ECONOMIC IMPACTS OF ENERGY USE DISCLOSURE ORDINANCES

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INTRODUCTION

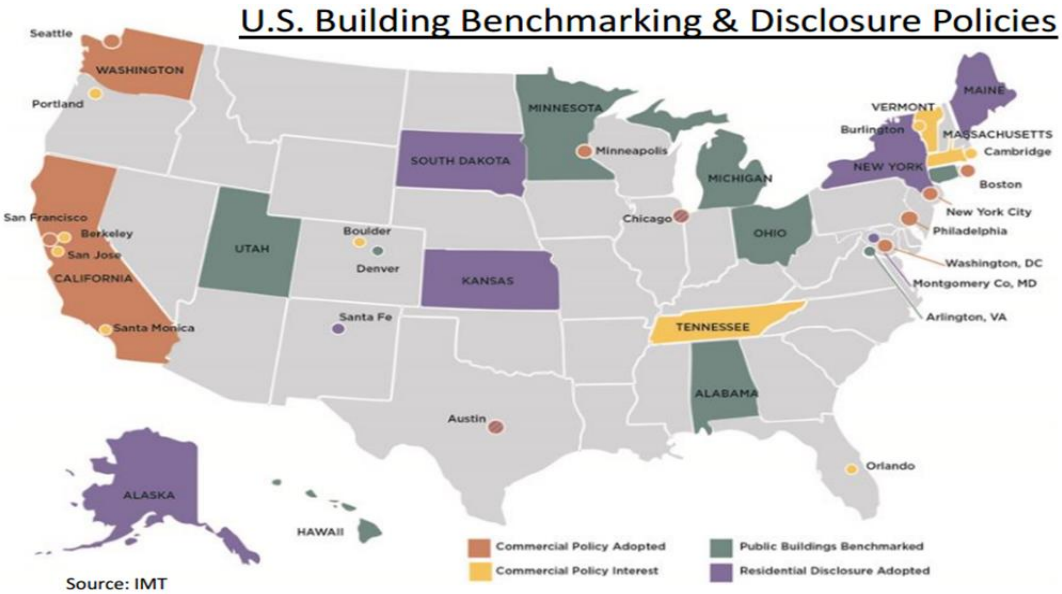
Energy generation and use are at the forefront of the sustainability movement of the 21st century. For solutions, many cities and states are looking to energy efficient buildings as a way to reduce carbon emissions and contribute to city sustainability goals. Thus, they are investigating the benefits and impacts of the development and implementation of Energy Use Disclosure Policy.

The primary purpose of this paper is to determine the economic impacts of Energy Use Disclosure Ordinances in U.S. metropolitan areas. Our research identified possible economic value drivers, and our analysis determined the benefits, best practices, and challenges involved with these ordinances. The key data is also a business case directed towards city councils to explain and to support states and cities in the development and successful implementation of related policies regarding energy rating and disclosure.

CURRENT STATE ANALYSIS

Buildings are the single largest user of energy and account for over 40% of total energy consumption in the U.S. So across the United States, a number of cities are unlocking a wealth of savings through the implementation of Energy Use Disclosure policies. Currently 28 cities, states, and counties have energy ratings and disclosure ordinances for commercial buildings and other properties; and ten more states and jurisdictions (Figure 1) are considering policies that require building owners to track and measure energy use. The energy information can then be reported and compared locally and nationally. This information allows owners and occupants to have an understanding of their building's energy performance and identify opportunities for improvement. These policies impact almost 6 billion square feet of floor space in 12 major real estate markets[1], creating a powerful incentive for energy efficiency[2].

Figure 1:



Source: IMT

[1] Chicago, Montgomery County, Boston, Philadelphia, Seattle, New York City, Washington State, California, Austin, Minneapolis, Washington, D.C., and San Francisco

[2] Institute for Market Transformation. (2011). Building Energy Transparency: A Framework for Implementing U.S. Commercial Energy Rating and Disclosure Policy.

LITERATURE REVIEW

We conducted case studies on Austin, TX; the District of Columbia; New York, NY; San Francisco, CA; and Seattle, WA to understand the stakeholders involved and the elements required for successful policy implementation. Below is a summary chart of our city-by-city analysis.

City	Ordinance Name	Date Enacted	Date(s) of 1st Compliance	Compliance Rate	Nonresidential Buildings Included	Requirements	Utility Support	Enforcement	Public Outreach, Education and Training
Austin, TX	Energy Conservation and Audit Disclosure Ordinance (ECAD)	Nov. 6, 2008	≥75k SF by 1 Jun 2012, ≥30k SF by 1 Jun 2013, ≥10k by 1 Jun 2014	50-65%	2,800 bldgs. 113,000,000 SF	Annual Benchmarking and disclosure for nonresidential properties. time of sale audits for single-family residential properties and a combination of energy audits, disclosure and mandatory energy retrofits for multifamily properties. Energy ratings must be disclosed to prospective buyers prior to the contract signing for a building sale and to Austin Energy within 20 days of transaction.	Austin Energy is not required to assist customers in collecting energy consumption data for benchmarking, but they are providing this service voluntarily and developing a tool to aggregate metered consumption of a building.	Noncompliance is a Class C misdemeanor. Fine of up to $500. If Criminal negligence is found, fine of up to $2000 can be assessed.	Newsletters, utility bill inserts, social media, Austin Energy's online blog, marketing brochures, presentations to local organizations. Austin Energy partnered with Austin Community College to offer monthly compliance classes for building owners, managers and tenants. Austin Energy is also administering a small business outreach program that sends Austin Energy interns to businesses to assist them with the benchmarking process and promote rebate programs.
District of Columbia	Clean & Affordable Energy Act	Jul. 1, 2008	≥100k SF by 1 Apr 2013, ≥50k SF by 1 Apr 2014	83%	2,000 bldgs. 357,000,000 SF	Existing - owners must annually benchmark using Portfolio Manager, and annually report benchmarking information to DDOE. Newly constructed and substantially renovated - required to generate energy performance projections using Energy Star Target Finder, and report to DDOE prior to the start of construction.	No requirements on local utilities, however Pepco is voluntarily supporting benchmarking by providing historical consumption data to customers upon their request	Fines up to $100 per day	Distributing notices and resources to local industry associations: Partnering with EPA, Apartment and Office Building Assoc, DC Building Industry Assoc, Pepco and USGBC to conduct live information and training workshops; benchmarking webinars; webpage
New York, NY	Local Law 84	Dec. 1, 2009	≥50k SF by 1 May 2011	84% by 2013	15,300 bldgs. 2,254,368,405 SF	Annual Benchmarking for nonresidential & multifamily buildings. *Multiple buildings exceeding 100,000 sf that are on the same tax lot must also comply.	No requirement for local utilities to assist in collecting energy consumption data. ConEd is voluntarily provided aggregrated consumption data to building owners for a fee of $102.50/ building.	Building owners that fail to submit a compliance report are subject to a $500 fine by the NYC Department of Buildings. Each subsequent quarter is additional $500 fine, max of $2,000	The Urban Green Council offered free information sessions to educate stakeholders. Assisting Real estate owners and operators to comply with the law. NYSERDA is funding a benchmarking center to help stakeholders with issues. Many Online resources.
San Francisco, CA	Existing Commercial Buildings Energy Performance Ordinance	Feb. 1, 2011	≥50k SF by 1 Oct 2011, ≥25k SF by 1 Apr 2012, ≥10k by 1 Apr 2013		2,700 bldgs. 205,000,000 SF	Building owners must annually benchmark using Portfolio Manager and report an Annual Energy Benchmark Summary (AEBS) to the San Francisco Department of the Environment (SFDOE) and to existing tenants in the building.	California utilities are compelled by state law to support the collection and upload of building energy consumption data to Portfolio Manager. The San Francisco ordinance does not specify additional requirements on utilities.	Warning, then public notice, then finse: Up to $100 per day for a maximum of 25 days, for buildings 50,000 gross square feet and greater; Up to $50 per day for a maximum of 25 days, for buildings 49,999 gross square feet or less	Materials to educate private sector stakeholders; webpage with posted previous committee workshops, recordings, presentations and workshop materials; published compliance manual; may engage a marketing company for additional public outreach activities; and existing training resources available through EPA
Seattle, WA	Building Energy Benchmarking and Reporting Program	Jan. 1, 2012	≥50k SF by 1 Oct 2012, ≥20k SF by 1 Apr 2013	96% by 2014	3,226 bldgs. 281,300,000 SF	Annual benchmarking for nonresidential buildings & multi family buildings with 5 or more units.	Utilities are required to maintain customer energy consumption records in a format compatible with Portfolio Manager for at least the most recent 12 months and upload data in a building owner's Portfolio Manager.	Penalties accrue quarterly, starting 90 days after reporting deadlines. Buildings 50,000 SF or greater: $1,000/quarter. Buildings greater than or equal to 20,000 SF and less than 50,000 SF: $500/quarter	Stakeholder group comprised of building owners, property managers, tenant association, energy services companies and utilities solicit feedback. Open house to educate stakeholders. Letters mailed to owners and property managers. Online resources. Website. Marketing brochures and presentations to local organizations.

Burr, A., Kelcher, C., Leipziger, D. (2011). *Building Energy Transparency: A Framework for Implementing U.S. Commercial Energy Rating and Disclosure Policy.* Institute for Market Transformation

In order to support the implementation of disclosure policies, policy makers have the duty to perform a cost-benefit analysis for their stakeholders. Our research shows that there are almost no negative aspects to consider when we reviewed the economic, environmental, and social impacts of disclosure ordinances.

Economic Value Drivers

A natural market effect can be seen in this Energy Rating and Disclosure Cycle of Improvement (Figure 2). When ratings are disclosed to the markets for comparison, less efficient buildings are less appealing so building owners are encouraged to improve efficiency with better management and capital investments in equipment and building quality. These changes drive competition and create demand for buildings with higher efficiency ratings, so the building stock is continuously improving. And these buildings are rewarded

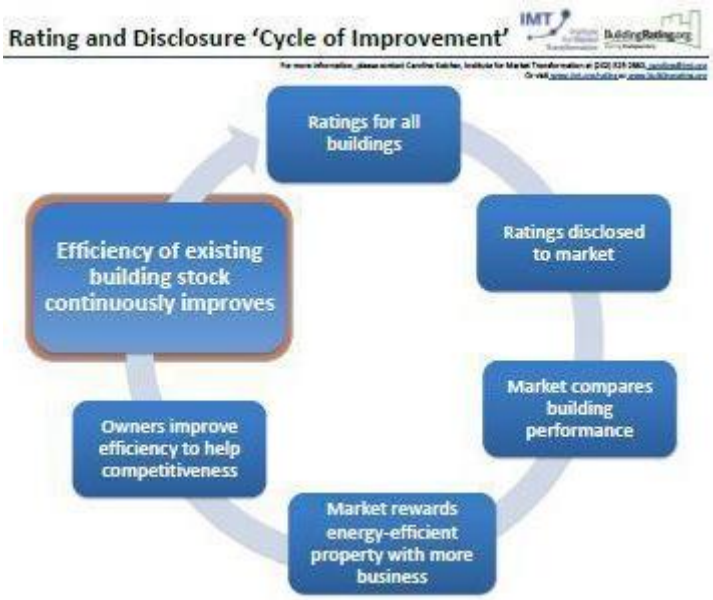
Building Owner Benefits

- ✓ Lower Operating Costs: 8-9% reduction = $3.8 billion through 2015, $18 billion through 2020
- ✓ Higher sale prices: up to 7.5% in sales price for each dollar invested
- ✓ Higher rents: Energy Star, LEED and Green Star-rated buildings typically command rental premiums up to 17% higher

(World Green Building Council)

with lower energy costs, higher occupancy rates, higher resale values, and higher rental premiums[3].

Figure 2:



Another circular effect is that of indirect value where money is funneled into energy-related industries and businesses and induced value where money comes out of the energy sector into non-energy sectors from savings, higher earnings, and discretionary income (Figure 2-2).

Disclosure can also spur business development by exposing risks and revealing new strategic direction and new opportunities for innovation in products and services. This pro-business environment is materializing without the need of public investments or subsidies.

Job Creation

Disclosure policies are simple, yet they have a powerful impact. There is a growing market-driven demand for energy efficient products and skilled workers that includes engineers, energy auditors, sustainability consultants, software developers, architects, construction workers, etc.[4] A recent study showed that $1 million invested in energy efficiency created 16.7 jobs (e.g. inspectors and auditors), compared to 5.3 jobs for fossil fuel investment[5]. And a 2009 USGBC Report said that green building will support nearly 8 million jobs in the U.S. economy and contribute $554 billion to U.S. GDP between 2009 & 2013[6]. Furthermore, sustainability is an important factor in acquiring talent and leads to higher levels of engagement on the job, particularly among millennials who want to make a difference through their work. In fact, Johnson Controls found that 96% of Generation Y respondents are highly concerned about the environment and expect employers to take steps towards becoming more sustainable.[7]

Energy-related Job Creation

- Non-Residential repair
- New Industrial
- New Commercial
- Retro-commissioning
- Auditing & Appraising
- Energy Management
- Retrofitting

- Hourly Mean Wage: $21.05
- Annual Mean Wage: $43,790

(IMT; PERI 2012)

[3] Burr, A., (2012). Energy Disclosure & The New Frontier for American Jobs. *Institute for Market Transformation*
[4] Burr, A., (2012). Energy Disclosure & The New Frontier for American Jobs. *Institute for Market Transformation*
[5] www.neep.org/sites/default/files/resources/BER%20Supplement_FINAL%20DRAFT_2-25-13.pdf
[6] http://www.usgbc.org/Docs/News/Green%20building,%20green%20jobs%20and%20the%20economy%20-%20Booz%20Allen%20report%20GS.pdf
[7] www.sustainablebrands.com/news_and_views/jul2012/employee-engagementkey-sustainable-success

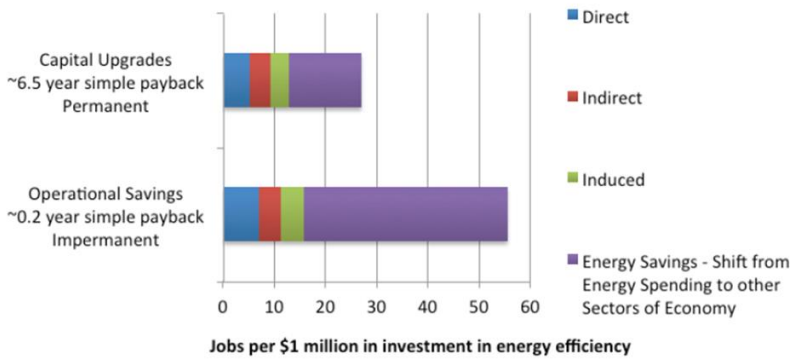


Figure 2-2 Employment in Different Energy Efficiency Improvements (Data: IMT & PERI 2012). "Permanent" refers to upgrade measure that last the lifetime of the financial analysis. "Impermanent" measures last three years.

Innovative energy policy is creating skilled, export-proof jobs in many cities across the U.S. due to the increasing demand for energy efficient services and technologies. And now savings opportunities are being uncovered that have gone unnoticed for years.

Made in the U.S.A.

Many of the products that are commonly used in energy remodeling have domestic shares higher than 90%[8] (Table 1). Thus, benchmarking and disclosure policies that ramp up energy efficiency measures will have a stronger economic impact in the United States.

Table 1: Made in the U.S.A.: Efficiency Materials

Remodel Category	Subcategory	% Domestic
Air Sealing	Caulk	95.7%
	Spray Foam	90.4%
Attic Insulation	Fiberglass and Mineral Wool	93.7%
Duct Sealing and Replacement	Caulk (includes duct mastic)	95.7%
	Duct Sheet Metal	99.4%
Wall Insulation	Fiberglass and Mineral Wool	93.4%
	Spray Foam	90.4%
	Rigid Foam (Polystyrene)	95.9%
Replacement Windows	Vinyl Windows	98.4%
Furnaces	Gas furnaces and Other	94.2%
A/C and Heat Pump	Air and Ground Source	82.3%
Water Heaters	Electric, Gas, Solar (tank and tankless)	77.9%
Refrigerators	Household Refrigerators & Parts	62.3%
Clothes Washers	Household Clothes Washers & Parts	76.8%

[9]Source: Home Performance Resource Center, 2010

CITY-SPECIFIC BUSINESS CASES

New York City

New York City created the largest publication of metered energy performance data from buildings in a single city with its Greater Greener Buildings Plan. Over 75% of NYC's greenhouse gas emissions are created by building energy use and energy costs are $15 billion each year.[10] Thus they have adopted an

[8] Home Performance Resource Center. (2010). Domestic Manufacturing Shares of Common Energy Remodeling
[9] *http://www.hprcenter.org/sites/default/files/ec_pro/hprcenter/domestic_manufacturing_shares.pdf*
[10] IMT. (2012). New York City Sets Precedent for Energy Transparency

aggressive goal of reducing carbon emissions by 30% by 2030. New York City is estimating $700 million in energy costs annually and the creation of 17,800 construction-related jobs in energy auditing, upgrading lighting, retro-commissioning, and maintaining equipment. [11]

Seattle

In 2013, Seattle completed the first stages of its Energy Benchmarking and Reporting Program by collecting whole-building energy use for buildings 20,000 square feet or larger. Seattle boasts some of the highest compliance rates in the country, with almost 96% compliance. Buildings that are now operating with Energy Star Certification are enjoying savings of $0.54 per sq. ft. and Seattle is well on its way to meet its 2030 goal to reduce energy use in commercial building by 10%, residential buildings by 20%, and Greenhouse Gas Intensity by 25%. [12]

Minneapolis

Minneapolis found that 51% of their energy efficiency opportunities could be achieved through low- and no-cost energy management such as:

- turning off lights,
- closing outside doors,
- altering hours of operations for off-peak energy pricing,
- changing to CFLs,
- adjusting building temperature

Austin

Austin approved the Energy Conservation and Audit Disclosure (ECAD) in November of 2008.
And since then building owners must benchmark annually all properties of 10,000 square feet or more using Portfolio Manager, or the Austin Energy Business Energy Analysis rating tool. Potential savings identified in the first year of ECAD audits include $723,650 in energy costs, almost 8 million kWhs of energy usage, and a decrease of 4,897 tons of carbon dioxide. [13]

DEVELOPMENT AND IMPLEMENTATION COSTS

Although some costs do exist with the implementation of energy efficient measure, they are quite minor, especially when compared to their tremendous benefits and reasonable payback periods.

Reporting Tools

You can't manage what you can't measure and that is where the EPA's Energy Star Portfolio Manager (ESPM) comes into play. It is the most widely used benchmarking tool for commercial buildings. It allows for a simple benchmarking process in which building owners enter 12 months of energy consumption and building data, then receive various statistics such as: a building score, energy use intensity per

[11] PlaNYC. (2014). New York City Local Law 84 Benchmarking Report A Greener, Greater New York.
[12] Seattle Energy Benchmarking & Reporting. (2011/2012). Seattle Building Energy Benchmarking Analysis Report
[13] www.fresh-energy.org, www.aceee.org/sector/local-policy/case-studies/austin-energy-con

square foot, and greenhouse gas emissions.[14]

EnergyIQ is an "action-oriented" benchmarking tool providing a standardized opportunity assessment and decision-support information to help refine action plans. However is it not available for nationwide use at the time of this report.

Retro-commissioning and Audits
Retro-commissioning is inspecting and calibrating equipment and systems to operate correctly and looking for major building energy issues

- Avg. Cost: $0.20 – $1.00/ sq. ft. Avg. Payback: 0.5 – 2 years[15]

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) commonly conduct energy audits. The audits are Levels I-III depending on the scope of the inspection and depth of reporting.

- Avg. Cost: $0.12 – $0.70/ sq. ft. Avg. Payback: 1 – 5 years [16]

BEST PRACTICES IN ENERGY DISCLOSURE PRACTICES

Engage with Local Utilities
Utilities can aid building owners with their compliance obligation by providing aggregate building energy consumption records and transfer the data that is directly compatible for upload into ESPM. Better energy efficiency information about their clients can help the utility prioritize programs and they can play an important outreach role in encouraging compliance and providing information on rating and disclosure rules to clients.

Use Trusted Ratings Systems
Market actors must believe that ratings accurately reflect the relative performance of buildings and trust that these ratings have been produced honestly. Energy Star Portfolio Manager (ESPM) is the predominant rating tool in the U.S. with over 260,000 building ratings performed to date. It is the most trusted benchmarking tool for both mandatory and voluntary energy rating initiatives, and with it building performance can easily be compared and measured over time.

Clear Messaging
Information disclosed in a rating or audit report must be clearly and easily understood by the average consumer.

Link Rating Results to Action
Austin is heavily engaged in tailoring its incentive programs and audit process to promote upgrades both prior to and following property sales, attempting to identify key trigger points that spur owners to act. They want to assist consumers with appropriate energy efficiency improvements, provide financial analyses, government or utility incentives, and financing opportunities. Additionally, Austin, New York

[14] Burr, A., (2013). Accelerating Commercial Building Energy Retrofits. Policy, Best Practices, Compilation, Pilot Implementations.
[15] California Commissioning Collaborative (CACX.ORG)
[16] Energysmart.enernoc.com/3-reasons-not-to-ignore-energy-star-for-your-building

City, and Washington State require mandatory upgrades of cost effective measures identified in audits for public facilities through lead-by-example legislation.

Know Building Stock
Austin & New York both consider the specific nature (age, use, etc.) of existing buildings before designing the BER&D laws.

Ensure Timely Disclosure
Ratings should be available early in the process and ideally in all advertising. If buyers only receive info toward the end of the process they will not be able to use that information effectively and the policy will have forfeited its opportunity to influence the marketplace.
Austin learned the impacts of untimely energy rating disclosure by recognizing the impact to sales and rental decisions. Legislation was amended to ensure ratings are available before a sale closes and ideally while the property is still being shown.

Careful Monitoring and Enforcement
The success of rating and disclosure policy relies on high compliance rates to be effective. Thus, a combination of strong incentives, credible enforcement, and dissuasive penalties are essential to ensuring success. However, fines should be the final step in a longer effort to engage and educate property owners. We suggest that an administrative agency with resources and mandate be assigned to build support for the BER&D rules, coordinate information campaigns, and track compliance data. This should have a greater impact than imposing fines and penalties.

CHALLENGES AND SOLUTIONS

Challenge	Solution
SPLIT INCENTIVE	**INCENTIVE STRUCTURE or RECOGNITION PROGRAM**
One person pays and one person benefits	Reward utilities, builders, owners, and operators for going above and beyond; Increase the impact of tax and ratepayer dollars; Analyze ratings to identify building efficiency trends in order to create more effective policies and incentives
PRIVACY ISSUE	**OUTREACH, EXPLANATION**
Who has information? Is it public?	Americans tend to disclose large amounts of personal information every day, knowingly and unknowingly. Energy usage is arguably less personal than many other types of information
POLICY SUPPORT FROM UTILITIES	**ENGAGE LOCAL UTILITIES**
Political will and influence by utilities	Show them benefits - Coupling billing data with building characterization information gives utilities a deeper understanding of their end users and new opportunities.

COST OF MAINTAINING & ENFORCING POLICIES	PACKAGE LAWS APPROPRIATELY
	New York City and Washington state – BER&D policies are being applied as a package of laws, making rating and disclosure part of a larger strategy with auditing and upgrade requirements
COST OF IMPLEMENTATION	**CREATE FINANCING SCHEME**
Access to funds for capital improvement projects	**Clean Energy Sacramento** provides financing to commercial property owners for renewable and energy efficient upgrades, repayable over long term via property taxes. **Green Finance San Francisco** uses an "open market" in which property owners negotiate project financing, interest rate and repayment term, with qualified lenders **Property Assessed Clean Energy (PACE)** – used to fund energy efficiency and clean energy improvements in 31 states and District of Columbia

RECCOMENDATIONS FOR ENERGY DISCLOSURE PRACTICES

If passing legislation is not possible, we suggest lead-by-example laws which are an alternative option for government entities. For example, the Department of Energy is supporting pilot-programs in Alabama, Massachusetts, and Washington that provide access to energy scoring tools and upgrade info from qualified experts. And Virginia's Local Energy Alliance Program (LEAP) is increasing reporting by working directly with real estate agents who then provide their clients with energy efficiency expertise. LEAP aims to encourage mandatory energy efficiency reporting.

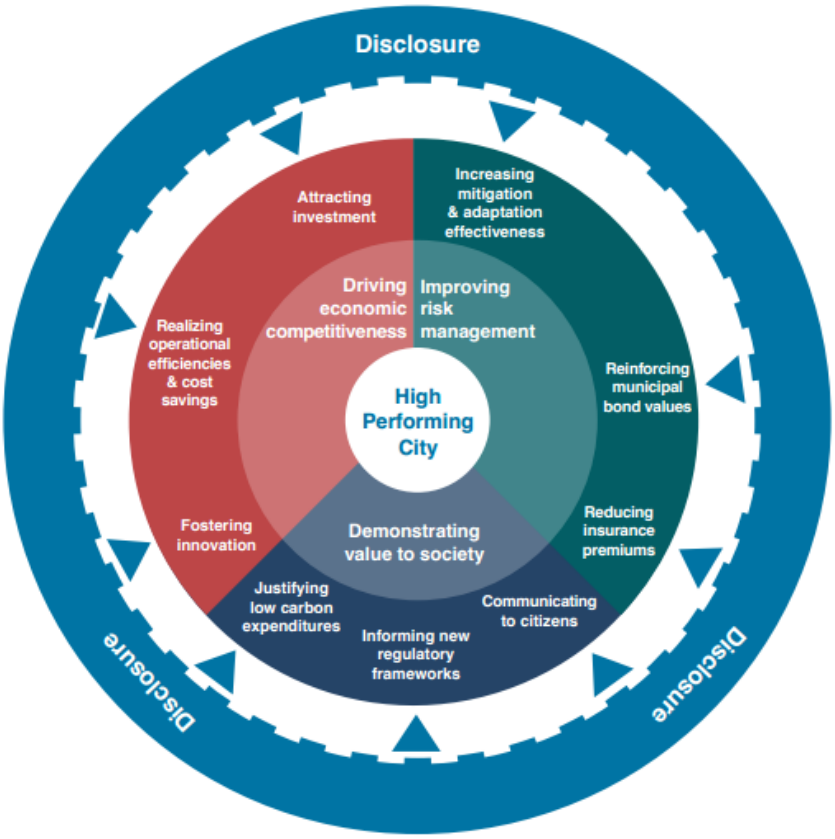
We also recommend that any city considering the energy policy should use IMPLAN, a highly accurate and adaptable economic model, to calculate direct, indirect, and induced employment and related benefits. Cities should also develop an outreach program to contact business owners directly and partner with local or regional organizations. Together they can provide continuous training and assistance, develop websites and other online media resources, such as an app with real-time feedback and energy data. This mobile technology could be utility-sponsored for building manager and operators, or sponsored by local government for apartment seekers.

> In terms of larger financial impacts of benchmarking and transparency policies, unfortunately most policies haven't been in place long enough for there to be a consensus, or even statistically significant information, on how big the impact has been. New York City's latest report has some interesting year over year information for the last few years (though again, it's too soon to conclude long-term patterns from these short term results).
> ~ Caroline Keicher, IMT, Associate Director, Building Energy Performance Policy

CONCLUSION

Every city should strive to become a high performing city (Figure 3). Upgrading and replacing high energy consuming equipment in buildings offers a significant capital investment opportunity that has the potential for job creation, climate mitigation, and public health benefits. In the U.S. more than $279 billion could be invested in the residential, commercial and institutional market segment and could lead to more than $1 trillion in energy savings over 10 years.[17] With the growing sustainability movement, mounting climate change risk, and the obvious economic benefits, the time to enact energy disclosure ordinances is now.

Figure 3: Source: IMT



[17] Rockefeller Foundation. (2012). United States Building Energy Efficiency Retrofits. Market Sizing and Energy Models.