



The Energy Reporting Requirement – A Background Report

February 2014

The purpose of this background paper is to provide a foundation for discussing the possible implementation of an energy reporting requirement for owners/managers of large buildings in Toronto.

What is an Energy Reporting Requirement?

An **Energy Reporting Requirement (ERR)** is a policy that requires the owners and/or managers of large buildings to measure and report their annual energy use. Numerous jurisdictions across the United States and elsewhere in the world have implemented ERR policies, which are sometimes referred to as energy benchmarking, energy rating¹ and disclosure, or energy labelling policies².

Typically, ERR policies require building owners to submit annual energy use reports³ to a government body, which then analyses the information and makes it available to the public. However, some jurisdictions only require building owners to disclose energy use to buyers, lessees, and/or lenders at the time of transaction (e.g. sale, lease, or loan)⁴. ERR policies also differ in accordance with the type and size of the building. Most commonly, ERRs are used for commercial buildings, but many policies also apply to municipal and multi-unit residential buildings. In most of the U.S. jurisdictions where ERR policies have been implemented, the ERR applies to commercial and multi-residential buildings that have a footprint of 50,000 square feet or greater. However, some jurisdictions have set thresholds at 10,000 square feet⁵.

How Does an Energy Reporting Requirement Work?

An ERR requires that building operators track and report their buildings' annual energy consumption. Based on the information provided through an ERR, a city can create a database of comparable building data, which can be analysed to form an accurate picture of building sector energy use. In this way, building owners not only track their buildings' improvements over time, they can also compare or benchmark their buildings' energy performance⁶ relative to a norm or standard, or to a group of peers⁷. At the same time, investors and consumers are provided with the energy information required to make informed real estate investment decisions, strengthening market pressures for improvement.

Measuring and Tracking Energy Use Leads to Energy Savings

Experience shows that the practice of reporting and comparing energy use leads to a reduction in energy consumption. For example, an EPA study of more than 35,000 U.S. buildings that were benchmarked⁸ between 2008 and 2011 found that buildings that consistently reported their energy performance achieved a total of 7% energy savings over that four year period (or an average of 2.4% energy savings per year)⁹.

A 2011 survey conducted by the American Centre for an Energy Efficient Economy (ACEEE) found that 62% of building owners and utility customers in California who registered for utility benchmarking workshops and benchmarked their buildings reported that their organizations changed their energy consumption patterns since they started benchmarking. In addition, 84% indicated that they had planned or implemented efficiency improvements since they started benchmarking¹⁰.

Energy Reporting Requirements in Action

Energy reporting requirements for existing buildings have been successfully implemented throughout the United States and elsewhere, and are now regarded as a best practice for accelerating energy efficiency in commercial buildings. American Jurisdictions that have adopted ERR policies include Austin (2008), Boston (2013), Chicago (2013), Washington D.C. (2008), Minneapolis (2013), New York City (2009), Philadelphia (2012), San Francisco (2011), Seattle (2010), the State of California (2007) and Washington State (2009), as well as the European Union (2002), Australia (2010), Brazil(2007), and China (2008). The tables below profile just a few of those jurisdictions' policies.

New York City	
	(Legislation passed December 2009)
Size and Type of Building Covered:	Commercial, mixed-use, and multi-residential buildings >50,000 ft ² Municipal buildings >10,000 ft ²
Information Disclosure Requirement:	<ul style="list-style-type: none"> Report energy and water use to government annually. Government posts results in an excel spreadsheet on the City's public web site: http://www.nyc.gov/html/gbee/html/plan/ll84_scores.shtml
Rating tool used:	ENERGY STAR Portfolio Manager
First compliance period	May 2010 for municipal buildings May 2011 for commercial, mixed-use, and residential buildings
Outcomes to date:	<ul style="list-style-type: none"> 75% compliance rate in 2012 (up from 64% in 2011) Median ENERGY STAR score increased from 64 to 67 from 2011 to 2012
Interesting aspects of jurisdiction-specific experience:	<ul style="list-style-type: none"> NYC partnered with universities, energy service companies, and the local Green Building Council chapter for assistance with data analysis, technical support, and outreach to building owners¹¹. NYC's benchmarking policy (LL84) is one of four regulatory pieces that make up NYC's Greener Greater Buildings Plan. The other policies require that renovations and alterations meet NYC's Energy Conservation Code (LL85), require energy audits and retro-commissioning every 10 years (LL87), and require lighting upgrades and sub-metering (LL88). These policies are supplemented by job training opportunities and financing.¹² City government reports annually on city-wide energy use and trends.

San Francisco (Legislation passed February 2011)	
Size and Type of Building Covered:	Non-residential buildings >10,000 ft ²
Information Disclosure Requirement:	<ul style="list-style-type: none"> • Disclose to current tenants and to buyers, lessees, and lenders at time of transaction. • Report annual energy benchmarking summary (AEBS) to government. • Government publishes AEBS results on a public web site.
Rating tool used:	ENERGY STAR Portfolio Manager
First compliance period	October 1, 2011 for buildings >50,000 ft ² April 1, 2012 for buildings >25,000ft ² April 1, 2013 for buildings >10,000ft ²
Outcomes to date:	The ordinance is expected to result in a doubling in energy retrofits over five years, which will reduce CO ₂ emissions by more than 70,800 tons, and save more than \$600 million ¹³ .
Interesting aspects of jurisdiction-specific experience:	To give San Francisco building owners time to understand the energy reporting process and a chance to improve their buildings' performance, buildings' very first AEBS scores will not be published.

District of Columbia (Legislation passed July 2008) ¹⁴	
Size and Type of Building Covered:	Commercial and multi-residential >50,000 ft ² Municipal >10,000 ft ²
Information Disclosure Requirement:	<ul style="list-style-type: none"> • Report energy and water use to government annually • Government makes reported information available on a public web site.
Rating tool used:	ENERGY STAR Portfolio Manager
First compliance period	2009 for municipal buildings 2010 for buildings > 200,000 ft ² 2011 for buildings > 150,000 ft ² 2012 for buildings > 100,000 ft ² 2013 for buildings over 50,000 ft ²
Outcomes to date:	<ul style="list-style-type: none"> • 399 public buildings benchmarked and profiled on public web site. • Government is now engaged in 29 energy and water use reduction projects in public buildings. • Private building energy use data will be posted online in winter 2014.
Interesting aspects of jurisdiction-specific experience:	<ul style="list-style-type: none"> • Phasing in compliance requirements, starting with government initially leading by example, was a successful approach because it demonstrated both the feasibility and the benefits of benchmarking.

Seattle (Legislation passed January 2010) ¹⁵	
Size and Type of Building Covered:	Non-residential and multi-unit residential buildings >20,000 ft ²
Information Disclosure Requirement:	<ul style="list-style-type: none"> • Report energy use to government annually. • Disclose energy use information to current and prospective tenants, prospective buyers and lenders, upon request.
Rating tool used:	ENERGY STAR Portfolio Manager
First compliance period	2011 for buildings >50,000 ft ² 2012 for buildings >20,000 ft ²
Outcomes to date:	<ul style="list-style-type: none"> • 93% compliance rate • Identified the potential for \$55million in annual energy savings if the worst performing 25% of buildings were brought up to national average ENERGY STAR ratings.¹⁶
Interesting aspects of jurisdiction-specific experience:	<ul style="list-style-type: none"> • Building size threshold was initially set at >10,000 ft², but was later raised to >20,000 ft² to better match the City's capacity to implement the policy.¹⁷ • Seattle achieved its policy's high compliance rate through strong outreach efforts to building owners that included technical support, and enforcement.

United Kingdom (UK Regulations passed in 2007) ¹⁸	
Legislation passed:	Energy Performance of Buildings Directive passed by European Union in 2002, Energy Performance of Buildings Regulations passed in England & Wales in 2007
Size and Type of Building Covered:	Residential and commercial buildings >50m ² (asset rating) Public buildings >1000m ² (approx. 11,000ft ²) (asset <i>and</i> operational rating)
Information Disclosure Requirement:	<ul style="list-style-type: none"> • Property owners must disclose Energy Performance Certificates (EPCs) to prospective buyers or lessees¹⁹. • Government stores EPCs in a central registry, which is accessible online²⁰. • Public buildings must place a Display Energy Certificate (an operational rating) in public view inside the building. • Commercial buildings >500m² that are frequently visited by the public must display an EPC if one has been issued.
Rating tool used:	UK Energy Performance Certificate (asset rating) and Display Energy Certificate (operational rating).
First compliance period	April 2008 for commercial buildings >10,000m ² July 2008 for commercial buildings >2,500m ² October 2008 for all remaining commercial buildings >50m ²
Outcomes to date:	As of August 2012: <ul style="list-style-type: none"> • 8.1 million Energy Performance Certificates for residential buildings • 357,000 Energy Performance Certificates for non-residential buildings • 124,000 Display Energy Certificates for public buildings²¹
Interesting aspects of jurisdiction-specific experience:	<ul style="list-style-type: none"> • If an EPC exists for a building, the EPC rating must be disclosed in any commercial media advertisements for the sale or renting of the property. • Property owners must make EPCs available to prospective buyers and lessees at the earliest opportunity, at least at the time of providing written information about the building, or when showing the building.

Benefits of Adopting an Energy Reporting Requirement

Community Benefits

Consumer and Investor Protection through Better Access to Building Energy Use Data

When buying a vehicle, consumers can compare the fuel efficiency of various models and incorporate that information into their purchasing decisions. Buying or leasing real estate is a much larger financial commitment than buying a car, but the equivalent access to energy efficiency information does not currently exist in the buildings sector. Energy reporting requirements make information about a building’s energy performance transparent, allowing would-be buyers, lessees and lenders to make decisions based on a price signal that might otherwise be obscured²².

Green Jobs

Increased demand for energy efficiency goods and services translates into local jobs for skilled workers (e.g. to perform energy audits, retro-commissioning, and energy-saving upgrades and retrofits). For example, in 2012, the Political Economy Research Institute and the Institute for Market Transformation did an analysis of job creation and energy cost savings as a result of building energy rating and disclosure policies. They calculated that 15.74 jobs are created for every \$1 million spent on operational improvements, and that around 13 jobs are created for every \$1 million spent on capital upgrades. In addition, they estimated that almost 10 jobs are created for every \$1 million of energy cost savings that are directed to non-energy spending²³.

CASE STUDY: Affordable Housing	527 12 th Avenue East, Seattle ²⁴
<ul style="list-style-type: none"> ➔ Benchmarking allowed Bellwether Housing to identify poorly performing buildings in its portfolio ⦿ An energy audit identified why Mercer Court’s energy costs were high and identified appropriate upgrades ⦿ Easy fixes yielded a ✓ 40% reduction in energy use in October and November 2011 compared to 2010 	 <p data-bbox="1068 1066 1307 1325">“For us, benchmarking and making energy-efficiency improvements isn’t just about helping the environment, it is also a good</p> <p data-bbox="638 1339 1307 1438">business decision. Our mission is to help families afford more than rent, so the more we can do to lower our energy costs and keep housing affordable, the better.”</p> <p data-bbox="688 1444 1307 1497">- Lynda Carey, Construction and Asset Manager at Bellwether</p>

Benefits for Building Owners

Energy Performance Information Informs Investment Decisions

Measuring and annually reporting on building energy use provides building owners and managers with valuable information that can help identify underperforming buildings in a portfolio and prioritize opportunities to invest in improving energy efficiency. For example, a 2012 survey conducted by the trade magazine *Building Operating Management* and Siemens Industry Inc. found that 73% of facility managers who had benchmarked their facilities had made efforts to improve their facilities’

performance as a direct result of their initial scores²⁵. Benchmarking also allows building owners to verify that savings from energy efficiency investments are being realized.

Achieving Cost Savings and Safeguarding Against Energy Cost Increases

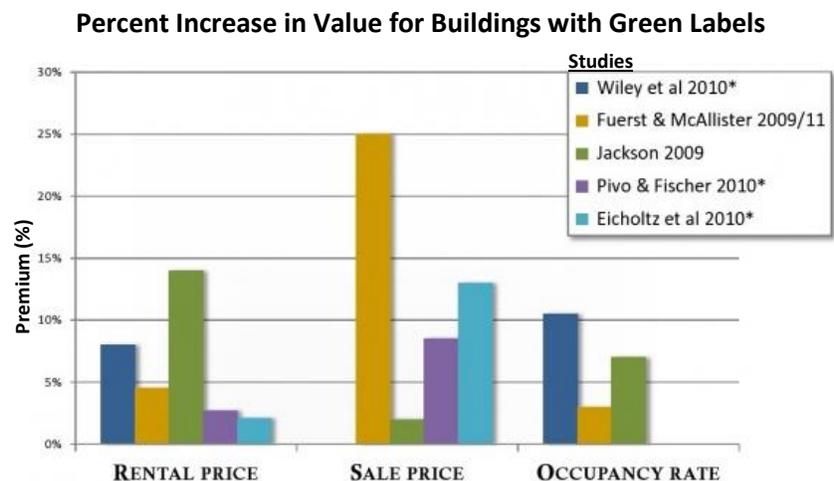
Building owners and cities alike are looking for ways to better manage energy costs. According to the EPA in the U.S., energy consumption represents 30% of a typical office building's costs and is a property's single largest operating expense²⁶. Energy prices are also notoriously volatile, which means that reducing energy use not only yields overall energy savings, but could also help offset increases in the price of natural gas and electricity. For example, One Franklin Square in Washington D.C. is a mixed-use building owned by the real estate company Hines. Hines has a company-wide policy requiring energy tracking, and it first benchmarked One Franklin Square in 1999. Since then, the company has continued to make small changes to improve the building's energy performance, raising the building's ENERGY STAR score from an already respectable 77 to an impressive 89. As a result, although utility rates in the D.C. area have increased by 125% over the past 18 years, Hines' tenants at One Franklin Square have only experienced a 19% increase in their utility bills over the same period²⁷.

CASE STUDY: Office Space and Retail		One Franklin Square, District of Columbia ²⁸
<ul style="list-style-type: none"> ➔ Regular benchmarking since 1999 showed how much energy was being used and how much was being saved by energy efficiency measures. ➡ Owner looked at hourly energy needs of tenants to help them implement smart operational changes. ✓ Reduced utility charges by 13% in the first three years with no capital changes. 		<p>“As utility rates continued to rise, the cost per square foot for utilities steadily declined due to operational changes and technology upgrades.”</p> <p>- Mark Jensen, Engineering Manager</p>

Marketplace Recognition of Energy Performance

Reporting annually on building energy use is a way of recognizing and rewarding building owners for their investments in energy efficiency. For top performing buildings, participation in an ERR program can also facilitate certification in voluntary green building labelling programs like LEED EB:O&M, BOMA BEST, or ENERGY STAR. Studies show that buildings with green labels benefit from higher sale prices, rental rates, and occupancy rates than non-green-labelled buildings²⁹.

This valuing of energy efficiency is reflected in the results of a 2011 survey of workshop participants in California who had benchmarked their buildings. More than half had used or expected to use their benchmarking activities to market their buildings, and 35% reported that benchmarking had played a role in the acquisition of new buildings by their organization³⁰.



(Adapted from the Institute for Market Transformation)

Benefits to the City

Achieving Toronto’s 2020 Greenhouse Gas Reduction Target

The City of Toronto has a target of reducing its GHG emissions by 30% below 1990 levels by 2020, equivalent to approximately 19.1million tCO_{2e}³¹. Roughly half of Toronto’s GHG emissions come from buildings³². Energy efficiency standards in the building code affect the emissions levels in new buildings – Toronto has shown leadership on this front by adopting the Toronto Green Standard³³. However, existing buildings represent a much larger source of GHG emissions in Toronto³⁴. Furthermore, even for new buildings built to TGS, building operations and management practices will have major impacts on performance. Implementing an ERR would go a long way toward meeting the city’s GHG reduction targets. If Toronto were to implement an energy reporting requirement for all commercial and multi-residential buildings larger than 50,000ft² starting in 2015, the resulting city-wide reduction in annual GHG emissions in 2020 would be approximately 350,000 tCO_{2e} per year³⁵.

Opportunity to Implement “Conservation First”

An energy reporting requirement for existing buildings aligns perfectly with the Conservation First focus of the province’s updated Long Term Energy Plan. Reducing the overall energy consumption of Toronto’s existing building stock would alleviate pressure on the city’s energy infrastructure and address localized electricity constraints that are inhibiting opportunities for in-fill development.

Improve Conservation Program and Policy Design

An energy reporting requirement would allow the City to develop a database of accurate and comparable data on the energy use of its larger buildings that could be used to analyse patterns of consumption and to identify structures most in need of energy efficiency measures. In this way, ERR results could inform conservation programs and policies so that they provide support to segments of the building sector most in need of improvement.

CASE STUDY: Office Building		5 Penn Plaza, New York City ³⁶
<ul style="list-style-type: none"> ➔ Benchmarking identified high fuel oil and electricity consumption ➤ ASHRAE Level 2 energy audit and retro-commissioning of building systems identified options for improving energy performance ➤ Management implemented lower cost measures ✓ 25% reduction in fuel oil use ✓ 2% reduction in electricity use ✓ ENERGY STAR score 77 (up from 71) 		<p>“Benchmarking our building proved to be highly beneficial as it identified the need for further investigation of our energy usage. Furthermore, the continual benchmarking helped us demonstrate that the implemented energy improvements at the building have resulted in an increase in our ENERGY STAR score.”</p> <p>- Abe Ramadan, Building Manager</p>

Areas of Concern Related to Adoption of an ERR

Reputational Damage

Building owners may be concerned that publicly reporting poor energy performance will negatively impact their corporate reputation or the value of their properties. Policy makers in cities in the U.S. have taken different approaches in responding to these concerns. One is to stipulate that the first year of energy use data not be made public, with the rationale that this would give owners of poorly-performing buildings the opportunity to improve their buildings' efficiency before energy use reports are made public. Another approach has been to require energy use disclosure to prospective buyers, lessees and lenders at the time of transaction rather than disclose energy performance to the general public on an annual basis.

Aversion to Sector Regulation

Some members of the building sector in the U.S. have viewed energy reporting requirements as adding to the building sector's regulatory burden, and have expressed a preference for tracking energy use and benchmarking on a voluntary basis – e.g. through participation in voluntary energy benchmarking and labelling programs like LEED EB: O&M, BOMA BEST and ENERGY STAR.

Time and Effort Required to Comply

Complying with an energy reporting requirement should be straightforward, and not overly time-consuming. Two concerns that have been raised in U.S. jurisdictions are the time and effort required to obtain whole-building energy use data for sub-metered buildings, and the effort required to input energy use data into reporting tools when uploading energy use data from utilities is unavailable. Thus, two important lessons about data access that have emerged from the U.S. experience in response to these issues are 1) the need for building owners to have easy access to whole building energy use data, and 2) the need to make data collection and data entry as automated as possible. Something that has greatly facilitated energy reporting in U.S. jurisdictions is the use of EPA's ENERGY STAR Portfolio Manager tool, which has been used to benchmark nearly 40% of the U.S. commercial buildings market, and which has recently been adapted for use in Canada by NRCan³⁷.

Privacy Concerns

Tenants in sub-metered buildings may be concerned that disclosure of their energy use data will reveal information about their patterns of energy use that they do not want disclosed. Thus, tenants may be reticent to provide building owners with utility bill data for the purpose of benchmarking. These types of privacy concerns tend to be more of an issue with multi-unit residential buildings than with multi-tenant commercial buildings. One way that U.S. cities have responded to this type of concern is to work with utilities to provide building owners with aggregated whole-building data for multi-tenant buildings. In any case, suite-level energy use data is never publicly disclosed under ERR programs, only whole building data.

Cost of Program Implementation

For a city implementing an energy reporting requirement, there are costs to design, roll out, and administer an ERR. Activities typically undertaken during the design process include consulting with stakeholders, and studying the city's existing building stock in order to determine the optimal levels at which building type and size thresholds should be set³⁸. Activities typically required during the roll-out of an ERR include providing information about the policy on the city's website, hosting sector-specific training sessions for building owners, and running a help centre where building owners can receive

support with data collection, using the benchmarking tool, and submitting their reports to the city. Other administrative activities include tracking building eligibility and compliance, providing compliance reminders and supports, and issuing fines for non-compliance³⁹. Once energy use has been reported, the data needs to be analyzed, and city-wide results and trends reported. All of these activities require human resources. One strategy that has been used in U.S. jurisdictions to minimize the need for city staff time is to work with community partners. For example, in New York City, academic partners and the local green building council chapter played key roles in training and assisting building operators as well as analyzing energy use data.

Overlap with Other Programs

Another concern is whether a municipal energy reporting requirement would overlap with existing regulatory requirements from other levels of government, or compete with voluntary programs. For example, municipalities in Ontario are already required by provincial regulation to report on energy use and GHG emissions generated by their corporate facilities⁴⁰. Therefore an additional energy use reporting requirement aimed at public buildings in Toronto would be redundant.

Voluntary energy benchmarking and labelling programs are available to both public and private buildings, and have demonstrated both the feasibility and the benefits of energy benchmarking for private buildings. However, such programs tend to attract only the top performers who wish to showcase their buildings' high efficiency, and not the poorest performing buildings, which are most in need of improvement⁴¹. The cost of achieving these certifications - which require far more than energy reporting - can also be a barrier for many buildings. Voluntary programs are therefore not expected to have a major impact on city-wide emissions, but continue to play an important role in cities which have adopted ERR.

City of Toronto Mandate and Powers

In 2009, Toronto City Council approved *The Power to Live Green: Toronto's Sustainable Energy Strategy*⁴², which included direction to City staff to "undertake the actions necessary in 2010 for the City to evaluate and implement a building energy benchmarking and energy use labelling program, initially for institutional buildings and subsequently for commercial/multi-unit and residential buildings"⁴³.

This directive has yet to be addressed in part because the City's authority to adopt and implement an energy reporting requirement for existing buildings has not been clearly established. While resolution of this issue would be a key concern and priority, there is some basis of understanding and precedent that seems to support the City's powers to adopt such a by-law.

For example, under section 8 of the *City of Toronto Act*, the City has the power to provide any service or thing that the City considers necessary or desirable for the public⁴⁴. The City also has the ability to make by-laws respecting the economic, social and environmental well-being of the City⁴⁵, by-laws respecting structures (including fences and signs)⁴⁶, and by-laws requiring persons to do things⁴⁷. Further, Toronto's Environmental Reporting and Disclosure by-law, which requires local facilities to track and annually report on the use and release of 25 priority substances⁴⁸ under the City's ChemTRAC program⁴⁹, could be considered to be a precedent for requirements concerning reporting of energy use. However, a formal interpretation of this issue has yet to be established.

Consideration of this issue would be an important first step in any further exploration of the ERR opportunity for Toronto.

Status of the Issue

Energy Reporting Requirement policies have met with great success in various jurisdictions in the U.S. and are now regarded as a best practice for accelerating energy efficiency in existing buildings.

The U.S. Environmental Protection Agency's ENERGY STAR Portfolio Manager tool, which has become the industry standard for benchmarking commercial buildings in the U.S., has recently been adapted for use in Canada by Natural Resources Canada.

Multiple stakeholders in Toronto have recently expressed interest in exploring the possibility of implementing an energy reporting requirement for buildings in the City of Toronto.

There is a Council-approved direction to evaluate and implement a benchmarking program for the commercial and multi-unit residential sectors.

Toronto Atmospheric Fund's 2014 Dan Leckie Forum provides an opportunity to explore the idea of an ERR policy for Toronto with a group of stakeholders.

Endnotes

- ¹ Depending on the policy, buildings may be rated based on their actual energy use (called operational rating), or using estimates of likely energy use based on building characteristics (called asset rating).
- ² ERRs can be distinguished from existing building rating, benchmarking and labelling systems like LEED EB:O&M and BOMA Best in that an ERR makes reporting building energy use mandatory for the entire subset of buildings to which the policy applies whereas programs like LEED EB:O&M and BOMA Best are voluntary and tend to attract only the best-performing buildings as participants.
- ³ Energy includes electricity, natural gas, fuel oil and propane. Energy use reports are often also required to include information about water use.
- ⁴ Some policies also require disclosure to current tenants. Policies can, and do, vary in whether they include one, all, or a combination of these mandatory disclosure options. For a summary of disclosure requirements in U.S. cities that have passed building energy reporting requirements, see the Institute for Market Transformation's summary chart of energy reporting requirement policies in U.S. jurisdictions at [http://www.imt.org/uploads/resources/files/Commercial Benchmarking Policy Matrix 9 13.pdf](http://www.imt.org/uploads/resources/files/Commercial_Benchmarking_Policy_Matrix_9_13.pdf).
- ⁵ The appropriate level at which to set building size thresholds will depend on the nature of the existing building stock in the jurisdiction where the ERR policy will be implemented.
- ⁶ The standard metric for measuring building energy performance is energy use intensity (EUI). EUI is calculated by dividing the total energy consumed by a building in a year by that building's total floor space, and is expressed in units of GJ/m² (<http://www.nrcan.gc.ca/energy/efficiency/buildings/energy-benchmarking/3721>)
- ⁷ Institute for Market Transformation, 2013, *Utilities' Guide to Data Access*, p. 2, [http://www.eebhub.org/media/files/IMT Report - Utilities Guide - March 2013.pdf](http://www.eebhub.org/media/files/IMT_Report_-_Utilities_Guide_-_March_2013.pdf)
- ⁸ Benchmarking is defined as "a process that either compares the energy use of a building or group of buildings with other similar structures or looks at how energy use varies from a baseline" (ENERGY STAR, 2008 qtd. In ACEEE, 2012, *Commercial Building Benchmarking: Will They Manage It Once They've Measured It?*, <http://www.aceee.org/files/proceedings/2012/data/papers/0193-000118.pdf>).
- ⁹ Environmental Protection Agency, 2012, *ENERGY STAR Portfolio Manager Data Trends: Benchmarking and Energy Savings*, p.1, [http://www.energystar.gov/buildings/sites/default/uploads/tools/DataTrends Savings 20121002.pdf?e969-5b60](http://www.energystar.gov/buildings/sites/default/uploads/tools/DataTrends_Savings_20121002.pdf?e969-5b60)
- ¹⁰ ACEEE, 2012, *Commercial Building Benchmarking: Will They Manage It Once They've Measured It?*, p. 368-369, <http://www.aceee.org/files/proceedings/2012/data/papers/0193-000118.pdf>
- ¹¹ New York City, 2013, *New York City Local Law 84 Benchmarking Report: September 2013*, pp. 12, 37, http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/ll84_year_two_report.pdf. (Also, personal communication with Caroline Keicher of the Institute for Market Transformation, Jan. 14, 2014).
- ¹² For more information on NYC's Greener, Greater Buildings Plan, see <http://www.nyc.gov/html/gbee/html/plan/plan.shtml>
- ¹³ Green Cities California, 2012, *ENERGY BEST PRACTICE: Commercial Building Energy Efficiency, San Francisco, CA*, http://greencitiescalifornia.org/best-practices/energy/SF_commercial-building-energy-efficiency.html
- ¹⁴ District of Columbia, 2008, *Clean and Affordable Energy Act, 2008, Title V: Energy Benchmarking Requirements for Private and Government Buildings*, pp. 17-18, http://ddoe.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/CAEA_of_2008_B17-0492.pdf
- ¹⁵ City of Seattle Legislative Information Service, 2010, *Ordinance Number 123226*, <http://clerk.ci.seattle.wa.us/~scripts/nph-brs.exe?s1=&s3=116731&s4=&s2=&s5=&Sect4=AND&l=20&Sect2=THESON&Sect3=PLURON&Sect5=CBORY&Sect6=HITOFF&d=ORDF&p=1&u=/~public/cbory.htm&r=1&f=G>
- ¹⁶ City of Seattle Office of Sustainability and Environment, 2014, *2011/2012 Seattle Building Energy Benchmarking Analysis Report*, p. 3-4, <http://www.seattle.gov/Documents/Departments/OSE/EBR-2011-2012-report.pdf>
- ¹⁷ City of Seattle Legislative Information Service, 2012, *Ordinance Number 123993*, <http://clerk.ci.seattle.wa.us/~scripts/nph-brs.exe?s1=&s3=&s4=123993&s2=&s5=&Sect4=AND&l=20&Sect2=THESON&Sect3=PLURON&Sect5=CBORY&Sect6=HITOFF&d=ORDF&p=1&u=/~public/cbory.htm&r=1&f=G>

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- ¹⁸ Legislation.gov.uk, *The Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007*, <http://www.legislation.gov.uk/ukxi/2007/991/contents/made> (Note: UK regulations transposed a 2002 European Union Energy Performance of Buildings Directive into a national law).
- ¹⁹ EPCs must be disclosed to potential buyers and lessees at the earliest opportunity – at the very least, earlier than a) the time of providing the prospective buyer or lessee with any information about the property in writing, or b) at the time the prospective buyer or lessee views the property. If an EPC already exists for a building, the EPC rating must be included in any commercial advertisements for the property. (Legislation.gov.uk, *The Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007*, <http://www.legislation.gov.uk/ukxi/2007/991/part/2/made>)
- ²⁰ Landmark Information Group, n.d., *EPC Registers*, <http://www.epcregister.com/>
- ²¹ Department for Communities and Local Government, 2012, *Impact Assessment (IA): Recast of the Energy Performance of Buildings Regulations*, p. 3, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/39379/Impact_Assessment.pdf
- ²² If markets function best when all participants have as close as possible to perfect information, then providing prospective buyers, lessees or lenders with additional information upon which to base their purchase, leasing or lending decisions should help to improve the functioning of real estate markets.
- ²³ Institute for Market Transformation & Political Economy Research Institute, 2012, *Analysis of Job Creation and Energy Cost Savings from Building Energy Rating and Disclosure Policy*, pp.11-12, http://www.imt.org/uploads/resources/files/Analysis_Job_Creation.pdf
To cite another example, NYC's Greener Greater Buildings Plan (which includes LL84 – an energy benchmarking policy for buildings over 50,000 ft², as well as subsequent legislation requiring energy audits, retro-commissioning, and lighting upgrades) is expected to create or preserve 17,800 local skilled jobs by 2030 (New York City, 2013, *New York City Local Law 84 Benchmarking Report: September 2013*, p. 8, http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/ll84_year_two_report.pdf)
- ²⁴ City of Seattle, 2014, *Benchmarking: Unlocking Energy Savings in Residential Buildings*, <http://www.seattle.gov/documents/departments/ose/ebr-mercer.pdf>
- ²⁵ Building Operating Management & Siemens Industry Inc., 2012, *Measurement and Monitoring Can Improve Energy Efficiency*, p. 4, <http://www.facilitiesnet.com/reach4fms/pdfs/EnergyServices61912Press.pdf>
- ²⁶ Environmental Protection Agency, 2013, *Energy Efficiency in Non-Governmental Buildings*, <http://www.epa.gov/statelocalclimate/local/topics/commercial-industrial.html>
- ²⁷ District of Columbia, 2013, *Benchmarking: Capital Gains, One Franklin Square, Washington DC*, http://www.imt.org/uploads/general/OneFranklinSq_CS-final.pdf
- ²⁸ District of Columbia, 2013, *Benchmarking: Capital Gains, One Franklin Square, Washington DC*, http://www.imt.org/uploads/general/OneFranklinSq_CS-final.pdf
- ²⁹ For summaries of relevant studies on the impact of eco-labels on rental rates and capital value, see this Real Estate Appraisal web page compiled by academics from the University College London and the University of Reading: http://pjwrep.x10.mx/wp/?page_id=268 .
For visual representations of the premiums involved, see the Institute for Market Transformation's charts on sale prices (http://www.imt.org/uploads/resources/files/2Added_Value_of_Greener_Buildings_-_Sale_Price.pdf), rental rates (http://www.imt.org/uploads/resources/files/3Added_Value_of_Greener_Buildings_-_Rental_Price.pdf), and occupancy rates (http://www.imt.org/uploads/resources/files/2Added_Value_of_Greener_Buildings_-_Sale_Price.pdf)
The figure to the right is adapted from the Institute for Market Transformation, n.d., *Energy Efficiency and Property Value*, <http://www.imt.org/policy/efficiency-and-value>
- ³⁰ ACEEE, 2012, *Commercial Building Benchmarking: Will They Manage It Once They've Measured It?*, p. 368, <http://www.aceee.org/files/proceedings/2012/data/papers/0193-000118.pdf>
- ³¹ Toronto's total GHG emissions were 27,330,082 tCO_{2e} in 1990 (City of Toronto Staff, March 2013, [Summary of Toronto's 2011 Greenhouse Gas and Air Quality Pollutant Emissions Inventory](#), p. 5). Therefore, at 30% below 1990 levels, Toronto's 2020 target is 19,131,057 tCO_{2e}.

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- ³² Toronto Atmospheric Fund (2010). *Unleashing the Power of Efficiency: TAF Strategic Plan*, p. 3.
Toronto Atmospheric Fund (2013). *Raising the Bar: Updating the Energy Efficiency requirements in Toronto's Green Standard for New Construction*, p. 3, <http://www.toronto.ca/legdocs/mmis/2013/ta/bgrd/backgroundfile-58487.pdf>
- ³³ City of Toronto, 2014, *Toronto Green Standard*,
<http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=f85552cc66061410VgnVCM10000071d60f89RCRD>
- ³⁴ For example, research under Toronto's Tower Renewal program indicates that deep retrofits to Toronto's existing concrete apartment towers (e.g. building envelop cladding and high efficiency heating systems) could reduce those buildings' utility use by 50%, which would cause a 5% reduction in overall city GHG emissions (City of Toronto, 2013, *Next 10 Years of Tower Renewal: Achieving city-wide improvement*, p. 1,
<http://www1.toronto.ca/City%20of%20Toronto/Social%20Development,%20Finance%20&%20Administration/S%20hared%20Content/Tower%20Renewal/PDFs/trtenyearstrategy.pdf>)
- ³⁵ The figure of 350,000 tonnes per year in 2020 is based on the following assumptions: 1) ERR applies to all commercial and multi-residential buildings over 50,000 square feet, 2) Compliance levels match New York City's experience of 74% compliance by floor area (New York City, 2013, *New York City Local Law 84 Benchmarking Report: September 2013*, p. 36,
http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/ll84_year_two_report.pdf). Buildings that comply with ERR experience a 2.4% annual reduction in energy use, as has been observed among buildings benchmarked in the EPA's ENERGY STAR Portfolio Manager (Environmental Protection Agency, 2012, *ENERGY STAR Portfolio Manager Data Trends: Benchmarking and Energy Savings*, p.1,
http://www.energystar.gov/buildings/sites/default/uploads/tools/DataTrends_Savings_20121002.pdf?e969-5b60).
- ³⁶ New York City, 2013, *New York City Local Law 84 Benchmarking Report: September 2013*, p. 26,
http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/ll84_year_two_report.pdf
- ³⁷ NRCan, 2014, *All about ENERGY STAR Portfolio Manager*,
<http://www.nrcan.gc.ca/energy/efficiency/buildings/energy-benchmarking/3733>
- ³⁸ In setting thresholds, an appropriate balance must be struck between effort expended and benefit gained. One lesson learned by Seattle in the development of its energy benchmarking policy was that requiring smaller buildings to measure and report on their energy use yields diminishing returns. Smaller buildings require more outreach and engagement to achieve compliance, but they typically represent a smaller share of GHG emissions than larger buildings. Therefore, although Seattle initially set its building size threshold at 10,000 square feet, it later increased the threshold to 20,000 square feet in recognition that the additional GHG savings that would result from bringing the smaller buildings into compliance did not merit the additional level of effort required to do so (Personal communication with Caroline Keicher of IMT, Jan. 14, 2014, and Rebecca Baker of the City of Seattle, Feb. 6, 2014).
- ³⁹ If results are to be disclosed publically, a city may also elect to create a website for displaying the energy use results of compliant buildings (as in the case of D.C.: <http://www.buildsmartdc.com/>), or may simply allow the public to download building energy use data from the City's existing website in spreadsheet format (as is the case in New York City: http://www.nyc.gov/html/gbee/html/plan/ll84_scores.shtml).
- ⁴⁰ Ontario Regulation. 397/11
- ⁴¹ For example, an EPA study of 35,000 benchmarked buildings in the United States found that buildings that started with lower than average energy efficiency actually achieved twice the reduction in energy use over a three year period as buildings that started with above average energy efficiency (Environmental Protection Agency, 2012, *ENERGY STAR Portfolio Manager Data Trends: Benchmarking and Energy Savings*, p.1,
http://www.energystar.gov/buildings/sites/default/uploads/tools/DataTrends_Savings_20121002.pdf?e969-5b60)
- ⁴² Toronto City Council, 2009, *City Council consideration on November 30, 2009: The Power to Live Green: Toronto's Sustainable Energy Strategy*, <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2009.EX36.9>
- ⁴³ Toronto City Council, 2009, *City Council consideration on November 30, 2009: The Power to Live Green: Toronto's Sustainable Energy Strategy*, s. 3.f, <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2009.EX36.9>
Under the same the Sustainable Energy Strategy, Council also directed the City Manager to work with province to

amend provincial laws to require energy audits and disclosure of energy consumption of buildings at point of sale (with the intent that the province should fund the required energy audits), and if necessary, to pursue alternative, local measures as permitted under the City of Toronto Act (Toronto City Council, 2009, *City Council consideration on November 30, 2009: The Power to Live Green: Toronto's Sustainable Energy Strategy*, s. 10.a.iii, <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2009.EX36.9>).

⁴⁴ *City of Toronto Act*, 2006, s. 8.

⁴⁵ *City of Toronto Act*, 2006, s. 8.(2)5

⁴⁶ *City of Toronto Act*, 2006, s. 8.(2)10

⁴⁷ *City of Toronto Act*, 2006, s. 8(3)

⁴⁸ City of Toronto Municipal Code, chapter 423, *Environmental Reporting And Disclosure*, http://www.toronto.ca/legdocs/municode/1184_423.pdf

⁴⁹ City of Toronto, 2014, *ChemTRAC*, <http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=8e00ebfc2bb31410VgnVCM10000071d60f89RCRD>