Benchmarking and Transparency: Resources for State and Local Leaders

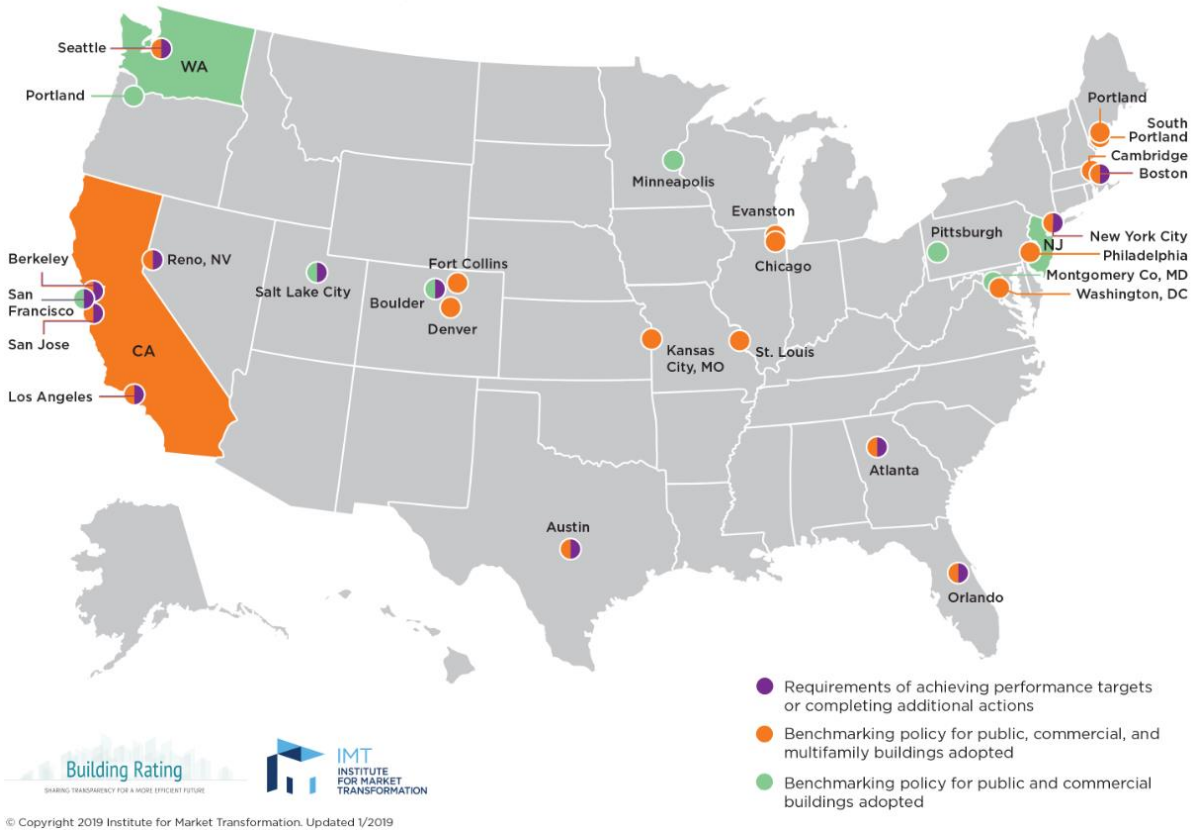
This resource guide provides state and local leaders with streamlined access to key existing resources for developing and implementing high-impact building energy benchmarking and transparency programs in their jurisdictions.

Overview

Buildings account for roughly 40% of the energy consumed in the United States.[1] Recognizing the tremendous opportunity for energy and cost savings and associated health and environmental benefits, state and local leaders are advancing building energy benchmarking and transparency programs to support improved efficiency.

Benchmarking and transparency provide the foundation for improved building energy performance. Building energy benchmarking means measuring a building's energy use and then comparing it to the energy use of similar buildings, its own historical energy usage, or a reference performance level (e.g., based on a building energy code).

FIGURE 1: U.S. Building Energy Benchmarking and Transparency Policies



[1] U.S. Energy Information Administration, 2018: Consumption and Efficiency. Available at: https://www.eia.gov/consumption/.

Measuring and assessing energy performance via benchmarking is an important initial step in identifying and prioritizing improvements that lead to greater efficiency. Transparency refers to making energy use data public so that energy performance is recognized and rewarded in the marketplace, providing an important incentive for improved performance. Benchmarking and transparency spur and support a range of energy efficiency measures—including retrofits and operational changes—that deliver energy and cost savings.

As of January 2019, 27 cities, one county,[2] and three states[3] have established energy benchmarking and transparency requirements covering public, commercial, and, in some cases, multifamily buildings (Figure 1). Some other state and local governments require benchmarking only for public buildings. There are also many examples of voluntary community-wide building energy data programs, including in the U.S. Department of Energy (DOE) Better Buildings Challenge.

There is a growing body of research aimed at understanding the impacts of benchmarking and transparency programs and identifying the most important program components to achieving energy and cost savings along with other community benefits. These studies provide additional evidence for creating a benchmarking and transparency program. For example, the U.S. Environmental Protection Agency (EPA) found an average annual savings of 2.4% in an analysis of 35,000 benchmarked buildings.[4] A Resources for the Future (RFF) analysis of four U.S. city benchmarking and transparency programs showed a 3% decrease in utility expenditures for office buildings.[5] A study of New York City's benchmarking and transparency program found that it led to 6% and 14% cumulative reductions in building energy use intensity (EUI) after three and four years, respectively.[6]

Several overviews and primers on benchmarking and transparency programs are available. Examples include:

- **Benchmarking and Transparency Resource Library:** This resource collection from the City Energy Project—a joint initiative of the Institute for Market Transformation (IMT) and the Natural Resources Defense Council (NRDC)—provides how-to guides, tools, templates, and city-specific examples of some of the most common strategies and best practices that state and local leaders use when developing a benchmarking and transparency program.
- **Energy Benchmarking, Rating, and Disclosure for Local Governments:** This DOE fact sheet provides an accessible introduction to benchmarking and transparency programs, including the rationale for their development and how they are implemented. The resource includes overviews of several existing city benchmarking and transparency programs.
- **Interactive Building Benchmarking and Transparency Policies Map:** This interactive map from IMT on BuildingRating.org shows jurisdictions around the world that have implemented benchmarking and transparency programs, including states, counties, and cities across the United States. For each jurisdiction, the site includes an overview of policies, key updates, and related documents.

[2] Montgomery County, Maryland. In addition, two Maryland cities, Rockville and Gaithersburg (both located in Montgomery County) have also elected to apply the county's benchmarking and transparency policy.
[3] California, Washington, and New Jersey.
[4] U.S. Environmental Protection Agency, 2012: Benchmarking and Energy Savings. Available at: https://www.energystar.gov/sites/default/files/buildings/tools/DataTrends_Savings_20121002.pdf.
[5] Palmer, K., and M. Wells, 2015: Does Information Provision Shrink the Energy Efficiency Gap? Resources for the Future. Available at: http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-15-12.pdf.
[6] Meng, T., D. Hsu, and A. Han, 2016: Measuring Energy Savings from Benchmarking Policies in New York City, ACEEE Summer Study on Energy Efficiency in Buildings. Available at: http://aceee.org/files/proceedings/2016/data/papers/9_988.pdf.

- **The Benefits of Benchmarking Building Performance:** This IMT paper synthesizes the research on the benefits of benchmarking and transparency, including energy savings, market competition, government efficiency, and job creation. For example, the report highlights an EPA study showing that benchmarked buildings achieved energy savings of 2.4% per year and a New York City finding that building efficiency improvements directly created 3,132 jobs over three years.

Program Development

In developing a benchmarking and transparency program, state and local leaders need to determine the goals of their program, the specific elements to be included, and processes for productive stakeholder engagement.

Goals

State and local governments are pursuing benchmarking and transparency programs to meet a variety of high-level goals. These include: energy savings, cost savings, local economic development, and improved health and environmental quality, among others. These programs also support objectives such as:

- Developing a strong market for building efficiency.
- Helping building owners and tenants evaluate their energy use and identify opportunities for efficiency improvement.
- Enabling building owners and tenants to demonstrate their energy performance and consumers to understand building energy performance and reward it through their business.
- Supporting policymakers, utilities, and other stakeholders in their pursuit of data-driven approaches to designing and directing efficiency programs.

Elements

Building energy benchmarking and transparency programs typically have several core requirements: certain buildings measure and report energy consumption data; utilities provide access to whole-building energy data; and state and local governments publish the data. There may be provisions for tenants to provide energy consumption data to building owners. Some cities have also adopted requirements for periodic audits and retro-commissioning. Benchmarking and transparency programs can be structured as voluntary or as mandatory, with compliance required by state legislation or local ordinance. Resources to inform program elements include:

- **Building Performance Policy Model Ordinance:** This document from the City Energy Project presents sample language that can be used by jurisdictions interested in drafting a comprehensive existing building performance policy that encompasses provisions for benchmarking, as well as additional actions beyond benchmarking.
- **City Energy Profiles:** This DOE tool provides estimates of building stock characteristics by city, including: number of buildings, floor area of buildings, and average floor area by building type for commercial, residential, and industrial buildings; distributions of building floor area and number of buildings for different floor area cutoffs; and a listing of the commercial and industrial activities that use the most energy.
- **Policy Comparison Tool:** This tool on BuildingRating.org allows users to create customized comparisons of jurisdictions based on benchmarking and transparency policy elements such as covered buildings and utility requirements. The tool presents the data in an interactive table and allows for export to a spreadsheet file.

- **Residential Energy Use Disclosure: A Guide for Policymakers:** This step-by-step guide from the American Council for an Energy-Efficient Economy (ACEEE) covers the development of a transparency policy specific to the residential sector and related stakeholder engagement. The resource discusses the importance of understanding local contexts and provides guidance on key policy components, implementation, and tracking results.
- **State and Local Energy Benchmarking and Disclosure Policy Page:** This DOE landing page provides a collection of resources spanning policy design, tools for benchmarking and transparency policy, support for post-launch activities, program scope, quality assurance and data verification, and evaluation and disclosure of results.
- **Audit, Retro-Commissioning, and Retrofit Requirements:** In addition to requiring covered buildings to annually report their energy use, some jurisdictions also mandate that buildings implement certain efficiency actions. For example, Boulder, Colorado requires covered buildings to receive energy assessments and retro-commissioning every 10 years and one-time lighting upgrades. For more information on required efficiency actions in existing policies, visit IMT's Policy Comparison Matrix.

Complementary Building Energy Rating Tools

Building energy rating tools facilitate the comparison of energy performance across buildings, enabling high-performing buildings to be recognized and rewarded in the marketplace and helping identify opportunities for improved efficiency. DOE's Building Energy Asset Score and Home Energy Score complement energy use data by providing comparable information on the energy-related assets of buildings.

- **Building Energy Asset Score:** DOE's Building Energy Asset Score (Asset Score) is a national standardized tool for assessing the physical and structural energy efficiency of commercial and multifamily residential buildings. The Asset Score generates a simple energy efficiency rating that enables comparison among buildings and identifies opportunities to invest in energy efficiency upgrades.
- **Home Energy Score:** DOE's Home Energy Score provides homeowners, buyers, and renters directly comparable and credible information about a home's energy use. Like a miles-per-gallon rating for a car, the Home Energy Score is based on a standard assessment of energy-related assets to easily compare energy use across the housing market. For an example of local implementation, see the Portland, Oregon Home Energy Score program.

Stakeholder Engagement for Program Development

Stakeholder engagement is critical to the successful development of a benchmarking and transparency program. Key stakeholders include utilities, the real estate community, building owners, and the public. The following resources describe best practices and examples of successful stakeholder engagement.

- **Energy Data Accelerator Stakeholder Engagement Strategy Guide:** This DOE guide offers tips on framing the energy data access discussion, understanding major stakeholders, identifying key issues, determining the forum for stakeholder engagement, and describing key elements of the engagement process. Salt Lake City, Utah and Philadelphia, Pennsylvania case studies provide local examples.

- **Energy Data Access: Blueprint for Action:** This toolkit of resources from DOE's Energy Data Access Accelerator features guidance documents and case studies that enable local governments and utilities to work together to overcome energy data accessibility challenges.
- **Energy Usage Data Access: A Getting-Started Guide for Regulators:** This ACEEE webpage discusses approaches for facilitating statewide energy data access and the roles and opportunities for different stakeholders, including residents, multifamily building owners, businesses, utilities, and regulators.
- **Engage with Utilities to Implement Energy Performance Policies:** This guide from the City Energy Project focuses on the key steps that cities can take to engage their energy and water utilities around the development and implementation of a building performance policy.
- **Engaging the Community in Policy Development:** This guide from the City Energy Project provides an overview of the types of stakeholder meetings a city can host in developing and implementing building performance policies. It offers guidelines on how often to hold meetings and whom to invite to them, as well as recommendations for achieving high-impact outcomes from each meeting.
- **Overview of Utility Engagement Issues:** This report from IMT and the Pacific Coast Collaborative (PCC) describes the development of whole-building data access programs that are important to benchmarking programs, including guidance for state and local governments on collaborating with their utilities.
- **Stakeholder Engagement Guide: California Assembly Bill 802 Data Access and Benchmarking Policy:** This guide from IMT and the PCC identifies key stakeholder groups, their roles within benchmarking and transparency programs, and the types of information that needs to be conveyed to these groups. While the guide was developed for California state policymakers, the lessons about stakeholder engagement are broadly applicable.
- **Utilities Providing Energy Data for Benchmarking in ENERGY STAR Portfolio Manager:** This EPA fact sheet helps identify and contact utilities in your region that provide customers with energy data. The resource provides information on the format of data transfer from the utility to the customer (e.g., spreadsheet format or direct import to Portfolio Manager accounts via web services). EPA also provides an interactive map to visually explore where utilities provide energy data for benchmarking.

Program Implementation

After establishing a productive stakeholder engagement process and developing a benchmarking and transparency program, pursuing an organized and robust approach to implementation is critical to meeting program goals. The resources below help program implementers ensure that their benchmarking and transparency programs are effective and impactful.

Development of a Website

A well-designed website is important for facilitating the benchmarking compliance process for building owners and sharing program results with stakeholders. The websites from St. Louis, Missouri and Denver, Colorado provide examples for organizing key information and links. Important elements of a benchmarking and transparency program website include:

- Current reporting deadline: A highly-visible reporting deadline helps building owners stay aware and plan ahead to meet reporting requirements on time.

- Section on reporting data: A clear section that connects directly to the ENERGY STAR Portfolio Manager page of the jurisdiction helps building owners easily and quickly access their reporting template, minimize administrative time, and enhance ease of compliance.
- Description of the benchmarking policy: A description of the legal foundation for the program is important for informing building owners and the public of key requirements.
- Building ID and address lookup option (if applicable): Some cities require building owners to report their city-specific building identification (ID) numbers (e.g., St. Louis, Missouri); including an option to look up the ID helps simplify the reporting process.
- Enforcement and noncompliance information (if applicable): This information helps building owners understand the consequences of noncompliance and how to pay any fines, if relevant.
- Frequently Asked Questions (FAQs): Providing answers to FAQs—such as which buildings are covered, reporting deadlines, noncompliance information, and a description of ENERGY STAR Portfolio Manager—promotes stakeholder understanding, support, and compliance.
- Annual reports: Annual reports promote transparency and allow for yearly evaluation of program progress.
- Downloadable and interactive data: Accessible building data supports transparency, enables analysis of building performance, and helps identify opportunities for efficiency improvements.

Stakeholder Engagement for Program Implementation

For successful program implementation, state and local governments need to provide resources to assist building owners. This ideally includes an in-depth benchmarking guide, a compliance check-list, free trainings offered both in person and online, and a benchmarking help center. See below for examples and more detail:

- **Benchmarking Help Center Guide:** This IMT guide draws lessons primarily from the experiences of New York City and Seattle, Washington in their use of benchmarking help centers. The guide offers recommendations for how to plan and operate a benchmarking help center while taking into consideration how specific policy characteristics might affect help center usage.
- **Example Benchmarking Guide:** This example from Chicago, Illinois shows how to compile information that a building owner or manager will need in order to comply with benchmarking rules, including a checklist, fact sheet, step-by-step compliance instructions, a FAQ section, and a list of additional support and opportunities such as utility programs and trainings. In addition to a full guide, it is important to provide a benchmarking checklist in a shorter document for quicker access, such as this checklist from Chicago.
- **Example Training:** This benchmarking training flyer from St. Louis, Missouri demonstrates two different training options: a “Benchmarking 101,” which is designed to familiarize parties with the policy, and a “Benchmarking Jam,” which provides hands-on assistance with the designated reporting tool (i.e., ENERGY STAR Portfolio Manager).
- **Implementing Building Performance Policies: How Cities Can Apply Legislation for Maximum Impact:** This guide from the City Energy Project helps cities launch a benchmarking program and showcases best practices in six major tasks of implementing a program alongside specific city examples.

- **Office Building Benchmarking Guide: Engaging the Hard to Reach:** This resource from the Urban Sustainability Directors Network (USDN) provides helpful guidance on program design and offers insights on how to engage owners of Class B and C commercial buildings. While benchmarking participation tends to be successful among Class A buildings, many cities have a substantial stock of Class B and C rated buildings and therefore risk missing out on opportunities to drive further efficiency. For a related example from the Better Buildings Challenge, see the Business and Community Engagement Strategy for Milwaukee, Wisconsin.

Data Management Tools

When implementing a benchmarking and transparency program, leaders will need to identify data tools to manage and use building data based on their program objectives and requirements.

- **BuildingSync:** Developed through a working group including DOE, IMT, and other organizations, BuildingSync is a common schema for energy audit data that can be utilized by different software and databases involved in the energy audit process, allowing data to be more easily aggregated, compared, and exchanged. This streamlines the energy audit process, improving the value of the data, minimizing duplication of effort for subsequent audits, and facilitating achievement of greater energy efficiency.
- **ENERGY STAR Portfolio Manager:** Almost all states and local governments utilize the EPA's ENERGY STAR Portfolio Manager tool to implement their benchmarking and transparency programs. This free tool allows for the creation of custom reporting templates and other options to compile data and determine compliance. Visit EPA's Portfolio Manager training site for additional information and support, including access to a series of webinars that walk users through the features of Portfolio Manager.
- **Standard Energy Efficiency Data (SEED) Platform:** SEED provides public agencies and other organizations with a standardized but flexible, cost-effective, and secure enterprise data platform to manage portfolio scale building performance data from a variety of sources. The SEED Platform has the potential to significantly reduce the administrative effort required by public agencies and other organizations to implement building performance reporting and transparency programs.

Managing, Sharing, and Using the Data

In addition to data access, program implementers will also need to consider how they will manage, share, and use building energy data to drive energy efficiency in the market. A number of resources provide guidance for leveraging data to drive efficiency improvements.

- **Benchmarking Data Visualization:** Many cities have deployed online open data portals and interactive maps that allow users to easily access and utilize publicly reported building data. As illustrated in benchmarking maps from Seattle, Washington and New York City, a range of site characteristics can be displayed, including building floor area, EUI, and ENERGY STAR score. Online data visualizations promote transparency and ease of access, help recognize high performers, and enable insights that can speed up energy efficiency improvements.
- **Building Labeling Policies:** Both New York City and Chicago, Illinois have updated their benchmarking ordinances to include requirements for their covered buildings to display their efficiency ratings in a prominent location. New York City uses a letter grade rating (A, B, C, D, or F) that correspond to the 0–100 ENERGY STAR score system. Chicago uses a star rating (zero to four stars) based on ENERGY STAR score and recent efficiency improvements.

- **Energy Benchmarking Scorecards: Sharing Data to Motivate Action:** This report from IMT and USDN explores how program implementers use benchmarking scorecards to present data in an actionable format to drive investment in retrofits. The report describes the elements of energy benchmarking scorecards, citing examples of messaging strategies employed by several U.S. cities. The report also showcases the process that cities used to develop their benchmarking scorecards, including: Chicago, Illinois; Denver, Colorado; Minneapolis, Minnesota; Philadelphia, Pennsylvania; and Seattle, Washington.
- **Energy Data Management Guide** *(forthcoming)***:** This DOE guide offers a step-by-step, web-based framework for establishing a robust and sustainable energy data management program. The user-friendly platform is designed around three central pillars—Generate Buy-in, Build a Solid Foundation, and Hardwire Energy Management—and the simple interface enables users to easily access proven strategies, key data management tools, and case studies and examples drawn from across the public sector.
- **Managing Benchmarking Data Quality:** This report from IMT and USDN helps benchmarking and transparency program implementers understand current best practices for managing benchmarking data. The report recommends a system for identifying and responding to three categories of common data quality errors that implementers can use to set up their own data quality management system.
- **Putting Benchmarking Data into Action:** This paper from IMT and NRDC and presented at ACEEE's 2016 Summer Study on Energy Efficiency in Buildings discusses the different strategies, technologies, and tools that governments and other stakeholders have deployed to make energy benchmarking data actionable and drive efficiency improvements in the real estate market. The paper characterizes target audiences, classifies various data delivery methods, and offers a set of best practices and recommendations for how to effectively utilize benchmarking data.
- **Putting Data to Work:** Funded in part by DOE, this toolkit from IMT provides resources that help states, cities, and other energy efficiency program implementers better utilize the data being generated from benchmarking and transparency programs. These resources are organized in three categories:
  - **Guidance and Recommendations:** This includes reports on how to improve, communicate, and market benchmarking data; and how utilities can improve their operations using building data.
  - **Tools You Can Use:** This includes guides for assessing impact, aiding building owners, and using benchmarking data to improve efficiency.
  - **What Others Have Done:** This includes case studies from the District of Columbia and New York City on how they utilized data, formed partnerships, engaged utility customers, and realized energy savings.

Program Impact Evaluation

Impact evaluation is essential for ensuring effective program implementation and demonstrating the value of the program to the public and other key stakeholders. Existing benchmarking and transparency evaluations cover building energy performance as well as non-energy impacts—including economic growth, job creation, and emissions reductions—and use a variety of methods and metrics.

- **Analyzing Benchmarking Data:** This report from IMT and USDN helps benchmarking and transparency program implementers produce informative annual reports that provide summary information about public and private buildings and document trends in energy and water performance. The document recommends specific analyses that jurisdictions consider including in annual reports. For each analysis, the report explains the calculations and suggests ways of displaying the resulting information visually.

- **Annual Reports:** Annual reports issued by states, counties, and cities promote transparency and allow for yearly evaluation of the progress of benchmarking and transparency programs, including an assessment of impacts and identification of energy efficiency opportunities. For examples, see reports from Chicago, Illinois, New York, New York, and Seattle, Washington.
- **Benchmarking & Transparency Policy and Program Impact Evaluation Handbook:** This DOE handbook offers guidance on how to estimate the energy and non-energy benefits accrued as a result of benchmarking and transparency policies and programs. It discusses various methodologies available and recommended approaches for impact evaluation.
- **Building Energy Benchmarking: How Measurement Prompts Management:** This survey of facility managers from the National Electrical Manufacturers Association details the impacts of New York City's benchmarking and transparency policy, showing that it spurred operational changes such as training of building staff (for 51% of survey respondents) and educating building occupants (40% of respondents) and also catalyzed investments in technologies for lighting and heating (for 46% and 45% of respondents, respectively), among many other building efficiency improvements.
- **Does Information Provision Shrink the Energy Efficiency Gap?:** This multi-city study from RFF uses data on buildings, electricity prices, and local environmental and economic metrics to estimate the impact of benchmarking disclosure on utility expenditures. The authors found that disclosure policies resulted in about a 3% decrease in utility expenditures for office buildings covered by the laws.
- **Evaluation of U.S. Building Energy Benchmarking and Transparency Programs: Attributes, Impacts, and Best Practices:** This Lawrence Berkeley National Laboratory report discusses benchmarking and transparency program design and implementation characteristics, examines approaches to measure and estimate program impacts, and summarizes evaluations of city programs. The report found that most studies of benchmarking and transparency programs indicate 3% to 8% reductions in gross energy consumption or EUI over a two- to four-year period of implementation.
- **Impact Assessment: A Guide for City Governments to Estimate Savings from Energy Benchmarking and Energy Efficiency Programs:** This IMT paper describes how cities are actively using benchmarking data to evaluate the impact of their energy efficiency policies and programs, and includes best practices for other cities to conduct similar analyses.
- **Measuring Savings from Benchmarking Policies in New York City:** This Massachusetts Institute of Technology and University of Pennsylvania study uses a modeling approach to estimate the impacts of New York City's benchmarking and transparency policy. The study found that the policy led to 6% and 14% reductions in building EUI after three and four years, respectively.
- **New York City Benchmarking and Transparency Policy Impact Evaluation Report:** This DOE report evaluates New York City's benchmarking and transparency policy in terms of energy consumption, cost savings, jobs, and other metrics. It also provides examples of program evaluation methodologies. The report found a cumulative energy savings of 5.7% and a cumulative cost savings of $267 million during the first four years of policy implementation.

This resource was developed in collaboration with the Institute for Market Transformation (IMT).

For more information, visit: ***www.energy.gov/eere/slsc*** *and* ***http://www.imt.org/***

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