databases, a primary source of building data for any city, are frequently out of date or incomplete and that these data sets may be of limited use. CoStar, a third-party vendor of commercial building databases, was cited as one potential source for up-to-date building stock information, frequently including information about ownership contacts, management firms, rentable square footage and other critical building metrics. One interviewee reported that CoStar includes a robust dataset for commercial real estate, but may be less useful for other building types that may need to comply with a benchmarking regulation such as non-profits and hospitals.

Cities have also developed regulations that exempt some building types from the requirement. For instance, in Seattle, manufacturing facilities do not need to comply with the requirement[14] and in San Francisco, new buildings less than two years old are exempted from reporting.[15]

Engage Existing Networks

Each of the cities reviewed in this report engaged local associations to assist with disseminating information about their programs. Local chapters of the U.S. Green Building Council (USGBC) and the Building Owners and Managers Association (BOMA) were essential in helping cities inform and educate property owners about the implementation of benchmarking policies. Cities have worked with these and other local groups to convene stakeholders, build consensus and conduct trainings.

Several interviewees commented that despite significant outreach through existing associations and networks, many building owners were unaware of their new reporting obligations until they received their first direct letter from the city. This suggests that, while engagement with existing networks is critical, it is likely not sufficient to reach all affected owners, particularly for reaching smaller building owners who may not actively participate in local business associations.

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[13] Buildings applying to receive an Energy Star designation (PM score of 75 or greater) must have their scores independently verified by a professional engineer, and EPA maintains a list of qualified contractors who provide this service. Interviewees report that score verification costs are typically between $500 and $1,000 depending on building size.

[14] http://www.seattle.gov/dpd/cms/groups/pan/@pan/@sustainableblding/documents/web_informational/dpdp021659.pdf

[15] http://www.sfenvironment.org/article/benchmarking/overview

Conduct Trainings

City staff in each city were actively engaged in training and educating building owners on the requirements of their benchmarking policies. This often included hands-on Portfolio Manager training sessions as well as educational presentations about the compliance requirements. A city interested in implementing its own benchmarking and disclosure program can also leverage the significant training resources available through the U.S. EPA, and can also work with local business and trade associations to help conduct informational session.

Establish a Program Hotline

Cities have established dedicated hotlines that assist building owners with meeting their compliance obligations. New York City has outsourced the staffing and management of its benchmarking hotline to a local university. The New York City hotline can be accessed through the City's existing 311 service. Other cities have dedicated staff, typically funded with foundation support, to provide technical services to building owners.

IV. CASE STUDIES

The following section provides information about building benchmarking and disclosure programs in three leading cities: New York, San Francisco, and Washington, D.C. These studies review critical policy aspects such as authorizing legislation specifics, outreach strategies and utility engagement. Table 2 below includes some of the key features of each policy. Where applicable, these brief case studies also review notable energy efficiency policies that affect commercial building owners in these markets.

Table 2. Key features of several city benchmarking and disclosure programs.

	New York City	San Francisco	Washington, D.C.
Disclosure	Public website	Public website	Public website
Building Size (sq ft)	≥ 50,000	≥ 10,000	≥ 50,000
Staffing	1.75 FTEs with significant partner support	1.5 FTE	1 FTE
Utility Data Integration	Aggregate data provided via spreadsheets	Automatic upload to PM	Pending
Reporting Period	Annual	Annual	Annual
Type of Data	Address, year built, gas, steam, electricity and oil usage, water consumption, EUI, energy star 1-100 rating, GHG emissions, onsite generation, green power purchases	Contact information, square footage, Energy Use Intensity, energy star 1-100 rating, greenhouse gas emissions	Building address, year built, energy star rating, electricity use, water use, occupied space, energy intensity, gas use, gross area

A. New York City

1. Policy

The Greener, Greater Buildings Plan (GGBP), an initiative of the Mayor's Office of Long-Term Planning and Sustainability, is aimed at improving the energy efficiency of large non-residential and multi-family buildings. The GGBP is a part of New York City's climate action and sustainability plan, PlaNYC, which seeks to reduce the city's greenhouse gas emissions by 30% by 2030.[16]

The GGBP consists of a package of four energy efficiency laws passed unanimously in December 2009. The laws target the 16,000 largest public and private buildings in the city – approximately one-half of citywide square footage and 45 percent of greenhouse gas emissions.[17] The GGBP laws are together expected to reduce the city's carbon footprint by nearly 5 percent.[18] The four laws have significant implications for energy efficiency, and cover:

- Benchmarking (Local Law 84)
- New York City Energy Code (Local Law 85)
- Energy Audits and Retro-Commissioning (Local 87)
- Lighting Upgrades and Sub-Metering (Local Law 88)

The New York City Energy Code applies to all buildings, whereas the other three GGBP laws apply only to buildings of 50,000 square feet or more. In all, the GGBP is expected to "reduce citywide energy costs by $700 million annually by 2030 and create roughly 17,800 construction-related jobs over ten years."[19]

Local Law 84 covers benchmarking, mandating annual energy efficiency benchmarking coupled with public disclosure for all buildings over 50,000 square feet and multiple buildings on the same tax lot exceeding 100,000 feet. Enacted as part of the GGBP suite, the benchmarking law has a gradual implementation phase-in, beginning in September 2011 with the web-based public disclosure of benchmarking results from city buildings, followed by non-residential buildings in September 2012, and finally residential buildings in September 2013.[20]

Property owners must use the EPA's Portfolio Manager tool for annual benchmarking of building energy and water usage data.[21] New York City is unique in that it is the only city in the nation that provides automated data water usage data upload or Portfolio Manager.

The New York City Energy Code was adopted as Local Law 85 with the suite of GGBP laws, and came into effect July 1, 2010. The City Energy Code applies to all building owners and operators. The local energy code was adopted to address a loophole in the state energy code and to allow the City to incrementally make more stringent requirements.[22] Under the previous state energy code, the "50% rule" loophole allowed renovations of less than 50% of a building or major system to avoid complying with the current

[16] IMT-Building Energy Transparency Report
[17] http://www.nyc.gov/html/planyc2030/html/about/ggbp.shtml accessed Sept. 1, 2011
[18] http://www.urbangreencouncil.org/education/ggbp-education/ accessed Sept. 1, 2011
[19] http://www.nyc.gov/html/planyc2030/html/about/ggbp.shtml accessed Sept. 1, 2011
[20] http://www.nyc.gov/html/dob/downloads/ppt/Benchmarking_PPT.pdf accessed Aug. 30, 2011
[21] http://www.nyc.gov/html/dob/html/sustainability/benchmarking.shtml accessed Sept. 1, 2011
[22] Commercial Energy Policy Webinar Series, Session 4: An In-Depth Look at NYC's Greener, Greater Buildings Plan. Nov. 2, 2011.

energy code.[23] As of July 1, 2010, all additions, renovations, and repairs for all buildings must meet the new construction requirements of the New York City Energy Code (IECC 2009 and ASHRAE 90.1 2007).[24]

Local Law 87 requires energy audits and retro-commissioning of large buildings (over 50,000 square feet) every ten years. The results of the audit and retro-commissioning report must be submitted as an Energy Efficiency Report, starting in 2013 on a staggered schedule based on building tax block numbers. An energy use audit will identify cost effective energy efficiency upgrades and capital improvements with "reasonable" payback periods. The audit must be in compliance with the ASHRAE Level 2 Energy Audit.[25] Retro-commissioning refers to re-tuning an existing building's system to achieve better performance, energy savings, and upgrade paybacks. Retro-commissioning must address all the items in the City check-list and cover all "base" building systems (HVAC, electrical and lighting, domestic hot water, building envelope, and conveying systems).[26]The energy audit requirement can be waived if the building is Energy Star or LEED for Existing Buildings certified, or if a specified set of energy efficiency measures has been completed; the retro-commissioning requirement can be waived if the building is LEED for Existing Buildings certified.[27]

Lighting upgrades and sub-metering are covered by Local Law 88, which requires lighting upgrades and sub-metering by 2025. Lighting systems in all space types, except residential, must be upgraded to meet the current energy code requirements. Sub-meters must be installed on all floors over 10,000 square feet and for all tenants, except residential, over 10,000 square feet.[28] Monthly electrical statements must be submitted to tenants and a full documentation report must be filed with the City Department of Buildings upon completion.[29]

2. Outreach

The New York State Energy Research and Development Authority (NYSERDA) has been critical in the development of New York City's outreach and assistance strategy around its benchmarking program. In 2011 NYSERDA launched their FlexTech Benchmarking Pilot Program, offering commercial building owners up to $7,000 in benchmarking services, and a 50% cost share for projects larger than $7,000.[30] NYSERDA is also funding benchmarking training workshops, which are run by the City University of New York (CUNY).[31]

In addition, the City established the Benchmark Help Center in partnership with NYSERDA, CUNY, and the Institute for Market Transformation. The Help Center runs a phone service that provides technical

[23] http://www.urbangreencouncil.org/education/ggbp-education/ accessed Sept. 1, 2011
[24] Commercial Energy Policy Webinar Series, Session 4: An In-Depth Look at NYC's Greener, Greater Buildings Plan. Nov. 2, 2011.
[25] http://www.urbangreencouncil.org/education/ggbp-education/ accessed Sept. 1, 2011
[26] Commercial Energy Policy Webinar Series, Session 4: An In-Depth Look at NYC's Greener, Greater Buildings Plan. Nov. 2, 2011.
[27] The exact qualifications for LL87 exemptions are noted on slide 18 of the Urban Green Council's Objective Presentation (http://www.urbangreencouncil.org/education/ggbp-education/ggbp_website.pdf). Note that the date of the LEED certification or Energy Star label is important.
[28] Commercial Energy Policy Webinar Series, Session 4: An In-Depth Look at NYC's Greener, Greater Buildings Plan. Nov. 2, 2011.
[29] http://www.urbangreencouncil.org/education/ggbp-education/ accessed Sept. 1, 2011
[30] http://prattcenter.net/news/nyserda-benchmarking-incentive accessed April 12, 2012
[31] IMT-Building Energy Transparency Report

assistance for Portfolio Manager's online tool. The Center also releases a weekly digest with information on available services and tips and tricks for using Portfolio Manager.

3. Utility Engagement

Con Edison, the primary utility in New York City, has formed a comprehensive suite of energy efficiency services they call the "Green Team". As a part of this suite of services, they offer 24 month's worth of aggregated building consumption data for electric and gas consumption for a $102.50 per-building fee.[32] This aggregate data will include all energy use in the building, but will not break down energy use by tenant. If the building owner wishes to request this level of granularity, a letter of authorization from each tenant is required.[33] A small number of customers in New York City receive their gas service from National Grid. For these customers, National Grid will provide aggregate consumption data upon request. [34]

B. San Francisco

1. Policy

The Existing Commercial Buildings Energy Performance Ordinance was directly informed by the Mayor's Existing Commercial Buildings Task Force, which was convened around three goals for commercial buildings: improve electricity reliability through efficient management of building systems; strengthen the competitiveness of the City's commercial real estate; and reduce emissions. The emphasis on building performance was underscored by the City's greenhouse gas emissions – 45% of the City's emissions in 2005 were attributed to buildings, with 48% of building sector emissions from commercial and industrial properties and an additional 14% from municipal buildings and facilities. With this in mind, the Task Force based its recommendations on the suggested target of cutting total energy use in existing commercial buildings 50% by 2050, or an average annual net reduction of 2.5%.[35] The resulting Ordinance supplemented a 2007 state non-residential benchmarking and disclosure law, and complements California Assembly Bill 1103, which requires commercial buildings to disclose Energy Star Portfolio Manager performance data at the point of transaction.[36]

The ordinance mandates annual benchmarking via Portfolio Manager, accompanied by periodic energy efficiency audits, and applies to existing non-residential buildings 10,000 square feet and greater. Comprehensive energy efficiency audits must be performed by a qualified energy auditor every five years. The auditor is required to submit a detailed report to the building's owner or operator, where "the point is to provide a reliable catalog of opportunities to cost-effectively improve energy efficiency. The priority should be to obtain specific recommendations that empower action to save both energy and money."[37] New buildings, buildings with LEED for Existing Buildings certification, and buildings that qualified for the Energy Star label for three of the last five years are exempt from the energy audit requirement.

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[32] Con Ed provides data in an excel format and does not directly upload data into Portfolio Manager.
[33] http://www.coned.com/energyefficiency/PDF/Tariff%20Filing%20(8-26-10).pdf accessed April 13, 2012
[34] IMT-Building Energy Transparency Report
[35] http://www.sfenvironment.org/downloads/library/sf_existing_commercial_buildings_task_force_report_1.0.pdf accessed Aug. 31, 2011
[36] IMT Building Energy Transparency p. 28
[37] http://www.sfenvironment.org/our_programs/interests.html?ssi=6&ti=14&ii=208 accessed Aug. 31, 2011

The annual benchmarking requirement must be met by entering all building energy usage data in Energy Star Portfolio Manager. Building owners are required to share key benchmarking results in an "Annual Energy Benchmark Summary" report, which includes Energy Star performance rating, California building rating, energy use intensity, greenhouse gas emissions, and basic descriptive data. Initial benchmarking compliance deadlines are staggered based on building size, as shown in the following table. Benchmarking results are transparent and made available to the public through a City website.

Table 3: Implementation Timeline for the Existing Commercial Buildings Energy Performance Ordinance[38]

Due Date	Benchmarking	Status of Public Disclosure
10/1/2011	Buildings larger than 50,000 square feet must benchmark	No public disclosure
4/1/2012	Buildings larger than 25,000 square feet must benchmark	Public disclosure begins for buildings greater than 50,000 square feet (only)
4/1/2013	Buildings larger than 10,000 square feet must benchmark	Public disclosure for buildings greater than 25,000 square feet
4/1/2014	Buildings larger than 10,000 square feet must benchmark	Public disclosure applies to all affected buildings

The City also has a Commercial Lighting Efficiency Ordinance, which required fluorescent lighting in commercial buildings meet a specific efficiency standard by Dec. 31, 2011. Under the Ordinance, all commercial buildings with 4-foot or 8-foot linear fluorescent lamps and ballast systems are required to be 81 lumens per watt of electricity consumed. The 81 lumens per watt efficiency standard is usually met with T-8 lamps and electronic ballasts. Lighting installed after December 31, 2011, must comply with the mercury content standard: each 4-foot linear fluorescent lamp must not exceed 5 milligrams of mercury and each 8-foot linear fluorescent lamp must not exceed 10 milligrams of mercury.

Chapter 13C of the San Francisco Building Code, a combination of the mandatory requirements of the 2010 California Green Building Standards Code (CALGreen) and stricter local requirements, mandates all newly constructed buildings of all size or occupancy must meet green building standards. Renovations - major structural upgrades and mechanical, electrical or plumbing upgrades - to areas over 25,000 square feet in existing buildings must also comply with the green building standards. The Chapter 13C green building ordinance went into effect January 1, 2011.

The City offers an expedited permit review in the Planning Department, Department of Building Inspection, and Department of Public Works through the LEED Gold Priority Permitting Program. The building project must meet or exceed a LEED Gold rating to qualify for the priority permit review.

2. Outreach

To provide outreach, training, and education around the new benchmarking program, the City organized a "guerilla" marketing effort utilizing a variety of communication channels. SF Environment, the department leading the outreach effort, sent official letters to building owners that would be affected by the ordinance to educate them about the initiative and to inform them about available resources. Since launching the program, the department has also led over 40 presentations and trainings. Additionally, the city works with professional networks such as the US Green Building Council (USGBC)

[38] http://www.sfenvironment.org/our_programs/interests.html?ssi=6&ti=14&ii=208

and the Building Owners and Managers Association (BOMA) to inform building owners about the program. [39]

To improve compliance rates, the City will provide direct outreach to building owners who may need additional technical assistance in completing the benchmarking requirements through the Portfolio Manager software.[40]

3. Utility Engagement

The State of California mandates that utilities automatically upload aggregate building energy data to Portfolio Manager significantly reducing this compliance barrier for building owners in San Francisco.[41] Automated Benchmarking Services are provided by PG&E at no cost to the utility customer.

C. Washington, D.C.

1. Policy

The Green Building Act of 2006 required non-residential municipal buildings constructed after 2008 score at least 75 points per the Energy Start Target Finder tool, and to be annually benchmarked thereafter using Energy Start Portfolio Manager.[42] The City is required to publicly disclose benchmarking information within 60 days from the time it was generated.[43] The Green Building Act also mandated all public buildings meet the LEED certification standards for environmental performance. The law also authorized expedited permit processing for private sector LEED Gold-level projects.[44] Approximately 75% of the City's emissions are attributed to the building sector.[45]

The Clean and Affordable Energy Act of 2008 (CAEA), passed unanimously in July 2008, amended the Green Building Act to require annual benchmarking and public disclosure of benchmarking data for new and existing commercial and multi-family buildings over 50,000 square feet, and public buildings of at least 10,000 square feet. Large construction or substantial renovation projects of 50,000 square feet or more must use the Energy Star Target Finder tool to estimate energy performance and submit those projections to the District of Columbia Department of Environment (DDOE) before starting construction, and, following completion, these projects must be annually benchmarked and reported to DDOE.[46]

The CAEA was amended in December 2010, bestowing DDOE authority to enforce the benchmarking provisions and collect building water consumption data, while also delaying the first benchmarking reporting deadline for private buildings.[47] The initial benchmarking and disclosure deadlines are staggered by size for private buildings, as shown in the table below.[48]

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[39] Interview with city staff
[40] Interview with city staff
[41] IMT Building Energy Transparency
[42] Administered by EPA, Target Finder is a commercial building energy rating tool that estimates energy performance based on energy modeling data. The tool provides an energy performance estimation on the same "1" to "100" scale as Energy Star Portfolio Manager.
[43] IMT-Building Energy Transparency Report
[44] http://rrc.dc.gov/green/cwp/view,a,1231,q,460953.asp green: Green Buildings, accessed Sept. 9, 2011
[45] http://www.buildingrating.org/content/policy-brief-washington-dc accessed Jan. 28, 2012
[46] IMT-Building Energy Transparency Report
[47] IMT-Building Energy Transparency Report
[48] http://www.buildingrating.org/content/policy-brief-washington-dc accessed Jan. 28, 2012

Table 4: Implementation Timeline for Clean and Affordable Energy Act of 2008 (CAEA)

Building Size	Initial Benchmarking Deadline	Public Disclosure
200,000 SF and greater	Compliance date has not been finalized[49]	Annually beginning in 2013
150,000-199,999 SF	Compliance date has not been finalized	Annually beginning in 2013
100,000-149,999 SF	April 1, 2013	Annually beginning in 2014
50,000-99,999 SF	April 1, 2014	Annually beginning in 2015

Annual benchmarking for public buildings of 10,000 square feet or more began in 2010, and the first year of benchmarking results were disclosed via public website in December 2010.[50] DDOE employed tax assessment data to create an inventory of buildings that must comply with the 2008 law – building owners and non-residential tenants who fail to comply with the requirements will face daily fines.

2. Outreach

By requiring government buildings to comply first with the benchmarking mandate, the City took a "lead by example" approach. This strategy helped city officials better understand the process and uncover compliance hurdles. This "municipal first" strategy also assured the city and building owners that the requirements were both reasonable and manageable.

The City applied their experience with public buildings to develop a comprehensive online and on-the-ground outreach strategy to inform, educate, and train owners, managers, and consultants on the new program. The DDOE developed (green.dc.gov/energybenchmarking) as a central resource for the benchmarking program. This website also currently hosts the results from the initial energy benchmarking of public buildings.

The City also worked with the EPA to host trainings on the Portfolio Manager software through webinars. Both general trainings and sector-specific trainings were held. To assist building owners with importing and maintaining their data through Portfolio Manager, the City set up live help lines with experts who could assist with any questions or problems.

3. Utility Engagement

Currently, local utility Pepco will provide commercial building owners with aggregated consumption data, as well as data from tenants who have agreed to provide this information. The City is working with Pepco to enable automatic data uploads into portfolio manager, reducing the overhead for building owners to manually input that data. However, the utility is currently constrained by the Public Service Commission's "Consumer Bill of Rights", and a legislative change may be needed to enable automatic data uploading.[51]

[49] The initial benchmarking deadline for buildings over 200,000 square feet has not been finalized, and was most recently extended beyond January 31, 2012. The deadline is expected to be sometime in the spring of 2012, but updates will be posted at http://green.dc.gov/page/private-building-benchmarking.

[50] Public Energy Benchmarking Results: http://green.dc.gov/service/public-energy-benchmarking-results

[51] Interview with city staff

V. CONCLUSION

Many of the lessons learned from cities that have implemented benchmarking and disclosure policies are applicable to the City of Boston, and learning from these first-wave cities can significantly benefit Boston's city officials, building owners and other real estate market participants. Key common lessons learned from these pioneering cities include:

- Allow adequate time for policy development, rulemaking, and compliance before the first mandatory reporting deadline;
- Leverage assistance from outside organizations to assist with program outreach and education;
- Use existing, no-cost software tools such as EPA's Energy Star Portfolio Manager and the DOE's Standard Energy Efficiency Database Platform to minimize implementation costs;
- Gain an in-depth understanding of the City's building stock before implementing any policy;
- Engage utility partners for assistance with data reporting and automated benchmarking services.

Learning from the experiences of other leading cities will allow the City of Boston to successfully implement a nation-leading benchmarking and disclosure program that will help drive the building energy performance improvements required to meet the City's ambitious greenhouse gas reduction commitments.

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