
How **City-Led Efficiency Efforts** Can Support State Climate and Energy Planning

energy.gov/eere/slsc/EEopportunities

About this Presentation

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This short presentation is intended give states and their stakeholders a vision for what it would look like to include city-led energy efficiency programs in their climate and energy plans.

City-Led Efficiency as an Emission Reduction Approach

Possible Leads

- City energy or sustainability office
- City general services office
- Municipal utility
- Community-based organizations

E-Savings

- Aggregate city-wide (municipal, industrial, commercial, residential) electricity savings compared to starting year consumption

Potential Program Components

- Building performance policies
- Voluntary building efficiency challenges
- Financing (property assessed clean energy [PACE], performance contracting)
- Municipal building efficiency
- Water/wastewater treatment facilities
- Streetlight upgrades
- Homeowner outreach

Potential Savings in 2030
55-110 million MWh
31-66 million short tons CO₂

Activities	EM&V
Energy Savings Approaches	
City offices, utility, or community-based organizations generate energy savings from: <ul style="list-style-type: none">• Training, outreach, enforcement of building efficiency policies• Outreach and technical assistance for voluntary programs• Installing energy upgrades to municipal buildings, water/ wastewater treatment facilities, streetlights	Recent resources provide guidance, including: <ul style="list-style-type: none">• DOE Benchmarking & Transparency Policy and Program Impact Evaluation Handbook• Assessment of Automated Measurement and Verification (M&V) Methods• Federal Energy Management Program M&V Guidelines Version 4
State Policy Options	
Could include: <ul style="list-style-type: none">• Enable cities to implement PACE• Provide guidance to utilities for streamlining energy data access for building benchmarking• Create state-led city programming (e.g., MA Green Communities)	
Low Income Opportunities	
<ul style="list-style-type: none">• Building energy efficiency programs in low income neighborhoods	

Why City-Led Efficiency?

How City-Led Efficiency Works

- Cities contribute 70% of global CO₂ emissions and are population and innovation hubs.
- Cities are poised to impact CO₂ emissions as asset owners, law makers, taxation authorities, and recognition providers.
- Cities can contribute to statewide CO₂ emission reductions through:
 - 1) Energy efficiency improvements in local government assets such as municipal buildings, water/wastewater treatment, and streetlights
 - 2) Building performance policies to catalyze energy savings in commercial buildings
 - 3) Voluntary programs in which local governments provide assistance for and recognition of energy efficiency in commercial, multifamily, and residential buildings

Benefits of City-Led Efficiency

- Many cities have already set CO₂ emissions reduction goals for as much as 80% reductions by 2050 and are taking action to achieve their goals.
- As of January 2016, Mayors from 121 U.S. cities have signed the [Compact of Mayors](#), committing to reduce CO₂ emissions, develop a climate action plan on how to deliver savings, and measure and report progress through a standardized format. This is a natural springboard for state-level climate planning.



Current Status - Municipal Building Efficiency

These 43 local governments have committed to reducing energy use across their municipal building portfolio by at least 20% over a decade through the Better Buildings Challenge



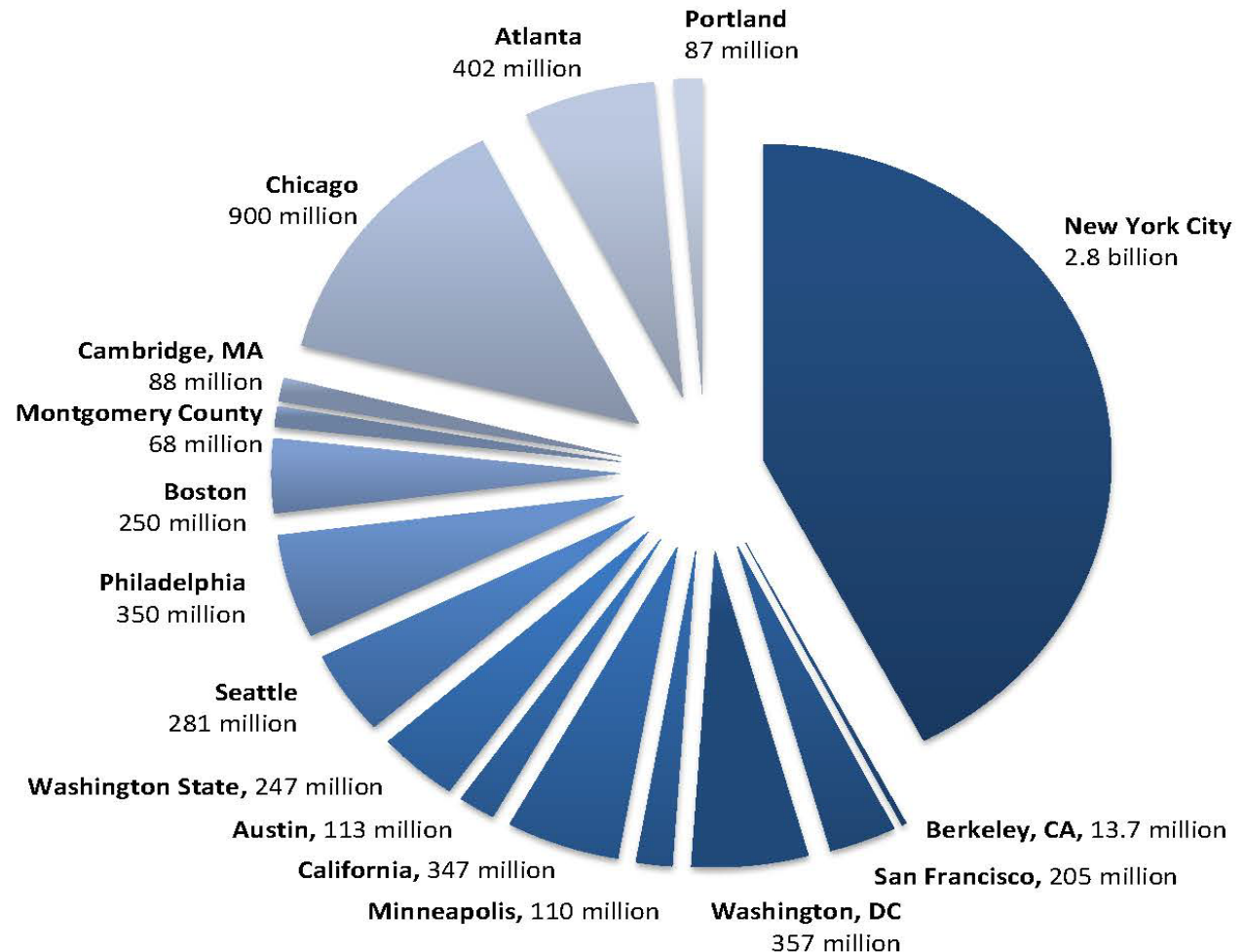


Current Status – Building Performance Policies

City-level benchmarking and transparency policies:

As of July 2015, approximately 6.6 billion square feet of floor space across these 16 real estate markets are included

Building Area (in Square Feet) Covered Annually



Current Status – Voluntary Programs



- Local governments lead an estimated 50 energy efficiency challenge programs nationwide, which encourage building owners in their jurisdictions to adopt and pursue efficiency goals. These include:
 - *Kilowatt Crackdown in Minneapolis, Phoenix, Portland + others*
 - *ICLEI Green Business Challenge in Lexington, West Palm Beach + 14 others*
 - *Better Buildings Challenge programs in Atlanta, LA, Chicago + others*
 - *Salt Lake City Skyline Challenge*
 - *Envision Charlotte*



- Local governments help administer over 30 commercial property assessed clean energy (PACE) programs that facilitate energy efficiency loans for building owners. Local governments in six states also have active residential PACE programs.
 - As of 2015, an estimated 493 commercial PACE projects and 59,100 residential PACE projects (\$1.4 billion invested) have been completed nationwide. (Source: [PACE Now](#))

State and Local Role in City-Led Efficiency

City-led efficiency requires state and local action

Policy Actions

State legislatures or public utility commissions can facilitate city savings through:

- Enabling policies that facilitate clean energy financing, such as PACE (e.g., Texas, Colorado)
- Utility requirements to facilitate better access to energy data (e.g., California, Washington)
- Targeted city programming to encourage and provide technical and financial assistance for community-wide efficiency (e.g., Massachusetts)

Implementation Actions

City offices (e.g. General Services, Sustainability, Finance, Mayor's Office), municipal utilities, or community-based organizations generate energy savings from:

- Training, outreach, enforcement of building efficiency policies
- Outreach and technical assistance for voluntary efficiency programs
- Installing energy upgrades to municipal buildings, water/ wastewater treatment facilities, streetlights

Partners

Potential partners for successful programs include:

- Capital providers to capitalize clean energy loan programs
- Utilities to provide data, information, and financial incentives
- Energy service companies (ESCOs) to execute retrofits
- Business development organizations and real estate associations to assist with outreach to building owners
- National and local foundations to promote best practices and provide program funding for efficiency



Best Practices in City-Led Efficiency

Savings Stream	Best Practice Resources
Municipal Buildings	<u>DOE's Commercial Buildings Integration Tools</u> <u>ACEEE Energy Efficiency in Local Government Buildings</u>
Streetlights	<u>DOE Municipal Solid-State Street Lighting Consortium</u> <u>DOE Better Buildings Outdoor Lighting Accelerator</u>
Water/Wastewater Treatment	<u>DOE's Water Energy Tech Team</u> <u>EPA's Guide for Energy Efficiency in W/WW Facilities</u>
Building Performance Policies	<u>SEE Action Commercial and Public Building Energy Efficiency</u> <u>IMT's Building Energy Performance Policy webpage</u>
Voluntary Efficiency Challenges	<u>Better Buildings Solutions on Private Sector Engagement</u>
PACE	<u>DOE's State and Local Solution Center PACE webpage</u> <u>PACE Nation website</u>

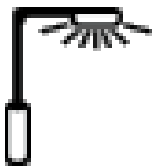
Current Energy Savings Examples: Municipal Operations



- **Beaverton, OR**, reduced energy use in its entire municipal buildings portfolio by 20% between 2009-2014
- **Roanoke, VA**, reduced energy use in its entire municipal buildings portfolio by 16% between 2009-2014



- **Atlanta, GA** reduced energy use by 36% and CO₂ by 9,200 metric tons annually from its water treatment plant



- **Los Angeles, CA** replaced streetlights to reduce their energy consumption by 60%, saving 68,000 MWh, \$7.5 million, and 40,500 tons of CO₂ annually



Energy Savings Examples & Future Estimates: City-Wide

Current Examples:

- In **New York City**, buildings subject to a suite of benchmarking, disclosure, and performance policies reduced energy use by 5.7% (22 million MMBtus) and CO₂ emissions by 9.9% in the first three years of the Greener, Greater Buildings Plan
- The **Massachusetts' Green Communities Act**, during its first six years of implementation, has/will lead to cumulative (2010-2025) reductions of fossil fuel power production of 33.9 million MWh, increases in renewables by 28.3 million MWh, and \$1.2 billion net economic benefits

Future: In 2030, city-led efficiency efforts could produce **55-110 million MWh** and **31-66 million short tons CO₂** of savings if:

- The largest 50 U.S. cities reduced electricity consumption 10-20% city-wide (municipal, residential, commercial, and industrial) from a 2012 baseline.

Sources: DOE, 2015, [New York City Benchmarking and Transparency Policy Impact Evaluation Report](#); Analysis Group, 2014, [The Impacts of the Green Communities Act on the Massachusetts Economy](#); Extrapolated from ACEEE, 2015, [City Energy Efficiency Scorecard](#) Table C6; [EPA eGRID 2012](#)

Are City-Led Efforts Cost-Effective?

- Yes, though financial costs and benefits vary widely for city-level efficiency based on approach, scope, delivery, sector, etc.
- The cost-effectiveness of municipal building and infrastructure retrofits is well established.
 - Example: A lighting retrofit at the FDNY Fleet Services Shop in Queens cost \$406,362 and will save the city \$101,411 annually.
- For policies and voluntary programs, costs and benefits accrue to different parties and are difficult to track consistently.
- Non-energy benefits are often an important factor for determining cost-effectiveness to local governments.
 - Example: In its first six years of implementation, non-energy benefits from the Massachusetts Green Communities Act included:
 - \$1.2 billion (in 2013 net present value dollars) in net economic benefits to Massachusetts
 - State and local tax revenues of roughly \$155 million (included in \$1.2 billion)
 - More than 16,000 jobs

EM&V Methods for City-Led Efficiency

Savings measured through benchmarking before and after project completion using metered energy use (or streetlight fixture wattage)



Resources:

- [International Performance Measurement and Verification Protocol](#)
- [FEMP M&V Guidelines](#)
- Actual savings as captured in Portfolio Manager (if able to verify)

Savings measured through analysis of energy data collected from participating buildings



- [DOE Benchmarking & Transparency Policy and Program Impact Evaluation Handbook](#)
 - References IPMVP methods
 - Actual savings as captured in Portfolio Manager
 - Quasi-experimental methods

DOE Support for City-Led Efficiency (1 of 2)

- [Better Buildings Challenge](#) – provides best practices, solutions, and case studies to achieve efficiency in municipal and commercial buildings
- [Better Buildings Accelerators](#):
 - [Energy Savings Performance Contracting](#) – supports the use of innovative and best-practice approaches to enhance ESPC programs
 - [Outdoor Lighting](#) – demonstrates best practices to accelerate the adoption of high-efficiency outdoor lighting and improve system-wide replacement processes at the municipal level
 - [Energy Data](#) – supports local governments and their local utilities to make it easier for building owners to get access to whole-building energy usage data
- [Municipal Solid-State Street Lighting Consortium](#) - shares technical information and experiences related to LED street and area lighting

DOE Support for City-Led Efficiency (2 of 2)

- [State and Local Solution Center](#) - provides resources for states and local governments to advance successful, high-impact clean energy policies, programs, and projects
- [SEE Action Resources](#) - provide technical and policy decision making information to state and local governments and utility regulators on policy and program strategies for energy efficiency in public and private commercial buildings
- [Benchmarking & Transparency Policy and Program Impact Evaluation Handbook](#) - provides both a strategic planning framework and standard methodologies to determine the energy and non-energy benefits of benchmarking and transparency policies and programs
- [Standard Energy Efficiency Database \(SEED\) Platform Collaborative](#) - a strategic effort to help cities and states successfully manage building energy performance data and identify opportunities for efficiency improvements in their jurisdictions

Get More Information on This Pathway and Others

Visit: energy.gov/eere/slsc/EEopportunities

[How Energy Efficiency Programs Can Support State Climate and Energy Planning](#)

Overview and individual presentations on features and benefits associated with including energy efficiency in climate and energy plans, covering:

- National electricity savings potential estimates for 2030
- Current activity at the national and state levels, best practices, energy savings examples, cost-effectiveness, measurement approaches, and DOE support for:
 - Building energy codes
 - City-led efficiency efforts
 - Combined heat and power
 - Energy savings performance contracting
 - Industrial efficiency, including superior energy performance
 - Low income energy efficiency
 - Ratepayer-funded programs
- Technical assistance available

[Guide for States: Energy Efficiency as a Least-Cost Strategy to Reduce Greenhouse Gases and Air Pollution, and Meet Energy Needs in the Power Sector](#)

State and Local Energy Efficiency Action Network (SEE Action) resource presents pathways thru:

- Case studies of successful regional, state, and local approaches
- Resources to understand the range of expected savings from energy efficiency
- Common protocols for documenting savings
- Sources for more information