

# DIRECTOR’S REPORT AND RECOMMENDATION

## Building Energy Efficiency and GHG Reduction

### 2016 Legislation

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## **1.0.0 Introduction**

At the direction of the Mayor, from Q4 2014 through October 2015 the Office of Sustainability and Environment (OSE) led a process to develop building energy efficiency and greenhouse gas (GHG) reduction policies that would ensure continued progress towards meeting the Climate Action Plan (CAP) goals. In order to achieve the targets laid out in the CAP, Seattle's building stock – which accounts for 33% of the city's core emissions – must reduce emissions 82% from a 2008 baseline by the year 2050. The CAP further delineates that these emissions reductions should come from a 45% reduction in commercial energy use and a 63% reduction in residential energy use in that same time period. It should be noted that these are net reductions—that is to say they remain fixed relative to the 2008 baseline even as Seattle continues to add people, jobs, and buildings every year. Our current trajectory falls well short of these targets, indicating that additional policy measures are necessary in order for Seattle to achieve its goal of carbon neutrality.

Improving the energy and GHG efficiency of Seattle's existing private building stock will most directly help us to reduce our climate impact, but will also more broadly:

- ensure we have high performing buildings better able to respond to a changing climate;
- maintain affordability for commercial and residential tenants through reduced annual building operating expenses; and
- support local green jobs

The proposed policy efforts have focused on improving performance in existing commercial buildings; OSE will continue to investigate opportunities for improving efficiency in the existing residential buildings during 2016. This proposal is a continuation of the CAP implementation plan and is assumed to be part of an ongoing iterative process to develop and implement appropriate and timely policies between now and 2030. These policies demonstrate the City's commitment to addressing climate change and creating a sustainable future by protecting, conserving, and enhancing the region's environmental resources.

## **2.0.0 Proposal Summary**

The proposed approach relies on clear targets and tracking, maintaining a strong benchmarking program and expanding its outreach capabilities, providing innovative utility incentives, and establishing a regulatory pathway to meet our performance targets. The proposed actions would establish the foundation for growing a building market that values energy efficiency, and set minimum expectations around efficient operations.

### **2.1.0 Legislation**

#### **2.1.1 Building Energy Transparency**

The proposed legislation updates the building energy benchmarking ordinance to include public transparency of energy performance. This is a foundational policy, implemented by all but one other benchmarking city, which will create a long-term market demand for energy efficient buildings, protect tenant interests, and reward high-performers.

### **2.1.2 Building Tune-Ups**

The proposed legislation phases in a periodic tune-up requirement for commercial buildings, beginning with larger buildings. Tune-ups will optimize energy and water performance and encourage active management in Seattle's commercial buildings.

### **2.1.3 City Leadership**

Underpinning any regulations, the building community is looking to the City to take a leadership role with its own facilities and to model actions before placing expectations onto the private market. An accompanying resolution would direct the City to:

- Conduct tune-ups on City-owned buildings. This is included as a key component of the Resource Conservation Management Plan, adopted in 2013.
- Establish a policy for asset preservation and equipment replacement to ensure energy efficiency is addressed while work is already being conducted on a building.

## **2.2.0 Supporting Actions**

### **2.2.1 Energy & GHG Reduction Targets**

The building sector energy and GHG reduction goals outlined in the CAP are broadly distinguished by commercial and residential buildings. Periodic Community GHG Inventories allow us to track progress against these broad goals. Additionally, consultant analysis is underway to identify targets by building type to allow building owners to better understand how these goals relate to their particular building and to allow the City to track progress and establish policy in a more refined manner. OSE is proceeding to identify building energy reduction targets by building type (e.g. office, retail, single-family, multifamily) for 2020, 2025 and 2035, which will be used to monitor progress over time and develop new policies based on needs specific to each building type.

### **2.2.2 Utility Incentives for Existing Buildings**

Seattle City Light has been piloting and evaluating a number of innovative utility incentives and, after redesign, intends to bring two of them to scale in 2016:

- **Pay for Performance (P4P)**, which provides incentive payments based on the actual measured energy savings of a facility. The incentive will also include a workforce development component. SCL's standard incentive program traditionally makes a one-time payment based on the estimated energy savings; the P4P model is designed to pay incentives over a specified period of time for delivered energy savings. P4P allows customers to pursue a mixture of conservation strategies that could include equipment replacements in addition to operations-related efforts (tuning of equipment and temperature settings) and includes the interaction that occurs across systems that are difficult to calculate in a traditional incentive program.
- **Retro-Commissioning**, which provides incentives for operational improvements. The focus is to improve overall building operations through identifying system improvements that can be

implemented through low cost/no cost actions. Buildings over 100,000 sq. ft. are eligible for the program which includes scoping, investigations, implementation and verifying the installation of energy conservation measures. In addition, owners may receive a bonus incentive for verified savings after the first year following implementation.

### **2.2.3 Energy Code for Existing Buildings**

The most cost-effective time for energy efficiency improvements is when buildings are already undergoing upgrades. As part of the 2015 Seattle Energy Code process, the Department of Planning and Development (DPD) is exploring how efficiency is addressed at substantial alteration and equipment replacement, while also considering the financial impacts on building owners.

## **3.0.0 Background**

### **3.1.0 Climate Action Plan (CAP)**

The City of Seattle adopted the CAP in 2013 by Council Resolution 31447, and in doing so established the goal to become a carbon neutral city by 2050. The actions outlined in the CAP are aimed at reducing GHG emissions and preparing for climate impacts, all while building vibrant neighborhoods, fostering economic prosperity, and enhancing social equity.

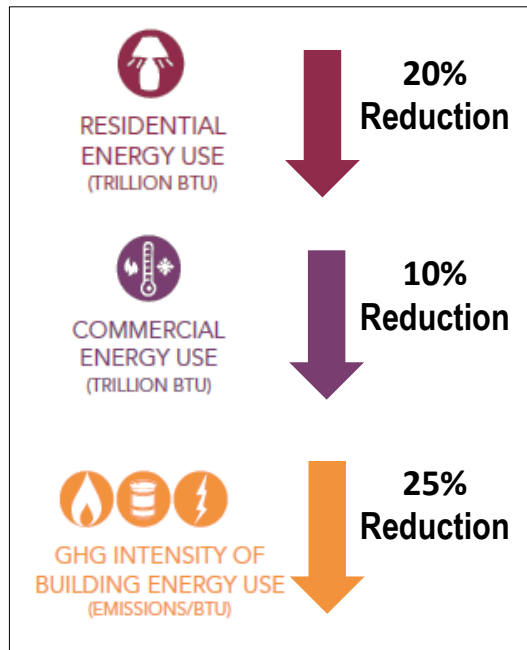
The building sector is responsible for 33% of Seattle's core emissions. The CAP calls for an 82% reduction in building-related emissions by 2050, to be achieved through investments in both building energy efficiency and clean energy to achieve reductions in energy use and reductions in the GHG intensity of that building energy. While combined per capita emissions are going down, total emissions remained flat between 2008 and 2012<sup>1</sup>.

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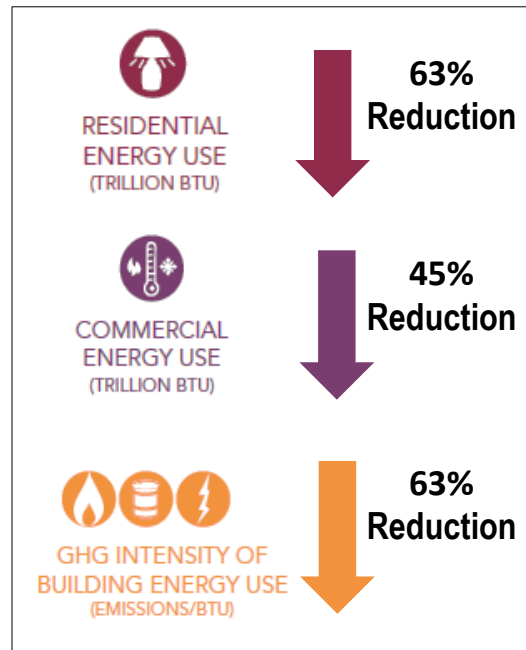
<sup>1</sup> 2012 Seattle Community Greenhouse Gas Emissions Inventory. Seattle Office of Sustainability & Environment, April 2014.

### Building Energy & GHG Targets

**2030**



**2050**



### 3.2.0 Progress to Date

The CAP calls for total energy use for both commercial and residential buildings to be reduced by 52% (from 48.8 trillion BTUs in 2008 to 23.4 trillion BTUs in 2050), or 1.24% per year. However, the 2012 Seattle Community GHG Inventory shows total energy use reductions at only 0.75% per year between 2008 and 2012. The majority of the reductions are from the residential sector, with total commercial energy use only dropping 0.25% per year. Seattle Benchmarking results similarly document a reduction of only 0.6% between 2012 and 2013 for buildings 20,000 sq. ft. and larger that benchmarked both years.<sup>2</sup>

The CAP established a range of near-term (by 2015) and long-term (by 2030) actions to put the city on the path to achieving those goals. For the commercial and multifamily sectors, a summary of those actions and their status is outlined below.

<sup>2</sup> *Seattle Building Energy Benchmarking Analysis Report, 2013 Data*. Seattle Office of Sustainability & Environment, September 2015.

Climate Action Plan Building Energy Actions and Status

- ✓ Complete
- Underway
- No action, or included in current planning process

	<b>By 2015</b>		<b>By 2030</b>
<b>Leadership in City Facilities</b>			
	<ul style="list-style-type: none"> <li>✓ Develop Resource Conservation Management Plan</li> <li>✓ Publically disclose energy benchmarking scores</li> <li>▪ Pilot Living Building Challenge</li> </ul>		<ul style="list-style-type: none"> <li>▪ 20% reduction by 2020 (from 2008)</li> </ul>
<b>Incentives</b>			
	<ul style="list-style-type: none"> <li>➤ Pilot retro-commissioning incentives</li> <li>➤ Pilot pay for performance incentives</li> <li>➤ State legislation to authorize property tax exemption for rental housing retrofits</li> <li>➤ Update Living Building pilot                             <ul style="list-style-type: none"> <li>▪ Identify financing tools and develop plan to bring to market</li> <li>▪ Provide technical assistance to retrofit historic buildings</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>➤ If successful, implement pay for performance                             <ul style="list-style-type: none"> <li>▪ City property tax exemption</li> <li>▪ Energy price structure tied to conservation</li> <li>▪ Permitting fees tied to efficiency</li> <li>▪ Land use incentives for deep efficiency</li> </ul> </li> <li>➤ Incentivize waste heat utilization                             <ul style="list-style-type: none"> <li>▪ Financing that remains with the building</li> <li>▪ Identify new funding sources</li> <li>▪ Allow alternative energy in right-of-way</li> </ul> </li> </ul>
<b>Regulations</b>			
	<ul style="list-style-type: none"> <li>✓ Minimum energy requirements for substantial alterations</li> <li>✓ Increase efficiency standards in each code cycle</li> <li>✓ Outcome-based code option                             <ul style="list-style-type: none"> <li>▪ Energy audits for largest &amp; least efficient buildings</li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>▪ Minimum energy performance standard for all buildings</li> <li>▪ Require waste heat recovery in new buildings</li> <li>▪ Code focused on actual performance</li> <li>▪ Periodic retro-commissioning of largest &amp; least efficient buildings</li> <li>▪ Public disclosure of benchmarking data</li> </ul>

With the majority of the near term actions underway, it is time to continue the Climate Action Plan implementation process and put in place new policies that will keep us on track to meet our climate goals.

#### 4.0.0 Policy Development Process

In Q4 2014, OSE established an interdepartmental working group with DPD, Seattle City Light (SCL), and the Office of Economic Development (OED) to identify next steps the City could take in order to stay on a track towards achieving the CAP’s building sector GHG reduction goals. The Mayor’s Office subsequently directed OSE to conduct a stakeholder engagement process and develop policy recommendations. Preliminary recommendations were presented to the Mayor in a briefing on July 29<sup>th</sup> 2015, at which point OSE was directed to develop legislation. The policy development effort included both the exploration of a variety of policy options and discussions with a range of stakeholders.

### ***4.1.0 Policy Options***

OSE identified a range of potential policy options, including those already identified in the CAP as well as those of other municipalities. Some of these options were regulation-based, such as minimum performance standards and building energy audits. Others focused on incentives, such as utility “Pay-for-Performance” programs, development incentives for existing buildings, and property tax exemptions. In particular, more in-depth reviews and discussions with other municipalities were conducted on building energy performance transparency and on retro-commissioning (improving building systems operations) and building audits.

### ***4.2.0 Stakeholder Engagement***

OSE, joined by SCL in many instances, met with key individuals and organizations representing building owners and developers, facilities management, and energy efficiency interests. Initial scoping discussions were held during Q1 and Q2 of 2015 to better understand participant priorities. Follow up meetings with these organizations, and with additional stakeholders, were held in Q3 and Q4 to obtain feedback on preliminary recommendations. A full list of the organizations and the individual participants engaged during this process is included as Appendix A.

#### ***4.2.1 Round 1: Initial Scoping Discussions***

During the first round of discussions participants were provided with background on the Climate Action Plan (CAP) goals for buildings, informed of the City’s process to develop new policy, and asked to discuss their views on the most effective means to move the market towards building energy use and GHG emissions reductions sufficient to meet the CAP goals. A summary of the feedback received is provided below:

##### *Operations & Maintenance*

Those involved in facilities management identified a significant need for buildings to be operated more effectively on an ongoing basis, best summed up by the comment: “we don’t know how to operate our buildings.” New buildings not being properly commissioned is a concern, as are older buildings that never receive periodic tune-ups. Continuous commissioning (ongoing management of building systems) is the ultimate goal to ensure persistence of savings.

##### *Building Upgrades*

Energy upgrades are recognized as the best way to significantly improve energy efficiency to achieve the deep savings we will need, but this topic brought the most concern about the city directing how and when capital energy upgrades are done. There is considerable variation in the ownership and facility management structure and in the timeframe for holding properties, which consequentially impacts whether owners are interested in investing in their facilities. There was a preference for focusing on buildings already going through an upgrade or replacing equipment. However, there were also concerns about the financial ability of owners to bring buildings up to current energy code – especially if they are already paying for other improvements and meeting other codes.

##### *Outreach & Technical Assistance*

While many sophisticated owners already understand their buildings and are taking advantage of available incentives, others still need information and one-on-one assistance to help identify improvement opportunities, find incentives and evaluate financial return. More outreach was considered valuable, with a specific proposal to develop an energy assistance center. Also important is outreach directed at tenants and not simply the owners

#### *Tenants*

The issue of split-incentives came up in discussions of both commercial and multifamily properties. Some owners refrain from investing in upgrades because the lowered utility savings do not accrue to them; others saw the ability to attract and maintain tenants with lower utility bills as important. Both market-rate commercial owners and affordable housing owners noted that they can charge more rent if utility bills are lower – with both owner and tenant having reduced expenses. At the same time, there were concerns about owners charging higher rents if they make upgrades and therefore raising costs on tenants. Lowered tenant utility bills were identified by housing providers as an important issue for ensuring total housing affordability.

#### *Incentives*

There was overwhelming interest in the City providing incentives: utility incentives, development incentives, tax incentives and carbon reduction incentives received the most mention. Performance-based incentives were of particular interest, as were building analysis incentives (e.g. paying for energy audits). Each of the multifamily housing organizations had a number of members who noted how useful the existing utility incentives have been in making their upgrades possible. Some noted that incentives are even more necessary in Seattle because inexpensive energy rates mean the payback on energy upgrades is longer than in other locations, making it harder for investments to look financially viable.

#### *Financing*

We heard from both commercial and multifamily owners that the return on investment (ROI) is the deciding factor, and that incentives can help to make the ROI work. For larger commercial and multifamily owners, access to capital itself isn't an issue, except that any upgrade project may strain the capital budgets. However, affordable housing and smaller multifamily owners noted that access to insufficient credit and lack of access to capital can be a significant barrier. Commercial owners would like incentives that allow the cost of upgrades to be incorporated into the operational budget instead of the capital budget, with on-bill repayment noted as a potential tool. Others suggested financing tied to property (e.g. PACE) as a good option and low-interest green loans were suggested.

### **4.2.2 Round 2: Preliminary Recommendations**

OSE conducted follow up meetings with organizations contacted in Round 1, as well as with additional stakeholders, to obtain feedback on preliminary recommendations.



There was general support amongst energy efficiency organizations, multifamily building associations, facility managers and service providers for making building benchmarking data publically available. There are concerns from building owners that transparency would impact the marketability of their properties and that the information published would not provide the proper context for the actual performance of any individual building. Some building owners also raised concerns about receiving aggressive sales pressure from energy efficiency vendors based on published information.

#### *Periodic Tune-Ups*

Energy efficiency organizations, facility managers and service providers tended to be supportive of mandatory building tune-ups. Housing providers were concerned with applicability to multifamily and the potential cost impacts if the legislation were to apply to residential buildings. Commercial building owners were similarly concerned with cost impacts, as well as wanting their existing efforts to properly manage their buildings to be taken into consideration. A number of stakeholders encouraged setting building energy performance standards with tune-ups as one of the means for an owner to meet the requirements. In all discussions there was a strong desire for incentives to help owners meet any requirements.

#### *Supporting Programs*

Round 2 participants also provided feedback on additional actions they felt would support the overall goal of reducing GHG emissions and improving building energy efficiency. These include:

- Carbon reduction investment fund, especially to help financially disadvantaged building owners make upgrades
- Financing against energy savings, with repayment on utility bills
- Density bonus for energy efficiency retrofits to existing buildings
- Expedited permitting for efficiency upgrades to existing buildings

## **5.0.0 Proposed Legislation**

### ***5.1.0 Building Benchmarking Transparency***

#### ***5.1.1 Rationale***

The Seattle Energy Benchmarking and Reporting Program currently requires owners of commercial and multifamily buildings (20,000 square feet or greater) to annually benchmark the energy performance of their building with the EPA's ENERGY STAR Portfolio Manager. Chapter 22.920 of the Seattle Municipal Code was originally passed by Ordinance 123226 in 2010 and amended by Ordinance 123993 in 2012. Per the code, building owners must provide building energy performance information to any current or prospective tenant, buyer, or lender involved with a real estate or financing transaction, but only upon request.

The City does not currently make the energy performance data of individual buildings publicly available or "transparent." Since 2010, when Seattle was one of the first cities to adopt benchmarking, other cities have included transparency as a key aspect of their benchmarking programs. In the United States, 15 jurisdictions (14 cities and one county) and two states currently require energy benchmarking and 13

make the data publicly transparent—only Seattle and Austin, Texas do not. An overview of the US jurisdictions with transparency policies, including case studies of the four US cities which have already publically disclosed building performance data, as well as a case study for Australia, is provided in Appendix B.

Transparency of building energy performance data is a key tool for long-term market transformation: it lets owners and managers understand how their buildings stack up against their peers, lenders and investors accurately assess the value of energy efficiency, would-be tenants and buyers make informed choices, and building design professionals evaluate the real-world efficacy of their work.

Transparency places a market value on energy efficiency and leverages the real estate industry to push for improved energy performance, leading over time to energy savings and greenhouse gas emissions reductions. Full transparency unleashes the full power of the market to push for energy efficiency by getting important information to all potential parties at all points in the real estate process. It ensures potential buyers and tenants will be able to see energy performance information early in their search process. Buildings with relatively low energy use will be able to truthfully market themselves accordingly, earning value for their commitment to energy efficiency, as well as marketing savings on utility bills. Transparency also provides brokers with energy performance information they can incorporate into listing portfolios to better serve their clients' needs.

#### **5.1.2 Change from Existing Policy**

The existing Energy Benchmarking and Reporting program will be modified to allow the City to publish individual building energy performance data for all benchmarked buildings online. No additional action will be required of building owners.

#### **5.1.3 Impact – Energy & GHG Emissions**

For cities where benchmarking & transparency has been in place for a number of years, there are some early indications of increased efficiency. A Department of Energy report evaluated New York City's benchmarking and transparency policy and found that between 2010 and 2013, buildings covered by the policy reduced their energy use by 5.7% and lowered their greenhouse gas emissions by 9.9% between 2010 and 2013.<sup>3</sup> Washington DC saw a 3% reduction from 2012 to 2013.<sup>4</sup> While this only indicates a correlation, not a direct causation, in NYC at least, the energy reductions occurred at the same time that GDP increased and energy costs decreased, which would more likely have caused energy use to increase. Meanwhile in Seattle (where building energy data is not transparent), benchmarked buildings collectively reduced their energy use by just 0.6% to date.

#### **5.1.4 Schedule**

2015 benchmarking results for the private market would be made publicly available in 2016. Benchmarking data would continue to be released annually for results from the previous year. The City

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<sup>3</sup> US Department of Energy. *New York City Benchmarking and Transparency Policy Impact Evaluation Report*, May 2015 (p. ii).

<sup>4</sup> <http://doee.dc.gov/node/970312>

of Seattle has voluntarily disclosed the annual energy performance of municipally-owned buildings each year since 2011 data.<sup>5</sup>

#### **5.1.5 Metrics Disclosed**

The metrics to be disclosed will be determined via the rulemaking process in early 2016. At a minimum, these will include building use, building size, building address, total electricity use, total natural gas use, total steam use, site energy use intensity, weather-normalized site energy use intensity, GHG emissions and ENERGY STAR score. Additional information might include periodic tune-up compliance status, comments by building owners and/or year over year change.

The specific information that has been made transparent by other jurisdictions falls, generally, into two categories (a full list of information being disclosed by benchmarking cities is provided in Appendix B):

1. Building information, such as the address, floor area, year built, or building use type.
2. Energy performance information, such as Energy Star Score, Energy Use Intensity (EUI-kBtu/sf), and greenhouse gas emissions.

A few cities allow building owners to add their own comments. Providing this space for accompanying comments on performance data gives building owners and managers an opportunity to share context, such as plans to improve, specific space use, or other extenuating circumstances that the benchmarking data alone may not have captured.

#### **5.1.6 Presentation of Benchmarking Data**

The City will publish reported building performance data in an excel spreadsheet as well as visually via an interactive website to allow energy benchmarking information to be considered and understood in context and encourage energy efficiency action in underperforming buildings. To effectively drive market transformation, a system is needed to quickly convey key performance metrics in a way that's useful for building owners and managers, tenants, investors, and policy-makers. Options utilized by other cities for how to present the information include searchable and sortable data tables, maps with embedded building data, charts and graphs of aggregate data, individual building profiles with pictures, and (almost) live energy use tracking. Stakeholders have requested a user-friendly, visual way to compare data between buildings and sectors. To implement this legislation, the City will adapt existing web based applications used by other municipalities to minimize the initial financial investment and ongoing maintenance costs yet achieve the desired data transparency and energy reduction goals. OSE will work with stakeholders during the Director's Rule revision and data visualization tool development process to create appropriate communication methods.

#### **5.1.7 Additional code language modifications**

In addition to transparency, minor clean up revisions to the code language are included in the proposed legislation:

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<sup>5</sup> *Seattle Municipal Buildings 2011-2012 Energy Performance Report*. Office of Sustainability & Environment, 2013.  
*Seattle Municipal Buildings 2012-2013 Energy Performance Report*. Office of Sustainability & Environment, 2014.  
*Seattle Municipal Buildings 2013-2014 Energy Performance Report*. Office of Sustainability & Environment, 2015.

- Change the length of time utilities are required to maintain energy records from twelve to twenty-four months.
- Notice of violations responses to be sent to the Office and Sustainability & Environment in lieu of the Department of Finance and Administrative Services.
- Correction of judicial review process following the Hearing Examiner decision issuance.

## **5.2.0 Periodic Tune-Up**

### **5.2.1 Rationale**

Like cars or bicycles, buildings need to be tuned up regularly in order to keep them running as efficiently as possible at all times. Simple tweaks to building operations can yield big energy and cost savings. Implementing no-cost and low-cost building tune-up measures can yield energy savings of 5% to 20% annually, according to analysis from the Pacific Northwest National Laboratory<sup>6</sup>. Active management of building operations helps contribute to persistence of those savings.

Building tune-ups achieve several benefits:

- **Provide owners and operators with information on specific opportunities to improve building performance:** Even engaged building managers may not be aware of all the intricacies of their buildings' energy and water use. Using tune-ups to make such information more readily available would allow for rapid uptake of the most cost-effective improvements.
- **Reduce operating costs for owners and tenants:** Keeping building systems optimized through tune-ups can prevent a more expensive overhaul or repair down the road and yield ongoing savings from increased efficiency.
- **Increased comfort for building occupants:** Tune-ups can identify and fix issues with indoor air quality and temperature control, ensuring a comfortable indoor environment for occupants.
- **Create green jobs locally:** Tune-up activities would be conducted by qualified and credentialed professionals drawn from a local workforce.

In the United States, five jurisdictions (Atlanta, Austin, Boston, New York City, and San Francisco) require some form of energy audit or retro-commissioning for their commercial and/or multifamily building stock, in conjunction with their energy benchmarking and disclosure programs. Most cities that currently have an energy audit requirement allow retro-commissioning in lieu of audits to fulfill the requirement. Case studies of these programs are described in Appendix C. Energy audits and retro-commissioning requirements cover the following activities:

- **An energy audit** is a comprehensive assessment of a building's physical and operational characteristics, along with its energy profile, that identifies opportunities for improving its energy performance. Audits may identify both capital and operational improvements, along with cost estimates and projected utility savings. Cities requiring audits reference the American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE) "Procedures for Commercial Building Energy Audits" publication, which delineates three levels of energy surveys based on the

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<sup>6</sup> *Improving Commercial Operations thru Building Re-Tuning, Meta-Analysis*. Pacific Northwest National Laboratory. ppt presentation, available at <http://buildingretuning.pnnl.gov>

complexity of the assessment performed. Audits requirements provide a more comprehensive assessment of building energy use and recommend improvements, but improvements are not required.

- **Retro- or re-commissioning** more directly addresses operational improvements, ensuring that existing building systems are functioning to their optimum potential. The retro-commissioning process typically focuses on energy-intensive equipment (like HVAC or lighting systems) that degrades in efficiency over time, as well as water systems. Retro-commissioning is done where defects or original design variances are discovered. Recommendations may also be made for more capital intensive improvements. Retro-commissioning requirements mandate that major building systems are tuned-up, but typically do not address larger capital measures impacting energy usage. There are no common standards for retro or re-commissioning and the specific requirements vary by city.

**OSE is recommending that, as part of this legislative package, Seattle instead require building tune-ups.** A tune-up is both an alternative term for retro or re-commissioning, and one that implies a less extensive building analysis and improvement process.

### **5.2.2 Policy Description**

The proposed ordinance would require owners of non-residential buildings 50,000 square feet and larger to conduct a tune-up **of energy and water performance** once every five years. The tune-up legislation would require (1) an inspection of energy and water systems, and (2) action to improve identified deficiencies that are operational in nature (e.g. building temperature set points, as opposed to capital upgrades) and are low-cost improvements that on average pay back in two to three years, and (3) a report to OSE certifying the tune-up was complete.

The minimum requirements a tune-up must include will be determined via the rulemaking process in early 2016. The minimum professional certification of an individual or firm performing the tune-up will also be established via this rulemaking process. The tune-up process will target no-cost/low-cost adjustments and minor repairs to existing buildings' systems (generally, actions with a simple payback of three years or less).

### **5.2.3 Impact – Energy & GHG Emissions**

The legislation focuses on larger commercial buildings because they have the greatest overall impact on energy use. Buildings 20,000 square feet or larger account for approximately 80% of the total floor area in the city. In the commercial sector, buildings 50,000 square feet and above comprise approximately 85% of the building area and consume 86% of electric use and 78% of gas usage. Given the area of commercial building space this legislation applies to, an assumption on the percentage of space receiving an exemption from the policy, and an average of 10% energy savings achieved across the complying building stock, OSE's preliminary estimate for citywide commercial energy savings is 5%, which is a significant portion of the 45% energy reduction goal called for in the Climate Action Plan. Consultant analysis is underway to refine the assumptions and create a more robust estimate of anticipated energy and GHG impacts, which will be available in November.

### **5.2.4 Cost to Owner**

Costs for building tune-ups vary depending on the size of building, complexity of systems, whether the building has previously been tuned-up and scope of work for corrective actions. Based on a review of available research and input from local providers, OSE estimates that costs will range from \$0.20/sq.ft. to \$0.50/sq.ft.<sup>7</sup> OSE is conducting an RSJI toolkit process on the periodic tune-up requirement and will be continuing that work during the rulemaking process in 2016 to identify unintended impacts and actions to mitigate them.

The implementation schedule is designed to allow building owners to take advantage of incentives available from both SCL and Puget Sound Energy (PSE) before owners are mandated to comply with the tune-up ordinance. SCL has been piloting a retro-commissioning incentive for commercial buildings 100,000 square feet and larger. PSE has a program in place for comprehensive building tune-ups for buildings 50,000 square feet and larger. These incentive programs can cover approximately 25-30% of the cost of building analysis and corrections, plus additional incentives for documented energy savings over time. OSE is coordinating with both utilities around the linkage between this legislation and their conservation incentive programs.

### **5.2.5 Compliance Schedule**

The legislation would phase in based on building size over four years, beginning in 2018. A phased-in approach by building size means that larger buildings, those that typically have more knowledgeable ownership and management, would be the first cohort while the owners of the smallest buildings would be allowed a longer lead in time to become familiar with the requirement. Phasing spreads the impact on service providers across multiple years, to ensure adequate capacity. Similarly, the phasing allows the City to spread the compliance workload across multiple years. Building Tune-Up reports would be due according to the schedule below. The approximate number of buildings impacted each year (based on data for buildings benchmarked in 2014) is noted for each size segment.

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<sup>7</sup> *Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions.* Lawrence Berkeley National Laboratory. Available at <http://cx.lbl.gov/documents/2009-assessment/lbnl-cx-cost-benefit.pdf>

*The Cost Effectiveness of Commercial-Buildings Commissioning.* Lawrence Berkeley National Laboratory. Available at <http://evanmills.lbl.gov/pubs/pdf/cx-costs-benefits.pdf>

*Building Commissioning Case Study: Office Building 2, Washington State Capitol Campus.* Available at [http://www.cacx.org/database/data/WA\\_capitol.pdf](http://www.cacx.org/database/data/WA_capitol.pdf)

J. Lee, Deputy Director for Green Buildings and Energy Efficiency at NYC Mayor's Office of Long Term Planning and Sustainability. Telephone communication, June 1, 2015.

Building Size	First Compliance Date	# of Buildings
200,000 sf or greater	October 1, 2018	185
100,000 sf to 199,999 sf	October 1, 2019	205
70,000 sf to 99,999 sf	October 1, 2020	150
50,000 sf to 69,999 sf	October 1, 2021	175

### 5.2.6 *Alternative Compliance Pathways*

Buildings that are able to show they are already performing optimally, that already perform regular tune-ups, or that have recently improved their efficiency will be allowed to opt out of a tune-up. A list of certifications and other actions that indicate high performance and/or active energy management and serve as an alternative compliance pathway will be determined by the rulemaking process in early 2016. This list will include, at a minimum:

- Buildings with a high certified ENERGY STAR score, one that places the building in approximately the top 25% of performance for Seattle,
- Buildings with a green building certification that indicates a high-performing building,
- Buildings that can show evidence of active monitoring and continuous commissioning,
- Buildings that have participated in a Seattle City Light or Puget Sound Energy retro-commissioning or tune-up incentive program,
- Buildings that have conducted an energy audit no less stringent than the ASHRAE Level II standard and implemented all of the no-cost/low-cost efficiency measures,
- Buildings with demonstrated energy savings.

### 5.2.7 *Exemptions and Extensions*

A list of extenuating circumstances that qualify a building owner for an exemption or extension will be determined by the rulemaking process in early 2016. This list will include, at a minimum:

- Buildings with less than 50% of the rentable floor area occupied
- Buildings scheduled to be demolished within one year of the date the building tune-up is due
- Buildings that demonstrate financial distress, such as being owned by a financial institution through default of the borrower
- Buildings receiving their initial certificate of occupancy less than three years prior to the date the building tune-up is due

### 5.2.8 *Penalties*

The first cohort of buildings required to comply, those 200,000 square feet and larger, would be fined \$5,000 if out of compliance on April 1, 2019, and an additional \$20,000 if still out of compliance on October 1, 2019. Penalties for subsequent building groups would be as follows:

1. Buildings 100,000-199,999 square feet (first compliance deadline of Oct 1, 2019):
  - a. \$2,500 penalty if out of compliance 180 days past the compliance due date
  - b. \$10,000 penalty if out of compliance 360 days past the compliance due date

2. Buildings 50,000-99,999 square feet (first compliance deadlines of Oct. 1, 2020 for buildings 70,000-99,999 square feet, and of Oct. 1, 2021 for buildings 50,000-69,999):
  - a. \$2,000 penalty if out of compliance 180 days past the compliance due date
  - b. \$8,000 penalty if out of compliance 360 days past the compliance due date

The timeframes for the initial six-month and subsequent one-year penalty provide owners greater opportunity to complete a tune-up. The intention of the penalty structure is to incentivize compliance, and OSE staff work with building owners toward that end.

Penalty amounts are lower than the estimated low-end cost for a tune-up (\$0.20 / sq. ft.). For instance, a 200,000 sq. ft. building might be expected to pay \$40,000 for a \$0.20/sf tune-up, but the fine for non-compliance would total only \$25,000. The penalty is designed to encourage participation and allow for ongoing engagement with the building owner over time. If it is demonstrated that the penalty is not high enough to ensure that projects fully comply with the requirements, OSE will consider recommending an increase to the penalty amount.



## 6.0.0 Appendices

Appendix A: Stakeholders

Appendix B: Benchmarking Transparency Policies

Appendix C: Energy Audit and Retro-commissioning Policies

### 6.1.0 APPENDIX A: Stakeholder Organizations and Participants

S2030D	Seattle 2030 District	Charlie Cuniff, Interim Executive Director Matthew Combe, Project Director Brett Phillips, Unico
		Mtg #2: Susan Wickwire (Executive Director), Matthew Combe, and approximately 15 additional attendees from S2030D, AIA, NEEC, and BOMA
	Emerald Cities	Steve Gelb, Executive Director Mike Mann, Cyan Strategies Perry England, MacDonald-Miller
		Mtg #2: Steve Gelb, Mike Mann, + 5 additional members
BOMA	Building Owners and Managers Association	Rod Kaufman, President Catherine Stanford, Legislative Consultant Lyn Krizanich, Clise Properties Coleen Spratt, CommonWealth Partners
		Mtg #2: Rod Kaufman, Catherine Stanford, Lyn Krizanich, Coleen Spratt, + 8 additional members
IFMA	International Facility Management Association	Chris Dawe, President Mike Feldman, IFMA Foundation Cynthia Putnam, Putnam-Price
		Mtg #2: Chris Dawe, Mike Feldman, Cynthia Putnam, + 20 additional members
HDC	Housing Development Consortium	Representatives from Bellwether, Capitol Hill Housing, Plymouth, LIHI, + architecture, engineering and green building consulting
RHA	Rental Housing Association	Bill Hinkle, Executive Director + 7 Board Members
		Mtg #2: Bill Hinkle, Sean Martin (External Affairs Director)
WMFA	Washington Multifamily Housing Association	Angie Lausch, ConAm Brandon Morgan, Vulcan Joseph G., Security Properties John Broos, Essex Property Trust
AIA	Seattle Chapter of the American Institute of Architects	Public Policy Board, Eric Anderson, Chair
ASHRAE	American Society of Heating Refrigeration & Air Conditioning Engineers – Puget Sound Chapter	Michel Sotura, Coffman Engineers Carmen Cujedo, Ecotope
ILFI	International Living Future Institute	Stacia Miller, Policy & Advocacy Manager Brad Liljequist, Technical Director

DSA	Downtown Seattle Association	Economic Development Task Force Jack McCullough, Chair
UA 32	UA Local 32 Pipefitter / Plumbers	Leanne Guier, Business Development Steve Gelb, Emerald Cities
	EnWave Seattle	Stan Gent, President Marco Lowe, Vice President Brandon Oyer, Director of Engineering Hillary Higgins, Brookfield Asset Management Mike Mann, Cyan Strategies
	Climate Solutions	Elizabeth Wilmont, New Energy Cities Mgr Eileen Quigley, Director, Strategic Innovation Jenna Garmon, Research Analyst
NWEC	Northwest Energy Coalition	JJ McCoy, Senior Policy Associate
SCIDPDA	Seattle Chinatown-International District Public Development Authority	Paul Mar, Director of Real Estate Development
SAGE	Puget Sound Sage	Dionne Foster, Policy Analyst
PSE	Puget Sound Energy	Jason Hyatt, Senior Energy Management Engineer
NEEC	Northwest Energy Efficiency Council	Stan Price, Executive Director Janet Stephenson, Board of Directors (from Glumac)
	Glumac	Janet Stephenson, Dana Troy, Max Wilson, Angela Templin, Travis Lynn, Marc Inman, + additional staff
	MacDonald-Miller	Perry England, Vice President
	McKinstry	Megan Owen, Director of Strategic Market Development Robert Hail, Project Director Mark Jonson, Business Development Manager

## 6.2.0 APPENDIX B: Benchmarking & Transparency Programs

### 6.2.1 Transparency Timelines in Other Cities

<i>Jurisdiction</i>	<i>Legislation</i>	<i>First Year of Data Collected</i>	<i>First Year of Data Published</i>
<i>Atlanta</i>	April 2015	2015 (public >25K) 2016 (private >25K)	2015 (public >25K) 2016 (private >25K)
<i>Berkeley</i>	March 2015	2015 (>50K) 2016 (>25K)	2015 (>50K) 2016 (>25K)
<i>Boston</i>	May 2013	2012 (public) 2013 (non-residential >50K) 2014 (residential >50K or 50 units) 2015 (non-residential >35K) 2016 (residential >35K or 35 units)	2012 (public) 2014 (non-residential >50K) 2015 (residential >50K or 50 units) 2016 (non-residential >35K) 2017 (residential >35K or 35 units)
<i>Cambridge</i>	July 2014	2014 (public, residential >50 units, non-residential >50K) 2015 (non-residential >25K)	2014 (public) 2015 (residential >50 units, non-residential >50K) 2016 (non-residential >25K)
<i>Chicago</i>	September 2013	2013 (public and non-residential >250K) 2014 ( public and non-residential >50K, residential >250K) 2015 (residential >50K)	2014 (public and non-residential >250K) 2015 ( public and non-residential >50K, residential >250K) 2016 (residential >50K)
<i>District of Columbia</i>	July 2008	2010 (>200K) 2011 (>150K) 2012 (>100K) 2013 (>50K)	2011 (>200K) 2012 (>150K) 2013 (>100K) 2014 (>50K)
<i>Kansas City</i>	June 2015	2015 (public >10K) 2016 (private <100K) 2017 (private <50K)	2015 (public >10K) 2017 (private <100K) 2018 (private <50K)
<i>Minneapolis</i>	February 2013	2012 (public) 2013 (non-residential <100K) 2014 (non-residential <50K)	2012 (public) 2014 (non-residential <100K) 2015 (non-residential <50K)
<i>Montgomery County</i>	April 2014	2014 (public <50K) 2015 (private <250K) 2016 (private <50K)	2015 (public <50K) 2016 (private <250K) 2017 (private <50K)
<i>New York City</i>	December 2009	2009 (public <10K) 2010 (non-residential <50K) 2011 (residential <50K)	2010 (public <10K) 2011 (non-residential <50K) 2012 (residential <50K)
<i>Philadelphia</i>	June 2012	2011 (public >10K) 2012 (non-residential >50K)	2011 (public >10K) 2013 (non-residential >50K)
<i>Portland</i>	April 2015	2015 (non-residential >50K) 2016 (non-residential >20K)	2016 (non-residential >50K) 2017 (non-residential >20K)
<i>San Francisco</i>	February 2011	2011 (non-residential >50K) 2012 (non-residential >25K) 2013 (non-residential >10K)	2012 (non-residential >50K) 2013 (non-residential >25K) 2014 (non-residential >10K)

### 6.2.2 Information Typically Disclosed by Benchmarking Cities

Building Information	Energy Performance Information
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<ul style="list-style-type: none"> <li>• Building address</li> <li>• Building name</li> <li>• GPS Coordinates</li> <li>• Tax parcel number</li> <li>• Neighborhood name</li> <li>• Building owner name</li> <li>• Building owner address</li> <li>• Building owner contact information</li> <li>• Year of construction</li> <li>• Primary/additional use type(s)</li> <li>• Gross floor area</li> </ul>	<ul style="list-style-type: none"> <li>• ENERGY STAR score (when available)</li> <li>• Site energy use intensity (Site EUI)</li> <li>• Weather normalized site EUI</li> <li>• Source energy use intensity (Source EUI)</li> <li>• Weather normalized source EUI</li> <li>• Total electricity use</li> <li>• Total natural gas use</li> <li>• Total steam use</li> <li>• Total greenhouse gas emissions</li> <li>• Greenhouse gas emissions intensity</li> <li>• National median comparisons</li> <li>• Local median comparisons</li> </ul>
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### 6.2.3 Case Studies

The case studies below are compiled from each cities’ benchmarking legislation, outreach materials and public disclosure websites and from interviews of benchmarking staff at each City.

#### WASHINGTON, DC

<i>Policy Title</i>	<b>Clean and Affordable Energy Act of 2008 (Title V: Energy Benchmarking Requirements for Private and Government Buildings)</b>
<i>Policy Description</i>	All private commercial and multifamily buildings greater than or equal to 50,000 gross square feet (and municipal buildings greater than or equal to 10,000 gross square feet) must benchmark their energy use via ENERGY STAR Portfolio Manager. Beginning with the second year of benchmarking, energy performance data is disclosed on the District Department of Environment website. Because the benchmarking requirement was phased in according to building size over several years, the 2014 data (to be published in late 2015) will be the first published dataset to include all buildings covered by the benchmarking law.
<i>First year of data published</i>	2011 (Buildings >200,000 ft <sup>2</sup> ) 2012 (Buildings >150,000 ft <sup>2</sup> ) 2013 (Buildings >100,000 ft <sup>2</sup> ) 2014 (Buildings >50,000 ft <sup>2</sup> )
<i>Metrics Disclosed</i>	DC Real Property ID, Building Address, Building Owner, Ward, Building Name, Primary Property Type, Year Built, Reported Gross Floor Area (ft <sup>2</sup> ), Site EUI (kBtu/ft <sup>2</sup> ), Weather Normalized Source EUI (kBtu/ft <sup>2</sup> ), ENERGY STAR Score, Total GHG Emissions, Total GHG Emissions Intensity, Electricity Use (kWh), Natural Gas Use (therms), District Steam Use (kBtu), Other Fuel Use, Water Use (kgal), Coordinates for GIS mapping, Electric interval data (municipal buildings only)
<i>Website Address</i>	<ul style="list-style-type: none"> <li>• <a href="http://www.buildsmartdc.com">http://www.buildsmartdc.com</a> (Municipal Buildings)</li> <li>• <a href="http://opendata.dc.gov/datasets/d9d0410e00a6424ab7ee6479023bebd4_0">http://opendata.dc.gov/datasets/d9d0410e00a6424ab7ee6479023bebd4_0</a> (Private Buildings)</li> </ul>
<i>Website Features</i>	Municipal buildings: Includes searchable catalogue with photographs, descriptions, and on-map locations of each building, along with most recent annual energy benchmark data (including the annual energy cost in dollars) and almost-live energy use data in 15 minute intervals. Downloadable data and charts. Social-media ready.  Private buildings: Downloadable and sortable spreadsheets of energy performance

<i>Using the Data</i>	<p>benchmark data. Capable of creating charts based on user’s data selection. Plans are underway for a map-based data, either through the existing structure for their public facilities or a webpage similar to that used by Philadelphia. They are interested in including complete profiles and report cards for each building.</p> <p><i>Supporting Programs:</i> The previous mayor presented awards to buildings with the highest certified ENERGY STAR score and found that buildings greatly valued that local competition &amp; recognition factor.</p> <p><i>Media:</i> Several news outlets ran stories highlighting buildings on the high and low ends of the spectrum. Some reporters misunderstood the EUI metric and ran stories highlighting high EUIs of several LEED buildings without understanding or explaining the context. DDOE conducted some media outreach/education, but suggests that more may have been useful in light of the apparent confusion.</p> <p><i>Building Market:</i> There have been anecdotal reports of buildings increasing their budgets for sustainability improvements. The local conservation utility reports seeing a higher starting level of knowledge from building owners and managers with whom they engage.</p>
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## MINNEAPOLIS, MN

<i>Policy Title</i>	<b>Commercial Building Rating and Disclosure Ordinance</b>
<i>Policy Description</i>	<p>All non-residential and non-industrial buildings greater than or equal to 50,000 gross square feet (and municipal buildings greater than or equal to 25,000 gross square feet) must benchmark their energy use via ENERGY STAR Portfolio Manager beginning in their second year of operation. Energy performance data, including aggregated summary data, is disclosed on the City of Minneapolis website. Because the benchmarking requirement was phased in according to building size over several years, the 2015 data (to be published in 2016) will be the first published dataset to include privately-owned buildings covered by the benchmarking law. To date, only public buildings have been disclosed.</p>
<i>First year of data published</i>	<p>2012 (Municipal Buildings &gt;25,000 ft<sup>2</sup>) 2014 (Commercial Buildings &gt;100,000 ft<sup>2</sup>) 2015 (Commercial Buildings &gt;50,000 ft<sup>2</sup>)</p>
<i>Metrics Disclosed</i>	<p>Property Name, ENERGY STAR Score, Property Type, Address, Floor Area (ft<sup>2</sup>), Year Built, Total GHG Emissions (MtCO<sub>2</sub>e), Site EUI (kBtu/ft<sup>2</sup>), Weather Normalized Site EUI (kBtu/ft<sup>2</sup>), Source EUI (kBtu/ft<sup>2</sup>), Weather Normalized Source EUI (kBtu/ft<sup>2</sup>),</p>
<i>Website Address</i>	<p><a href="http://www.ci.minneapolis.mn.us/environment/energy/WCMS1P-116916">http://www.ci.minneapolis.mn.us/environment/energy/WCMS1P-116916</a> (Municipal Buildings)</p>
<i>Website Features</i>	<p>Municipal Buildings: Energy performance data is available in several formats on the City of Minneapolis website: 1) a PDF report including summary statistics, charts, written analysis, and a table of individual buildings’ results; 2) included on a searchable PropertyInfo database that also discloses zoning information, etc.; 3) a map interface where clicking on a property pulls up a call-out box with energy performance data.</p>
<i>Using the Data</i>	<p><i>Supporting Programs:</i> Minneapolis recently received a \$40,000 grant from the State Pollution Control Agency to certify around 50 ENERGY STAR eligible buildings.</p> <p><i>Data Verification:</i> All benchmarking data will be published so long as the reporting building is in compliance with the ordinance.</p>

*Media:* There was no real media coverage of disclosure of municipal buildings, but a local public radio reporter (unwilling to wait for the city’s report later this year) recently submitted a FOIA request for private buildings.

## NEW YORK, NY

<i>Policy Title</i>	<b>Local Law 84: Benchmarking</b>
<i>Policy Description</i>	All commercial and multifamily buildings greater than or equal to 50,000 gross square feet must benchmark their energy use via ENERGY STAR Portfolio Manager each year. Energy performance data is disclosed on the City of New York website.
<i>First year of data published</i>	2010 (Municipal Buildings) 2011 (Commercial Buildings) 2012 (Residential Buildings)
<i>Metrics Disclosed</i>	NYC Borough-Block-Lot (BBL) Identifier, NYC Building Identification Number (BIN), Address, Benchmarking Submission Status, Site EUI (kBtu/ft <sup>2</sup> ), Weather Normalized Site EUI (kBtu/ft <sup>2</sup> ), Source EUI (kBtu/ft <sup>2</sup> ), Weather Normalized Source EUI (kBtu/ft <sup>2</sup> ), Municipally Supplied Potable Water - Indoor Intensity (gal/ft <sup>2</sup> ), ENERGY STAR Score, Total GHG Emissions (MtCO <sub>2</sub> e), Direct GHG Emissions (MtCO <sub>2</sub> e), Indirect GHG Emissions (MtCO <sub>2</sub> e), Reported Property Floor Area (ft <sup>2</sup> ), Primary Property Type, Number of Buildings
<i>Website Address</i>	<a href="http://www.nyc.gov/html/gbee/html/plan/ll84_scores.shtml">http://www.nyc.gov/html/gbee/html/plan/ll84_scores.shtml</a>
<i>Website Features</i>	Building energy performance data is available in downloadable Excel spreadsheets and a searchable spreadsheet format that also allows users to create graphs and other visuals to compare data. The City of New York also publishes an annual report on the program including aggregated summary data and written analysis.
<i>Using the Data</i>	<i>Supporting Programs</i> New York plans to move toward a NYC-specific comparative metric and a personalized report card for individual building owners showing local peer comparisons and improvement over time.  <i>Media:</i> When disclosure first began, NYC assigned letter grades based on quartile association on buildings. This generated considerable media attention from reporters who mischaracterized low grades as an indictment of poor performer. They no longer publish building grades.  <i>Building Market:</i> A Department of Energy report indicated that buildings covered by the policy reduced their energy use 5.7% over 4 years between 2010 and 2013. <sup>8</sup> DOE’s report also suggests more building managers, real estate professionals, tenants, and investors are more aware of and attentive to energy use. However, the report notes that the policy has not yet driven wide-scale capital improvements for deeper energy efficiency.
<i>Companion Policies</i>	“Local Law 87 (LL87) mandates that buildings over 50,000 gross square feet undergo periodic energy audit and retro-commissioning measures. . LL88 requires large non-residential buildings to upgrade lighting to meet current New York City Energy Conservation Code standards, and to install electrical sub-meters for each large non-residential tenant space and provide monthly energy statements.”

<sup>8</sup> US DOE, *New York City Benchmarking and Transparency Policy Impact Evaluation*. Report. May 2015

[www.nyc.gov/html/gbee/html/plan/plan.shtml](http://www.nyc.gov/html/gbee/html/plan/plan.shtml)

## PHILADELPHIA, PA

<i>Policy Title</i>	<b>Philadelphia Code §9-3402: Benchmarking Energy and Water Use</b>
<i>Policy Description</i>	All commercial buildings greater than or equal to 50,000 gross square feet must benchmark their energy use via ENERGY STAR Portfolio Manager each year. Energy performance data is disclosed on the City of Philadelphia website. In addition, building owners must provide prospective buyers and lessees with the most recent ENERGY STAR Energy Performance report upon request.
<i>First year of data published</i>	2011 (Municipal Buildings) 2012 (Commercial Buildings)
<i>Metrics Disclosed</i>	Property Name, Address, Primary Property Type, Property Floor Area, Year Built, Number of Buildings, Philadelphia Building ID, Electricity Use (kBtu), Natural Gas Use (kBtu), Fuel Oil #2 Use (kBtu), District Steam Use (kBtu), ENERGY STAR Score, Site EUI (kBtu/ft <sup>2</sup> ), Source EUI (kBtu/ft <sup>2</sup> ), Water Use (kgal), Total GHG Emissions (MtCO <sub>2e</sub> ), Notes from Building Owners/Operators
<i>Website Address</i>	<a href="http://visualization.phillybuildingbenchmarking.com/#/">http://visualization.phillybuildingbenchmarking.com/#/</a>
<i>Website Features</i>	Searchable, filterable, and interactive map-based interface featuring individual profiles with building stats compared graphically to other buildings in the City. Data is available for both public and private buildings in separate tables online, as well as in downloadable .csv formats. Individual building performance, sector performance, and compliance rates for both private and municipal buildings are also summarized and aggregated each year in a written analysis report.
<i>Using the Data</i>	<i>Supporting Programs:</i> They are developing personalized report cards for each building, which would be available online but only accessible by the building owner.  <i>Media:</i> Some media reports immediately after data disclosure called out poor performers, signaling that perhaps media needs additional attention on what exactly benchmarking scores describe.  <i>Building Market:</i> The data visualization platform typically experiences major uptick in web traffic after new data is released.

## Australia

Internationally, National Australian Built Environment Rating System (NABERS) is one of the more successful building rating and disclosure programs. As of November 2011, the federal government of Australia requires sellers and lessors of office spaces greater than 2,000 square meters (21,528 square feet) to obtain and disclose a current Building Energy Efficiency Certificate (BEEC), when advertising space or undertaking a transaction. The BEEC includes a NABERS energy score (rated on a system of zero to six stars) determined by an independent, accredited assessor and is publicly accessible online. While NABERS has different tools to assess base building efficiency, tenanted spaces efficiency, and whole building efficiency, the BEEC required for the Commercial Building Disclosure rule employs the base

building rating system. This covers performance of the building's central services and common areas, but does not take into account lighting or other energy used directly by tenants.

About 72% of Australian office space has now been rated by NABERS. When mandatory transparency of NABERS ratings began in 2011, the average rating dipped slightly (likely because poor performers were obligated to obtain and declare ratings for the first time) but within a year it had bounced back to pre-mandatory disclosure levels. Since then, average ratings have increased steadily. Office buildings that regularly measure their performance have reported an average improvement in energy efficiency of 8.5%, and research shows that higher rated buildings have reduced vacancy rates and enhanced property values.



### 6.3.0 APPENDIX C: Building Audit and Retro-commissioning Case Studies

#### ATLANTA, GA

<i>Policy Title</i>	<b>Commercial Buildings Energy Efficiency Ordinance</b>
<i>Policy Description</i>	As part of an ordinance that includes benchmarking and disclosure of building performance data, Atlanta requires public buildings and private commercial or multifamily buildings to perform energy audits on base building systems every ten years. Audits are required on a schedule according to a building's Atlanta ID number. Audits must be performed by professionals possessing at least one certification from a list included in the ordinance. The minimum requirements for the audit itself (including a list of all reasonable measures that would reduce energy use if implemented and their costs/paybacks) are also specified in the ordinance. The ordinance also includes detailed specifications for retro-commissioning, though currently makes compliance with that section optional.
<i>First year of compliance</i>	2016 (public buildings >25K ft <sup>2</sup> , commercial/multifamily buildings >50K ft <sup>2</sup> ) 2017 (commercial/multifamily buildings >25K ft <sup>2</sup> )
<i>Frequency</i>	Every 10 years

#### AUSTIN, TX

<i>Policy Title</i>	<b>Energy Conservation Audit and Disclosure Ordinance</b>
<i>Policy Description</i>	Austin's ordinance requires energy audits and disclosure of results for all homes and multifamily buildings which are served by Austin Energy and located within Austin city limits.  Owners of 1-4 unit residential properties (10 years old and greater) must have an energy audit conducted by a professional certified by the City of Austin prior to selling their property. The audit must meet minimum standards specified by Austin Energy and the results of the audit must be disclosed to potential buyers.  Owners of multifamily buildings must have an energy audit conducted by a professional certified by the City of Austin every 10 years, and make the results available to current and prospective residents. Multifamily buildings using over 150% of average energy use (for similar properties) must implement upgrades sufficient to reduce their EUI by 20% and provide a "High Energy Use Report" to current and prospective residents.
<i>First year of compliance</i>	2011 (multifamily buildings and residential properties)
<i>Frequency</i>	Before sale (1-4 unit homes) Every 10 years (multifamily buildings)

#### BOSTON, MA

<i>Policy Title</i>	<b>Building Energy Reporting and Disclosure Regulations</b>
<i>Policy Description</i>	Boston's ordinance requires buildings greater than 35,000 ft <sup>2</sup> to perform either an "energy assessment" or an "energy action" every five years. Energy audits for buildings >50,000 ft <sup>2</sup> must meet the ASHRAE Level 2 standard. An "energy action" must be some efficiency upgrade or renewable electricity project that reduces annual energy assumption or greenhouse gas emissions by at least 15 percent. The action must be accompanied by an "Energy Action Report" that documents the required

	reduction. ENERGY STAR rated buildings, LEED certified buildings, and some others are exempt from the audit requirement. Boston is currently in conversations with remote audit providers (Retroefficiency) to discuss how they might satisfy the requirement. Specific audit requirements are still to be determined for buildings under 50,000 ft <sup>2</sup>
<i>First year of compliance</i>	2019 (non-residential buildings >50K) 2020 (residential buildings >50K or 50 units) 2021 (non-residential buildings >35K) 2022 (residential buildings >35K or 35 units)
<i>Frequency</i>	Every 5 years
<i>Impact</i>	Since the first year for required audits isn't until 2019, owners have yet to take action. However, at least one building owner reached out to the city prior to purchasing a large tower to check if an audit had already been completed on that building, evidence they are factoring in the energy assessment into real estate transactions..

## NEW YORK, NY

<i>Policy Title</i>	<b>Local Law 87: Energy Audits and Retro-commissioning</b>
<i>Policy Description</i>	New York's ordinance requires energy audits and retro-commissioning for base building systems of commercial and multifamily buildings greater than 50,000 ft <sup>2</sup> every ten years. The audit process must be at least as stringent as the ASHRAE Level 2 specifications. Retro-commissioning must meet minimum protocols established in the ordinance, and be conducted by a certified retro-commissioning agent. The audit and retro-commissioning activities must be summarized in an "energy efficiency report" filed with the City of New York. The energy audit requirement is waived for buildings that meet ENERGY STAR, LEED for Existing Buildings, or similar certification for at least two of the three years leading up to their audit deadline. No retro-commissioning is required for buildings certified by LEED for Existing Buildings which earned points for Existing Building Commissioning analysis and implementation.
<i>First year of compliance</i>	2013
<i>Frequency</i>	Every 10 years
<i>Impact</i>	Survey/anecdotal reports suggest around 80% of large commercial buildings (and 3% of multifamily buildings) that conducted an audit performed some of the audit recommendations. New York notes that by opting to allow a wide range of certifications to perform audits in order to ensure sufficient labor supply in the local market, it may have compromised data quality to some degree. Some building owners have objected to the cost of the audits – which can range from \$0.25-0.50/ft <sup>2</sup> – as well as the redundancy of the retro-commissioning completing similar tasks as a level 1 ASHRAE audit.

**SAN FRANCISCO, CA**

<i>Policy Title</i>	<b>Existing Commercial Buildings Energy Performance Ordinance</b>
<i>Policy Description</i>	San Francisco’s ordinance requires non-residential buildings larger than 10,000 ft <sup>2</sup> to obtain a comprehensive energy efficiency audit of the entire building every five years. At a minimum, audits must meet ASHRAE Level 1 requirements (and ASHRAE Level 2 for buildings larger than 50,000 ft <sup>2</sup> ). Audits must be conducted by qualified professionals who meet minimum certification and experience requirements as specified by the San Francisco Department of Environment. The auditor must submit a “Confirmation of Energy Audit,” which includes a summary of cost-effective energy efficiency measures, to the Department of Environment. Buildings can also choose to pursue retro-commissioning as an alternative means to satisfy the audit requirement. While there is no specific language outlining what qualifies as retro-commissioning, the buildings that have opted to comply this way have all done so through established pathways with utilities. San Francisco also defers to the California Commissioning Collaborative on protocol for existing building commissioning.
<i>First year of compliance</i>	2013
<i>Frequency</i>	Every 5 years
<i>Impact</i>	Audit reports require that the auditor note which upgrades the building owner intends to take, but it has been difficult to follow up to see whether or not they actually took place. Anecdotally, case studies indicate that buildings are acting on audit recommendations, even buildings that were unhappy about the audit requirement . To be more effective, San Francisco recommends allowing alternative compliance pathways for small/simple buildings with low overall energy use as audits are rarely cost effective for such buildings, as well as looking into remote audits as a tool to keep costs low for building owners.