

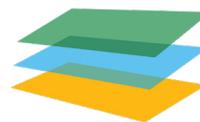


**The Implementation
of Local Building
Performance Standards:**
An Analysis of Progress
to Date and Guide
for Future Policy



NYU

Marron Institute
of Urban Management



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NEW YORK UNIVERSITY SCHOOL OF LAW

The Implementation of Local Building Performance Standards: An Analysis of Progress to Date and Guide for Future Policy

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The Implementation of Local Building Performance Standards: An Analysis of Progress to Date and Guide for Future Policy

Executive Summary

Introduction

Building Performance Standards (BPS) are a tool that local governments can use to reduce greenhouse gas (GHG) emissions and promote energy efficiency in buildings. As of November 2024, nine local governments had adopted BPS laws: Boston, Massachusetts; Cambridge, Massachusetts; Chula Vista, California; Denver, Colorado; Montgomery County, Maryland; New York City; Seattle, Washington; St. Louis, Missouri; and Washington, D.C. Some local BPS programs require buildings to reduce their energy consumption while others mandate that buildings lower GHG emissions. Buildings are a major source of GHG emissions in cities, and BPS laws are some of the most innovative measures that local governments have taken to mitigate climate change.

This report outlines the findings and recommendations of the most comprehensive analysis to date of the implementation of these nine local BPS programs. The report is based on: qualitative research undertaken by the Guarini Center on Environmental, Energy and Land Use Law at NYU School of Law (Guarini), including 46 interviews with local government officials and other experts; and quantitative analysis of building energy and other data by the NYU Marron Institute of Urban Management (Marron) in four cities (Boston, Denver, New York City, and Washington, D.C.).

Key Findings

Local BPS programs are not far enough along in their implementation to evaluate whether the programs are meeting their intended climate or energy reduction goals, or to assess the impact of particular design choices, such as GHG-based policies versus energy efficiency-based policies. However, our study did uncover significant challenges associated with standing up and implementing BPS programs. We also observed local governments deploying several innovative strategies to respond to these challenges. This report documents these challenges and responses with the aim of illuminating future policy discussions surrounding BPS programs or other building decarbonization strategies.

Our findings include:

- The nine cities are continuing to implement their BPS programs, notwithstanding the effects of the COVID-19 pandemic on the commercial real estate sector and concerns about housing affordability. As of 2025, buildings are being required to demonstrate compliance with BPS targets in three of the nine cities (Boston, New York, and St. Louis). Buildings in the other six jurisdictions will be required to report on their compliance in future years.
- To our knowledge, no local government has yet imposed a penalty on a building for not meeting its BPS target.¹
- Implementing a BPS policy is a complex, resource-intensive task for local governments. While most jurisdictions had already been collecting data from buildings about their energy consumption under benchmarking laws before they adopted BPS laws, issues with the quality of this data created challenges for new BPS programs.
- Local governments are implementing BPS programs with limited resources. Excluding New York City, none of the eight other local governments has more than twenty full-time equivalents (FTEs) allocated to implement their BPS policy, and most have fewer than ten FTEs.²
- Many buildings already meet the first (or initial) BPS target for energy consumption or GHG intensity (GHGI) under the laws. Marron's quantitative analysis of four cities shows that in three of them, over 60% of properties already met the first target, based on 2023 energy benchmarking data, before the BPS legal requirements took effect (Boston, New York City, and Washington, D.C.).
- Nonetheless, there is considerable concern among local governments, building owners, and others about the costs of the changes that BPS laws may require buildings to undertake in order to meet future targets.
- In practice, local governments are providing buildings with flexible timetables and varying what actions are required to comply with BPS programs during implementation. These various flexibility measures and alternative compliance requirements result in multiple options for building owners to satisfy their legal obligations, not all of which require the same reduction in energy usage or GHG intensity as the original building targets. In some cases, buildings may not be required to make changes on-site.
- Local governments are providing building owners with technical assistance, and, in some instances, financial assistance, to help meet the BPS requirements.
- Local governments are responding to the challenges of BPS implementation by deploying innovative approaches, such as multiple forms of building owner engagement and education, and deep efforts to integrate equity and affordability perspectives into their application of flexibility measures, financial support, and wrap-around services.
- The success of BPS policy implementation is affected by state and federal policies, particularly with regard to energy rates and sources of grid-supplied electricity.

Key Recommendations

In light of our findings, we make multiple recommendations for improving the implementation and design of BPS policies. For example, we recommend that:

- Successful BPS implementation requires adequate funding of local government agencies administering these programs. Funding is required to collect, manage, and process the data required to operationalize a BPS program. It is also required for public engagement and education, rulemaking, technical and financial assistance to building owners, and enforcement.
- In deciding whether to adopt a new BPS program and how to design it, local governments should analyze the costs and benefits of BPS programs. Costs include upfront costs associated with audits and retrofitting buildings, as well as potential utility bill increases. Benefits include climate, public health, and quality of life benefits from avoided GHG and localized pollutant emissions, as well as potential energy cost savings. Local governments additionally should consider the distribution of these costs and benefits among building owners, tenants, and surrounding communities, and consider sequencing or prioritizing BPS requirements to promote overall health and environmental and energy justice.
- In designing and implementing BPS programs, local governments should take into account regulated buildings' financial circumstances, and consider new policies to unlock public and private funding for local building decarbonization.
- In designing and implementing BPS programs, local governments should assess as potential models the innovative approaches that have been developed in jurisdictions with existing BPS policies. Some of the innovations highlighted in this report include: the independent review board that Boston has created to help implement its BPS which incorporates equity perspectives; the tools that Montgomery County's green bank has developed to assist building owners finance retrofits; the efforts of Washington, D.C. to engage and educate building owners early; Denver's nuanced approach to addressing buildings facing affordability and climate vulnerability challenges; and New York City's use of data to inform policy implementation.
- Local governments should carefully consider their approaches to enforcing BPS programs as building owners gain increasing experience with these laws. At this early stage in implementing these laws, local governments should provide transparent information about which buildings are in and out of compliance, and define what compliance means given the multiple pathways for complying with BPS laws.
- Given the challenges of standing up and implementing new BPS programs, and the potentially high costs of compliance, local and state governments should consider alternative or complementary approaches to building decarbonization.

Structure of the Report

This report has seven main parts.

- Part I introduces the study.
- Part II situates the study within existing literature on BPS policies and explains the report’s qualitative and quantitative methodologies.
- Part III analyzes the nine local BPS laws and their implementation to date.
- Part IV identifies key findings of the four-city quantitative analysis.
- Part V outlines key findings from the qualitative research in nine cities and our recommendations.
- Part VI identifies issues for future consideration, including the need to find ways of lowering the costs of BPS implementation for building owners and to consider policy options other than BPS programs for decarbonizing and reducing energy consumption in buildings.
- Part VII is the bibliography.

The report also contains several appendices, including further information on prior guidance for BPS programs (Appendix A), a more in-depth look at local BPS programs by jurisdiction (Appendix B), further background on our quantitative analysis (Appendix C), and a list of interviewees in the qualitative analysis (Appendix D).

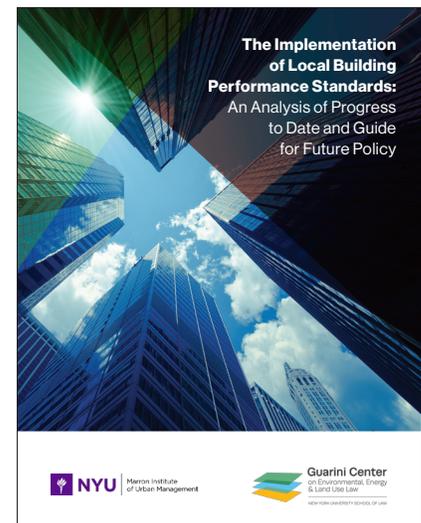


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I. Introduction

Energy use in buildings³ contributes one third of total U.S. greenhouse gas (GHG) emissions⁴ and represents approximately seventy percent of total GHG emissions in some cities.⁵ Building Performance Standards (BPS) are tools that some jurisdictions are using to regulate energy use and reduce GHG emissions in buildings as part of efforts to limit climate change. Some BPS laws require that buildings meet energy efficiency standards, while others require reduction of GHG emissions associated with energy use. In contrast with changes to specifications for new buildings, BPS policies can be used to meet these goals in existing buildings. Local governments and advocates for BPS policies project that a number of environmental, health, and social benefits will flow from the implementation of BPS policies: in addition to driving reductions in energy use and GHG emissions that can enable local governments to meet their climate goals,⁶ BPS policies have the potential to reduce local air pollution from particulate matter (PM), sulfur oxides (SOx), and nitrogen oxides (NOx) and create healthier housing by inducing building owners to upgrade their properties in ways that improve ventilation, reduce indoor sources of pollution, and reduce occupants' energy costs.⁷

Washington, D.C. was the first jurisdiction to enact a BPS law, in 2018. As of November 2024, nine local governments had established

BPS programs: Boston, Massachusetts; Cambridge, Massachusetts; Chula Vista, California; Denver, Colorado; Montgomery County, Maryland; New York City; Seattle, Washington; St. Louis, Missouri; and Washington, D.C.⁸ BPS policies have also been adopted in some states and at the federal level for federal buildings.⁹

This report focuses on local BPS laws. The earliest compliance deadlines for local BPS laws are beginning to take effect in some cities, although most will take effect in future years.

Despite the growing number of local jurisdictions that have adopted or are considering BPS laws,¹⁰ there has been limited analysis of how local BPS programs are being implemented in practice. This report outlines the findings and recommendations of the most comprehensive analysis to date of the implementation of existing local BPS laws. For the last year, a joint team of researchers at the Guarini Center on Environmental, Energy and Land Use Law at NYU School of Law (Guarini) and the NYU Marron Institute of Urban Management (Marron) have been using qualitative and quantitative methods to understand how local BPS laws are currently being implemented in the United States, interviewing local governments, building owners, and experts, and developing recommendations based on this research.

Local BPS programs are not far enough along in their implementation to evaluate whether they are meeting their intended climate or energy reduction goals, or to assess the impact of particular design choices, such as GHG-based policies versus energy efficiency-based policies. However, our study did uncover significant implementation challenges associated with standing up and implementing BPS programs. We also observed several innovative strategies deployed by local governments to respond to these challenges. This report documents these challenges and responses with the aim of illuminating future policy discussions surrounding BPS programs or other building decarbonization strategies.

Our findings include:

- The nine cities are continuing to implement their BPS programs, notwithstanding the effects of the COVID-19 pandemic on the commercial real estate sector and concerns about housing affordability. As of 2025, buildings are being required to demonstrate compliance with BPS targets in three of the nine cities (Boston, New York City, and St. Louis). Buildings in the other six jurisdictions will be required to report on their compliance in future years.
- To our knowledge, no local government has yet imposed a penalty on a building for not meeting its BPS target.¹¹
- Implementing a BPS is a complex, resource-intensive task for local governments. While most jurisdictions had already been collecting data from buildings about their energy consumption under benchmarking laws before they adopted BPS laws, issues

with the quality of this data created challenges for new BPS programs.

- Local governments are implementing BPS programs with limited resources. Excluding New York City, none of the eight other local governments has more than twenty full-time equivalents (FTEs) allocated to implement the BPS, and most have fewer than ten FTEs.¹²
- Many buildings already meet the first (or initial) BPS target for energy consumption or GHG intensity (GHGI) under the laws. Marron's quantitative analysis of four cities shows that in three of them, over 60% of properties already met the first target, based on 2023 energy benchmarking data, before the BPS legal requirements took effect (Boston, New York City, and Washington, D.C.).
- Nonetheless, there is considerable concern among local governments, building owners, and others about the costs of the changes that BPS laws may require buildings to undertake in order to meet future targets.
- In practice, local governments are providing buildings with flexible timetables and varying what actions are required to comply with BPS programs during implementation. These various flexibility measures and alternative compliance requirements result in multiple options for building owners to satisfy their legal obligations, not all of which require the same reduction in energy usage or GHG intensity as the original building targets. In some cases, buildings may not be required to make changes on-site.

- Local governments are providing building owners with technical assistance and, in some instances, financial assistance, to help meet the BPS requirements.
- Local governments are responding to the challenges of BPS implementation by deploying innovative approaches, such as multiple forms of building owner engagement and education, and deep efforts to integrate equity and affordability perspectives into their application of flexibility measures, financial support, and wrap-around services.
- The success of BPS policy implementation is affected by state and federal policies, particularly with regard to energy rates and sources of grid-supplied electricity.

Key Recommendations

In light of our findings, we make multiple recommendations for improving the implementation and design of BPS policies. For example, we recommend that:

- Successful BPS implementation requires adequate funding of local government agencies administering these programs. Funding is required to collect, manage, and process the data required to operationalize a BPS program. It is also required for public engagement and education, rulemaking, technical and financial assistance to building owners, and enforcement.
- In deciding whether to adopt a new BPS program and how to design it, local governments should analyze the costs and benefits of BPS programs. Costs include upfront costs associated with audits and retrofitting buildings, as well as potential utility bill increases. Benefits include climate, public health, and quality of life benefits from avoided GHG and localized pollutant emissions, as well as potential energy cost savings. Local governments additionally should consider the distribution of these costs and benefits among building owners, tenants, and surrounding communities, and consider sequencing or prioritizing BPS requirements to promote overall health and environmental and energy justice.
- In designing and implementing BPS programs, local governments should take into account regulated buildings' financial circumstances and consider new policies to unlock public and private funding for local building decarbonization.



- In designing and implementing BPS programs, local governments should assess as potential models the innovative approaches that have been developed in jurisdictions with existing BPS policies. Some of the innovations highlighted in this report include: the independent review board that Boston has created to help implement its BPS which incorporates equity perspectives; the tools that Montgomery County's green bank has developed to assist building owners finance retrofits; the efforts of Washington, D.C. to engage and educate building owners early; Denver's nuanced approach to addressing buildings facing affordability and climate vulnerability challenges; and New York City's use of data to inform policy implementation.
- Local governments should carefully consider their approaches to enforcing BPS programs as building owners gain increasing experience with these laws. At this early stage in implementing these laws, local governments should provide transparent information about which buildings are in and out of compliance, and define what compliance means given the multiple pathways for complying with BPS laws.

Lastly, we note that BPS policies put the legal onus and most of the costs of building decarbonization and improving energy efficiency on building owners and, by extension, potentially their tenants. Other policy options, such as standards for appliances used in buildings, or requirements for utilities to improve energy efficiency or use of renewables, would place legal obligations on different parties. These other options might spread the costs of improving building performance beyond owners and tenants to larger groups of people, such as electricity ratepayers, utility shareholders, and/or taxpayers at large.

This report proceeds as follows:

- Part II situates this study in existing literature on BPS programs and explains the mixed methods used in the study.
- Part III analyzes the existing BPS laws in the nine cities and their implementation to date.
- Part IV reports key findings from Marron's quantitative analysis in four cities (Boston, Denver, New York City, and Washington, D.C.) that illuminate several of the challenges involved in implementing BPS policies.
- Part V identifies the key findings of Guarini's qualitative analysis of BPS implementation in nine cities and includes our recommendations for BPS implementation and design.
- Part VI concludes by highlighting issues for further consideration, including ways of lowering the costs to buildings of complying with BPS programs and other policy options for decarbonizing or increasing the energy efficiency of buildings.
- Part VII is the bibliography.

The report also contains several appendices, including further information on prior guidance for BPS programs (Appendix A), a more in-depth look at local BPS programs by jurisdiction (Appendix B), further background on our quantitative analysis (Appendix C), and a list of interviewees in the qualitative analysis (Appendix D).

II. Situating This Study in Existing Literature

This study focuses on the implementation of BPS laws, a topic which has received little attention to date. However, the prior research surrounding BPS laws generally provides helpful background to our study and is summarized below.

A. Existing Literature

There are many resources to help localities and states design BPS laws. These sources identify key design choices and analyze different options for addressing them (see Appendix A). There also are studies prospectively analyzing the potential impacts of BPS laws, as well as related policy options.¹³

There are only a few studies analyzing the implementation of actual BPS laws—that is, retrospective studies in our terms. Indeed, as of the time of writing, there are only two retrospective studies of BPS policies, both of which have been led by policy analysts at the Institute for Market Transformation (IMT), which advocates for the adoption of BPS laws.¹⁴

At a high level, these studies focus on the practical challenges that interested stakeholders face at the design and implementation stage. Stakeholders typically include municipal officials, building owners, service providers doing work in buildings (e.g.,

energy consultants, architects, and contractors), and tenants (or tenant representatives). By surveying the perspectives of these stakeholders, researchers are beginning to understand if and how BPS policies are working on the ground.

In 2024, Duer-Balkind et al. provided the first retrospective analysis of BPS policies in five U.S. cities: Washington, D.C., New York City, St. Louis, Boston, and Denver.¹⁵ This study has quantitative and qualitative dimensions. Using publicly available benchmarking data, the study sought to understand what percentage of buildings met initial standards when they were set and the percentage that met the initial standards in the latest data. The study finds that between 30 and 80 percent of buildings in the cities surveyed, depending on location, are on track to meet the jurisdictions' first BPS targets, based on the latest data available to the study authors.¹⁶ The study also sought to understand, in jurisdictions that have defined their 2030 targets, what percentage of buildings met the 2030 standards at the time these were set and the percentage meeting these standards in the latest data.¹⁷

Duer-Balkind et al. (2024) also surveyed municipal officials and service providers from each of the five cities about the lessons they have learned thus far in implementing their

respective BPS programs. Only 60 service providers responded, although the authors contacted 1,000 individuals, representing a 5 percent response rate.¹⁸ Duer-Balkind et al. (2024) find that service providers expect that demands on their workforce will exceed supply especially as compliance deadlines approach and municipal enforcement efforts ramp up. Some providers also are concerned about potential exposure to liability as the BPS targets are enforced.¹⁹

In 2025, Duer-Balkind, Koolbeck, and Kelley expanded and updated the 2024 study to review one component of BPS policies, the implementation of alternative compliance pathways in 10 jurisdictions: Washington, D.C., New York City, St. Louis, Boston, Denver, Seattle, and Montgomery County, Maryland, as well as the states of Oregon, Colorado, and Washington.²⁰ Alternative compliance pathways are one of the ways that local governments provide flexibility for building owners to meet the applicable BPS requirements. Jurisdictions may offer different kinds of alternative compliance pathways. Some jurisdictions might allow a longer timeframe for compliance, while others may alter the final performance standard that an owner must meet.

Based on feedback from government officials, Duer-Balkind, Koolbeck, and Kelley (2025) find that governments are struggling with the increased administrative burden of managing alternative compliance pathway applications.²¹ Similar concerns arise for building owners, some of whom lack the time, money, and expertise to try to comply with the relevant laws.²² Canvassing, in part, service providers hired by building owners in the 2024 study, the 2025 study reports that the most common concerns heard by building performance resource hubs were the cost of compliance,

workforce availability, and the existence (or lack thereof) of government financing incentives and technical assistance.²³

Two other studies of BPS laws are worth noting, although they are not strictly retrospective analyses of the implementation of BPS laws. Jarrah, Garfunkel, and Ribeiro (2024), policy analysts at the American Council for an Energy-Efficient Economy (ACEEE), sought to understand the challenges of bringing affordable housing properties into compliance with BPS policy in cities where BPS policies are being developed or implemented.²⁴ They conducted a literature review and interviewed staff from non-profit organizations with experience in BPS and affordable housing in Denver (Energy Outreach Colorado), Boston (Planning Office of Urban Affairs), and New York City (Habitat NYC and Westchester). Jarrah, Garfunkel, and Ribeiro (2024) find that affordable housing property owners are either unclear about the specific requirements of BPS policies or unaware of their existence.²⁵ In interviews, they heard that governments are not providing adequate technical or financial assistance in order to facilitate compliance, although the cities are offering flexibility measures to accommodate affordable housing owners.²⁶

In a study of how climate justice has informed BPS policy implementation in Boston, Diezmartínez, Sovacool, and Short Gianotti (2024) find that there is a tension between the concerns of environmental and climate justice advocates and building owners.²⁷ Tenants in low-income, predominantly Black and Latinx communities have long borne the burden of environmental hazards, high energy costs, and unsanitary housing. BPS policies have the potential to address some of these burdens if they lead building owners to improve ventilation and indoor air quality, as well as

invest in energy efficiency upgrades to reduce energy costs. Diezmartínez, Sovacool, and Short Gianotti (2024) report that advocates interviewed in their study worried that environmental justice communities will not reap benefits of BPS compliance and instead be burdened by the cost of implementing BPS through rent increases or displacement.²⁸ The study found that building owners, on the other hand, are of the opinion that such equity concerns are beyond the scope of BPS policy and should be addressed separately.²⁹

B. This Study

This is the first study to comprehensively analyze the implementation of BPS laws in nine U.S. localities since the laws were passed. It examines BPS implementation in Boston, Massachusetts; Cambridge, Massachusetts; Chula Vista, California; Denver, Colorado; Montgomery County, Maryland; New York City; Seattle, Washington; St. Louis, Missouri; and Washington, D.C.

The study aims to understand: 1) the scale of the challenges involved in implementing local BPS laws in light of the structure of these laws and the levels of building energy consumption and GHG emissions before the laws were passed; 2) the steps that local governments have taken as of 2025 to implement these laws; and 3) the obstacles that local governments have experienced implementing BPS laws and the approaches that they have used to address these obstacles. We undertook this study at a time when buildings covered by local BPS laws are only beginning to be required to comply with these laws. By examining implementation challenges at this early date, the study aims to inform the ongoing implementation of existing laws, which will occur over decades, and the design of new laws to decarbonize buildings.

C. Methodology

The study uses a mixed methods approach, combining qualitative and quantitative methods.

Qualitative Research

Guarini began the qualitative portion of the research by assessing the local BPS laws and regulations that local governments have adopted, with attention to key design choices, such as focusing on reducing building GHG emissions or increasing building energy efficiency. We also analyzed the key steps that jurisdictions have taken to implement BPS laws, such as rulemakings, public education and outreach, delivery of resources, data tracking and analysis, and enforcement.

Guarini then conducted interviews to gain perspectives on implementation in the nine jurisdictions with local BPS laws. Across our 46 interviews, we targeted three categories of interviewees: 1) local government officials in the nine local jurisdictions that had adopted BPS laws as of November 1, 2024. This included programmatic officers and staff providing wrap-around services to support implementation, such as technical assistance and access to financial resources; 2) state officials; and 3) non-governmental interviewees in jurisdictions with BPS laws, including real estate industry representatives, building owners and developers, people involved in national and regional building decarbonization coalitions, technical experts, environmental and environmental justice advocates, and housing affordability advocates and experts. The level of analysis that we were able to capture varied by jurisdiction, depending on the age of the BPS law, scope of coverage, and other factors. For further details, see Appendix D.

Quantitative Research

Marron analyzed trends in building energy consumption and GHG emissions in four of the nine cities: Boston, Denver, New York City, and Washington, D.C. These cities were selected for quantitative analysis because they met two criteria: 1) the jurisdiction had adopted a local BPS law at least three years prior to 2024; and 2) there was publicly available data about building GHG emissions and/or energy consumption (“benchmarking data”) in that jurisdiction for at least three years before the passage of the law and three years after that could be utilized for the study. New York City had the longest range of benchmarking data (2010-2023), with five years of benchmarking data available after the passage of its BPS law in 2019. Data for the remaining three cities were as follows: Boston: 2014-2023, ten years total, three post-BPS (including BPS adoption year); Denver: 2015-2023, nine years, three post-BPS (including BPS adoption year); Washington, D.C.: 2011-2023, 13 years, six post-BPS (including BPS adoption year).

We used publicly-available data published on each city’s open data platform and other public resources specific to the respective BPS laws. First, we integrated various data sources to build a knowledge database that spans the selected cities. The foundation for this work was the Covered Building List (CBL) provided by each city, which provides information on properties covered by BPS laws, including compliance targets, current compliance status, and selected or assigned pathway, as available. Building energy performance, GHG emissions, and operational and physical characteristics were extracted from local energy benchmarking data collected by the selected jurisdiction, either as part of their BPS requirements or through energy benchmarking and reporting laws. To ensure consistency in our analysis, we used the

most recently published benchmarking data available for all four cities as of August 2025, which included energy consumption and GHG data for calendar year 2023.

Next, we merged benchmarking data with city land use and property geospatial data in order to geolocate buildings covered by BPS laws and to supplement the benchmarking data with additional building characteristics. Each jurisdiction has a unique way of identifying buildings and properties. In New York City, covered buildings are indicated by the Borough-Block-Lot (BBL) identifier, which provides an ID for each tax lot in the City. A tax lot can have more than one building associated with a single BBL. Boston uses a BPS program-specific ID—called the BERDO ID—to identify individual covered buildings. There can be multiple BERDO IDs on a single tax lot. In Denver, covered buildings are labeled with a Building ID, and there are instances of multiple Building IDs at a given address (a tax lot identifier was not available). Finally, Washington, D.C. uses the ENERGY STAR Portfolio Manager ID, which is a building-level identifier (assuming buildings are separately metered) assigned through the ENERGY STAR Portfolio Manager platform. For the properties that were not able to be geolocated through land use or tax lot data, we used the property address to map each building via the Census Geolocation API. Following these data cleaning and integration steps, the resulting database contained a total of 31,708 properties across the four jurisdictions. Each property is described by approximately 60 standardized features, including building size and age.

Using this data, Marron analyzed building energy consumption and GHG intensity levels in the cities before and after they passed BPS laws. Also using the benchmarking data, Marron assessed the extent to which

buildings covered by BPS policies currently meet the initial set of targets and broke down the analysis by building type (multifamily housing, office, and other) and other building characteristics. Marron developed a novel way to clean, process, and standardize city energy benchmarking data, BPS targets, and carbon emissions factors to allow for comparative studies across jurisdictions. Building on this foundation, Marron developed new methods to measure and evaluate BPS standards, including indicators for analyzing the difference between building-specific standards and the respective building's energy performance and carbon emissions. We analyzed the magnitude of emissions reduction needed to meet BPS targets across a variety of building characteristics, including use type and fuel source.

To validate assumptions and ensure data quality, Guarini and Marron conducted a series of interviews with the BPS data managers and analysts from each of the four jurisdictions.

Policy Recommendations

Using the quantitative and qualitative data collection and analysis described above, we developed recommendations for local governments seeking to decarbonize buildings and increase building energy efficiency using BPS laws. These recommendations are incorporated in the key findings in Part V of this report.

Advisory Committee

All aspects of our research, including quantitative and qualitative components, were guided by an advisory committee. The advisory committee was established at the outset of the project and included membership from local government officials, building

industry representatives, technical experts, and affordable housing experts. The advisory committee's input was integrated into both the research and policy development phases of the project. Specifically, the advisory committee helped us identify key stakeholders in the BPS jurisdictions, provided feedback on approaches to data collection and analysis, helped to ground-truth research findings, and helped shape our recommendations. The advisory committee meetings offered opportunities for local governments, building owners, and advocates seeking effective and equitable building decarbonization to exchange perspectives on present and future BPS approaches. We are enormously thankful to the advisory committee for sharing their time, expertise, and wisdom throughout this process.

Fall 2025 Convening

On September 29, 2025, we held a hybrid in-person/virtual convening at NYU Law School, which gathered local government officials tasked with implementing BPS laws, building owners and developers, affordable housing experts, and building decarbonization experts. We presented our key findings and draft recommendations, along with potential areas for future research. We solicited input and incorporated feedback from the convening in this final report. However, we note that the study's findings and recommendations are those of the study authors and should not be attributed to the members of the advisory committee or the people who attended the convening.

III. Existing BPS Laws and Their Implementation to Date

This section outlines how BPS laws work, including what they are seeking to regulate and the variety of design choices reflected among the nine jurisdictions we studied. After discussing how BPS laws were crafted, we then describe the mechanisms that local governments are using to implement these laws.

A. Understanding Building Performance Standards

BPS policies regulate either GHG emissions or energy consumption at the building level. A BPS operates by requiring owners of certain buildings to meet prescribed standards that typically grow more stringent over time. In most jurisdictions, BPS policies only apply to buildings over a certain size threshold or buildings serving particular uses. For example, Boston's BPS policy, the Building Emissions Reduction and Disclosure Ordinance (BERDO), covers non-residential buildings that are 20,000 square feet or larger and residential buildings that have 15 or more units.³⁰ St. Louis's policy covers municipal, commercial, institutional, and residential properties over 50,000 square feet.³¹

BPS laws differ from traditional command and control environmental laws, such as air pollution control regulations, in that they do

not directly regulate the emission rates of the equipment and systems that are the sources of pollution from buildings, nor the activities of people in buildings that drive the use of these pollution sources and can affect their levels of pollution outputs.³² While a BPS standard may ultimately lead a building owner to replace a polluting boiler or reduce energy consumption through a change in operations, the laws do not prescribe direct requirements for the equipment that causes pollution or the people that use such equipment.

Before specific requirements for building owners can be set, local governments must collect and understand extensive data related to building characteristics and energy use. The process of getting from a requirement to report building energy use data to an enforceable requirement to make changes to a building is described below.

B. Benchmarking Data Underlies BPS Policies

In establishing the building-specific limits that are the heart of BPS laws, jurisdictions rely on data about building energy use reported by building owners. All nine local governments have benchmarking laws that require that buildings report such information. Eight of the governments enacted an energy

benchmarking law before adopting a BPS. Chula Vista, California did not have its own benchmarking law prior to BPS adoption; it established its benchmarking and BPS laws in the same ordinance in 2021, although the state of California had previously established a benchmarking law for buildings over 50,000 square feet.³³ Washington, D.C. was the first jurisdiction to adopt a benchmarking ordinance, in 2008.³⁴

Local benchmarking laws generally require owners of covered buildings to report their actual energy use into a federal energy tracking tool— EPA’s ENERGY STAR Portfolio Manager. ENERGY STAR Portfolio Manager was launched in 2000 to help buildings voluntarily improve their energy efficiency.³⁵ The tool combines two types of data: 1) data about building characteristics, such as the total gross floor area, year built, occupancy, and how the building is used; and 2) actual utility and other energy data about the building, such as the amount of water, electricity, or on-site fossil fuels used by the building. Using this reported data, ENERGY STAR Portfolio Manager can offer information about the building’s energy use across different metrics, including energy use and intensity, greenhouse gas emissions, and ENERGY STAR Score, which is a metric generated by the tool itself that aims to measure building energy performance.³⁶ Using this combination of data, building owners are able to gain insights into how their buildings use energy and the largest sources of emissions, and local and state governments are able to monitor and assess how much energy buildings in their jurisdictions are using and target inefficient buildings for further evaluation.

BPS laws were largely enacted as the next regulatory step after benchmarking laws.³⁷ The concept underlying this regulatory transition was that local governments could use benchmarking data to require building owners to improve their structures’ performance through tangible actions that would increase energy efficiency or reduce GHG intensity over time. However, the transition from benchmarking to BPS programs has not been as smooth as anticipated. As discussed in Part V, local governments have had to address inaccuracies and gaps in the benchmarking data generated by building owners as part of BPS implementation.

C. Target Metrics and Timelines

BPS laws typically seek to improve building performance in one of two ways: 1) reducing GHG emissions associated with the building’s energy use; or 2) increasing the building’s energy efficiency. Four of the nine local governments that we studied have GHG-based BPS policies (Boston, Cambridge, New York, and Seattle), while the remaining five have energy efficiency-based BPS policies (Chula Vista, Denver, Montgomery County, St. Louis, and Washington, D.C.). As a result, the metrics that local governments use to set the performance targets for buildings vary by jurisdiction. Jurisdictions may measure performance based on greenhouse gas intensity, energy use intensity, or ENERGY STAR Score, or some combination thereof (see “Target Metrics” below), depending on the type of building and the goals of the jurisdiction. Each metric is described more fully below.

Target Metrics

Different local governments chose different metrics to evaluate building performance under BPS laws. The following were used most commonly by the jurisdictions we studied:

Energy Use Intensity (EUI) is the annual energy consumption of a building divided by its gross floor area, generally reported in thousands of British thermal units (kBtu) per square foot. The annual energy consumption in the numerator of this equation can be measured on either a “site” or “source” basis. “Site energy” reflects the quantity of electricity and other fuels a building’s systems directly consume. “Source energy” includes this direct energy consumption, as well as the energy that is required to produce and transmit a building’s fuels (thereby accounting, e.g., for the energy lost as electricity is dispatched from a power plant to customer buildings). Both site and source EUI normalize energy use across buildings of different sizes, which enables the comparison of energy use in large and small buildings. Denver, Montgomery County, and St. Louis use site EUI as the basis for buildings’ BPS targets. Washington, D.C. uses source EUI along with ENERGY STAR Score. Note that these jurisdictions use a weather-normalized version of EUI, which accounts for average weather conditions within a region.

ENERGY STAR Score (ESS) is a measure of how well a property is performing relative to similar properties, when normalized for climate and operational characteristics. ENERGY STAR Scores are based on data from national building energy consumption surveys, controlling for key variables, including climate, hours of operation, and building size. The 1-100 scale is set so that 1 represents the worst performing buildings and 100 represents the best performing buildings, with a score of 50 indicating that a building is performing at the national median. Calculations are based on source energy consumption (as opposed to site energy consumption). Chula Vista and Washington, D.C. use this metric.

GHG Intensity (GHGI) reflects the greenhouse gas emissions associated with a building’s energy consumption, divided by the building’s gross floor area. GHGI can include fossil fuel impacts attributable to the electricity a building draws from the utility grid (in the case of electricity consumption by the building) or might be limited to on-site carbon emissions associated with fossil fuel-fired boilers, furnaces, and hot water heaters. Boston, New York, and Seattle use GHGI as their BPS metric.

In most jurisdictions, the local government sets a performance target for a building based on a calculation involving the building’s size and how the building is used. Under this system, larger buildings are allowed greater total energy use or associated GHG emissions than smaller buildings, and buildings used

for different purposes (e.g., hospitals vs. multifamily housing) will have different limits that consider the energy needs of how the building is being used. Some jurisdictions set performance targets by looking at performance levels across buildings within the jurisdiction.³⁸

1. GHG-Based Policies

In GHG-based BPS policies, buildings must meet building-specific limits on the GHG emissions associated with the energy used by the building.³⁹ The total limit for a building is often determined based on the building's use type and square footage.⁴⁰ In jurisdictions that focus on GHG intensity per square foot, the amount of GHGs allowed per square foot is referred to as greenhouse gas intensity (GHGI). For example, in setting the limit for hotels, a BPS would dictate that hotels are allowed to emit up to a certain amount of GHGs per square foot. Under some BPS programs, the permissible GHG-based target is then lowered over time. For example, in Boston, an office building may emit no more than 5.3 kgCO₂e/sqf/year in the 2025-2029 period, 3.2 kgCO₂e/sqf/year in the 2030-2034 period, and so on until reaching 0.0 kgCO₂e/sqf/year in 2050.⁴¹

As GHG outputs are not measured directly by buildings, local governments implementing a GHG-based BPS must translate the energy used by buildings into CO₂ equivalent emissions. To enable the translation, local governments must establish carbon conversion factors, sometimes referred to as GHG coefficients or emissions factors, for energy sources and usage.⁴² Converting data about energy to measurable information about carbon emissions requires consideration of fossil fuel sourcing, which would include on-site burning of fossil fuels in boilers and hot water heaters, and might also include GHG emissions attributable to fossil fuel sources powering electricity grids, depending on the policy.

One challenge with setting GHG coefficients that will apply into the future is that they depend on expectations regarding which energy sources will supply the locality's electricity grid. For example, a building using

electricity from a grid mostly powered by renewables will have lower GHG emissions than a building using the same amount of electricity from a grid that is sourced from predominantly fossil fuels. This information may be hard to predict or outside of either the local government's or the building owner's control. Assumptions local governments make with respect to the future carbon-intensity of electricity grids can have significant impacts on the relative stringency of their GHG-based BPS policies.⁴³ As a result, establishing local emissions factors and coefficients, particularly in future compliance years, has been a challenge, given the changing landscape for grid-level decarbonization; coefficients set today may not reflect the actual level of GHG emissions in the future.

New York provides an example of some of the challenges that can arise in setting carbon emissions conversion factors. Local Law 97's implementing rules include a carbon conversion factor for utility-supplied electricity through 2034, the end of the law's second compliance period.⁴⁴ Assigning a static value to the carbon intensity of the electricity grid this far in advance is a policy decision that may support market signals in favor of decarbonization and improve capital project planning certainty. However, it also means that this conversion factor may not provide an accurate picture of actual greenhouse gas emissions from the electricity grid during the relevant compliance period.⁴⁵ The carbon intensity of electricity purchased from the grid is dependent on what generation sources the grid draws upon, which are largely outside the city's control. When New York City regulators set Local Law 97's utility electricity conversion factor for the second compliance period, they assumed that New York's grid would decarbonize at the rate prescribed in state's climate law, the Climate Leadership and Community Protection Act

(CLCPA).⁴⁶ If the state is unable to comply with the CLCPA's grid decarbonization requirements, however, and the grid decarbonizes at a slower rate than state law requires, the 2030-2034 utility electricity carbon emissions factor likely underestimates the electricity-related emissions impact of regulated buildings for that period.⁴⁷

2. Energy Efficiency-Based Policies

BPS policies that focus on energy efficiency generally measure the amount of energy the building uses as compared with the size of the building, usually measured in gross floor area. As with GHG-based standards, energy efficiency requirements are set with consideration of the building's use. Energy efficiency may be measured in terms of energy use intensity (EUI) or EPA ENERGY STAR Score.⁴⁸ These types of BPS policies require building owners to either decrease their EUI or improve their ENERGY STAR Score relative to a pre-established target set for buildings in the same use category (e.g., offices or bowling alleys). Washington, D.C. incorporates a combination of both EUI and ENERGY STAR Score into its BPS policy, in view of the fact that not all building types are eligible for ENERGY STAR Scores.⁴⁹

3. Comparing Metrics

Quantitative analysis undertaken by Marron for this study suggests that EUI, GHGI, and ENERGY STAR Score are all rational metrics for supporting energy efficiency and decarbonization in buildings, but that the metric chosen is relevant to the jurisdiction's ability to meet particular policy goals. Figure 1 shows that there is a correlative relationship between EUI, GHGI, and ENERGY STAR Score in Boston, Denver, New York, and Washington, D.C. Each blue dot represents information about a building drawn from the city's energy

benchmarking data from 2023. For example, in the graphs on the top row, a blue dot is the ENERGY STAR Score (on the x axis) and the GHGI (on the y axis) for a building, drawn from 2023 benchmarking data. The red line is the best fit line, showing the trend in the data. As expected, there is a positive relationship between energy consumption and GHG emissions. As site EUI increases, GHGI also increases, on average. Similarly, higher ENERGY STAR Scores are associated with lower site EUI and GHGI.

However, while suggesting that there is a relationship between the three metrics, Figure 1 also illustrates that there is variability, as indicated by the dispersion of the data points around the best fit line. For example, in the top row of graphs, the data points (blue dots) in the top right corner indicate that there are some buildings in the cities with high ENERGY STAR Scores and high (rather than low) GHGI. In this case, in a jurisdiction with an ENERGY STAR Score target metric, a building might meet the requirement of the BPS law but still have a high GHGI. The potential for variability indicates that the choice among GHGI, EUI, and ENERGY STAR Score may matter for policy implementation, depending on the goals of the jurisdiction.

It should also be noted that the ENERGY STAR Score methodology accounts for several factors that influence building energy consumption, rather than providing a direct measure of consumption or emissions. The score is estimated based on a regression model using reference data from a national sample of buildings. There are limitations of this model, as it depends on accurate reporting of data and building characteristics, and there are particular limitations for larger buildings and those whose characteristics deviate significantly from the reference sample.⁵⁰ In addition, a building can

improve its ENERGY STAR Score without adjusting energy use or carbon emissions, which may add further challenges for policy implementation and evaluation.⁵¹

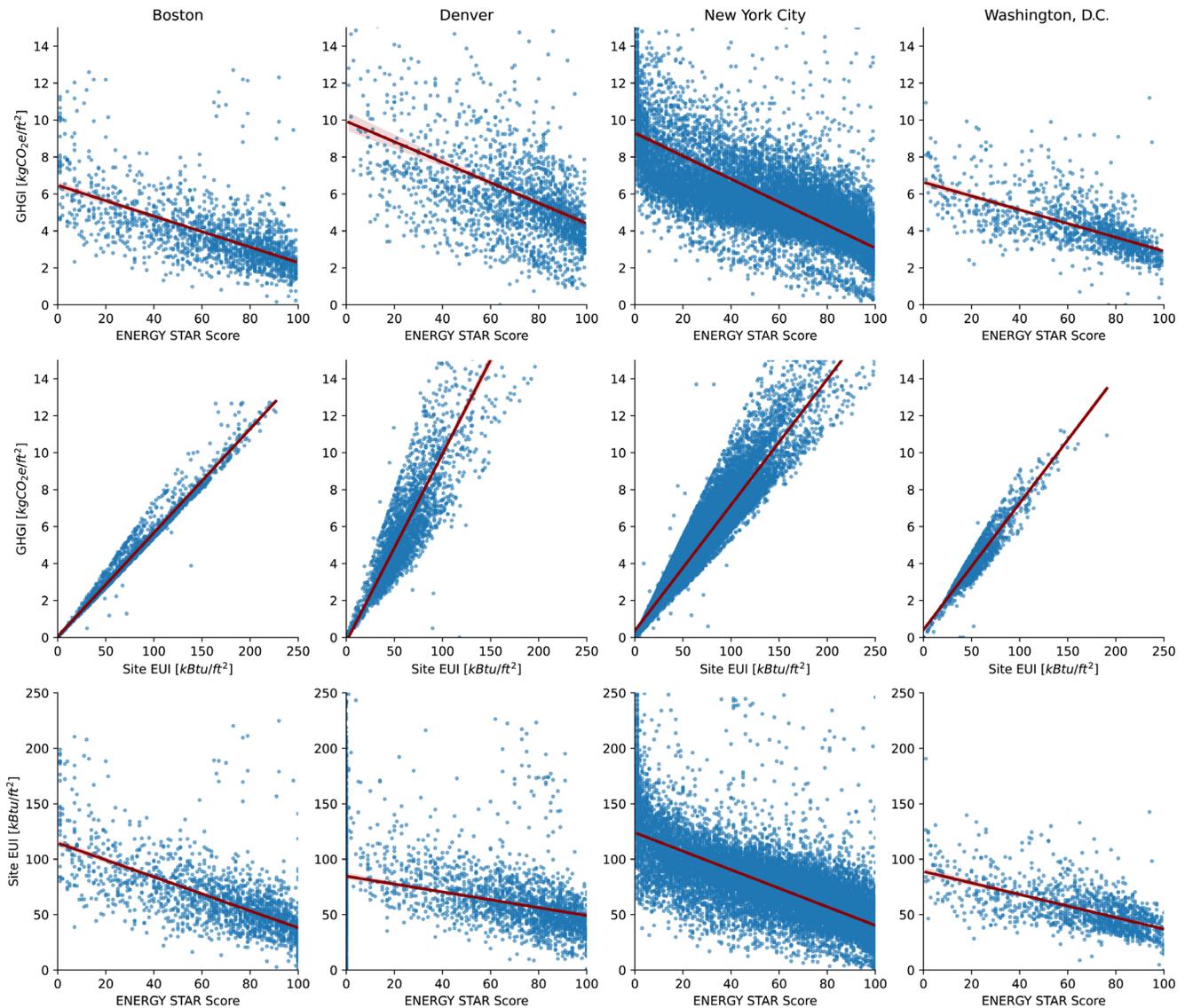


Figure 1. The relationships between EUI, GHGI, and ENERGY STAR Score in four cities.

4. Timelines

Local governments have taken varying approaches to the timeframes that buildings are given to meet performance targets. The timeframes for compliance may be linked with the locality's climate action plan or net-zero emissions goals.

Some jurisdictions have established multiple, increasingly stringent targets for buildings over time and fixed dates by which buildings must comply with each of these targets. New York's BPS policy, Local Law 97, takes this approach. Local Law 97 requires that buildings meet their first limits in 2024; more stringent limits then take effect in 2030, 2035, and 2050.⁵²

Some local governments have established their BPS program around a single target. Denver's BPS policy, Energize Denver, specifies that all covered buildings must achieve a collective 30% energy savings by 2030 and then directs the implementing agency to set interim targets in the years leading up to that date.⁵³

As discussed later in Finding 2, in most jurisdictions, deadlines have been pushed back in practice during the implementation process through the use of individualized or general time extensions.

D. From Data to Action: Complying With Building Performance Standards

BPS laws typically provide building owners with a variety of options to comply. To satisfy a building-specific target, a building owner can make changes to the building shell, building systems, or the way the building is operated. In practice, this means they might assess energy use patterns to optimize equipment runtime, install LED lighting, or retrofit the building to

replace fossil-fuel fired furnaces with electrical heating equipment, such as heat pumps.

In some jurisdictions, buildings may be authorized to comply with BPS laws without meeting prescribed numeric limits on GHG emissions or energy use at all. For example, in some jurisdictions, certain buildings are allowed to comply with BPS laws by taking specific actions to improve building systems, or by paying into a decarbonization fund, rather than achieving measurable reductions in emissions or energy levels in their own building.

A certain degree of flexibility has been built into local BPS laws by design. In most jurisdictions, the original BPS ordinances provided implementing agencies with legal authority to craft and apply flexibility measures and alternative compliance requirements.⁵⁴ For example, Washington, D.C.'s BPS ordinance states that the Department of Energy and Environment must establish "a prescriptive pathway for buildings to achieve compliance" as well as "other compliance pathways" and "exemption criteria for qualifying buildings to delay compliance ... for up to 3 years."⁵⁵ Most jurisdictions allow a subset of buildings to comply with their BPS laws by meeting targets that are less stringent, and most allow a subset of buildings to exceed performance limits for a period of time by extending compliance deadlines.

Most of the jurisdictions included in this study have actively deployed flexibility mechanisms and alternative compliance requirements when implementing their BPS programs, which has opened up a number of different routes to achieving compliance with program requirements that differ from the prescribed targets and deadlines discussed above. Finding 3 in Part V provides a more detailed discussion of how local governments have deployed

flexibility measures in their implementation of BPS laws.

E. Key Implementation Steps: Rulemaking, Staff, and Public Education

BPS ordinances designate a specific department or agency within the local government to oversee the implementation process, and local governments have taken varying approaches in choosing BPS implementing agencies. For example, New York City and St. Louis adopted similar approaches. New York’s BPS program, Local Law 97, is overseen by the Department of Buildings. St. Louis’s BPS program, the Building Energy Performance Standards (BEPS), is overseen by the Building Division within the Department of Public Safety. By contrast, other jurisdictions—like Boston, Seattle, Cambridge, and Chula Vista—have housed the program in their respective equivalents of an energy, environment, or sustainability department. Denver’s program is overseen by its Office of Climate Action, Sustainability, and Resiliency. Excluding New York City, none of the eight other local governments has more than twenty full-time equivalents (FTEs) allocated to implement the city’s BPS, and most have twelve or fewer FTEs (see Table 1 below).

Local agencies across all jurisdictions began their BPS implementation processes with some type of public engagement. A key component of public engagement was educating stakeholders, particularly building owners and service providers. Many jurisdictions have developed comprehensive resources to support building owners in making the necessary changes. Every city with a BPS policy has provided at least one guidance document, and many have created a vast set of online resources to provide a step-by-step breakdown

of compliance actions. Some local governments facilitated their public engagement process by creating task forces or working groups focused on creating sets of recommendations that were driven by conversations with technical experts, communities, building owners, service providers, and other key constituents. Specific approaches to public engagement are described in Finding 4 of Part V below.

Utilizing recommendations from the public, the local governments in the study then began rulemaking. Most have approached their rulemaking processes in phases. While local governments have prioritized different regulations for their initial rulemakings, all jurisdictions needed to establish building-specific limits on GHG emissions or energy intensity, define means of complying with these limits, develop data verification processes for successful monitoring of performance, establish eligibility criteria and specifications for the various flexibility measures offered to building owners, and set enforcement timelines and penalties.

Some local governments have also set aside time in their rulemaking processes to establish advisory or oversight boards to support implementation and program administration. For example, Phase II of Boston’s rulemaking process established the BERDO Review Board, a body consisting of six members who oversee implementation of the BPS program and make key decisions including reviewing applications for alternative compliance or time extensions.⁵⁶ For more on the BERDO Review Board, see “Spotlight on Boston” in Part V.

In several jurisdictions, these rulemaking processes yielded a comprehensive set of regulations and accompanying technical or guidance documents that regulated entities can utilize to support their compliance efforts.

In most cases, the process has been iterative, with localities amending or updating their regulations and, sometimes, the original laws to respond to their experiences with implementation.

Each of the local governments discussed in this report is at a different phase within the implementation process. Boston, Denver, New York City, St. Louis, and Washington, D.C. all have issued regulations and are at or near their first compliance reporting deadlines.⁵⁷

Cambridge, Chula Vista, and Montgomery County have finalized most of their necessary rulemaking but have not yet reached their first compliance reporting deadline. Seattle published its first rulemaking in December 2025.

Table 1 summarizes key features of the nine local BPS programs and their implementation. For a more in-depth look at the implementation progress in each of the nine jurisdictions, see Appendix B.

Table 1: Key Features of Nine Local BPS Policies and Their Implementation

City	Benchmarking Adopted	BPS Adopted	First Compliance Period/Interim Deadline ⁵⁸	Metric	Number of Covered Buildings ⁵⁹	FTE Personnel ⁶⁰	FY 2026 Budget (Approximate) ⁶¹
Boston	2013 ⁶²	2021 ⁶³	2025-2029 ⁶⁴	GHGI (kgCO ₂ e/sf) ⁶⁵	5,489 ⁶⁶	8.75	\$542,500 (Excluding personnel costs)
Cambridge	2014 ⁶⁷	2023 ⁶⁸	2026-2029 ⁶⁹	GHG (kgCO ₂ e) ⁷⁰	844 ⁷¹	2.5 (+ additional consultant teams)	\$250,000
Chula Vista	2021 ⁷²	2021 ⁷³	2026-2031 ⁷⁴	ENERGY STAR Score/ Site EUI ⁷⁵	600 ⁷⁶	3.25 (+0.25 as a consultant)	\$405,000
Denver	2016 ⁷⁷	2021 ⁷⁸	2024 ⁷⁹	Site EUI ⁸⁰	3,031 ⁸¹	6 (+14 contractors)	\$8,250,000
Montgomery County	2014 ⁸²	2022 ⁸³	2028 ⁸⁴	Site EUI ⁸⁵	1,865 ⁸⁶	5.5	~\$700,000 (excluding personnel costs)
New York	2009 ⁸⁷	2019 ⁸⁸	2024-2029 ⁸⁹	GHGI (tCO ₂ e/sf) ⁹⁰	26,982 ⁹¹	Implementation is managed by the Department of Buildings' Sustainability Bureau, which staffs 111 positions.	Unavailable
Seattle	2010 ⁹²	2023 ⁹³	2031-2035 ⁹⁴	GHGI (kgCO ₂ e/sf) ⁹⁵	N/A ⁹⁶	7 (+3 Additional Staff)	\$7,000,000
St. Louis	2017 ⁹⁷	2020 ⁹⁸	2021-2024 ⁹⁹	Site EUI ¹⁰⁰	495 ¹⁰¹	3	Unavailable
Washington, D.C.	2008 ¹⁰²	2018/2019 ¹⁰³	2021-2026	ENERGY STAR Score/ Source EUI ¹⁰⁴	1,896 ¹⁰⁵	12	~\$1,000,000 - \$1,200,000

F. Enforcement

BPS laws empower implementing agencies with enforcement capabilities. Tools of enforcement may include fines, liens, and permit revocations. Fine amounts vary by jurisdiction, and state laws may affect fine levels.¹⁰⁶ In New York City, buildings covered by Article 320 of Local Law 97 (buildings over 25,000 square feet that are neither affordable housing nor houses of worship) may be fined a penalty of \$0.50 per square foot of the building's floor area per month for failing to submit an annual emissions report, and \$268 for every ton of CO₂e they emit over their emissions limit per year.¹⁰⁷ Boston has set a fine of \$1000/day for failure to comply with emission standards for buildings over 35,000 square feet or with more than 35 residential units, and \$300/day for failure to comply with emission standards for smaller covered buildings.¹⁰⁸ In St. Louis, in addition to fines, building owners may also have their occupancy permits revoked for failure to comply with the performance standard.¹⁰⁹ As of November, 2025, no local government that we studied had yet issued a fine for failure to meet a building performance target under a BPS law.

Jurisdictions have taken varying approaches in what they require of building owners to do in order to demonstrate compliance with their BPS laws. In some jurisdictions, compliance with BPS requirements follows a similar approach to compliance with benchmarking requirements. For example, in St. Louis, buildings demonstrate compliance through the submission of benchmarking reports. Such reports must be verified by third parties in the last year of each compliance period.¹¹⁰ Other jurisdictions have built out specific online platforms tailored to the BPS program. For example, in New York City, buildings must submit compliance reports

through the Building Energy Analysis Manager (BEAM) platform, which receives the data necessary for compliance with Local Law 97, New York City's BPS law, as applicable to that building.¹¹¹ The BEAM platform then assesses each building's emissions limit and whether that limit has been exceeded or not. Building owners (or their designated agents) must attest to the accuracy of the information submitted through BEAM.¹¹² Other jurisdictions, such as Denver, use Touchstone IQ, another customized Customer Relationship Management (CRM) tool with reporting capabilities, to facilitate BPS program enforcement.¹¹³

As discussed above, some buildings can comply with local BPS laws by taking actions that do not involve reducing energy use or GHG intensity to a particular pre-determined level. Instead, buildings that fall under certain eligibility criteria may be allowed to take certain prescribed actions in the building in order to comply. This variability is reflected in the compliance reporting systems developed by local governments as part of BPS implementation. In Montgomery County, for example, there are two pathways to comply with the County's BPS law. The first is called the performance pathway and requires buildings to achieve a normalized net site EUI at or below the standard set for the building type. Annual benchmarking reports are used to demonstrate compliance under this first pathway. Under the second pathway, known as the Building Performance Improvement Pathway (BPIP), buildings that cannot meet their site EUI-based standards must come up with retrofit plans and report annually on their progress in implementing those plans.¹¹⁴

IV. Key Findings From the Four-City Quantitative Analysis

A. Overview

To understand the context for BPS implementation, Marron undertook a quantitative analysis of energy consumption trends in four of the nine cities with BPS policies: Boston, Denver, New York City, and Washington, D.C. As explained in Part II, the four cities were selected because they each had enacted a BPS at least three years before 2024 when we began the study, and they have publicly available benchmarking data for at least three years before and after the passage of their BPS laws. Two of these cities have GHGI-based BPS policies (Boston and New York) and two have energy efficiency-based BPS policies (Denver uses site EUI and Washington, D.C. uses a blend of ENERGY STAR Score and source EUI).

The quantitative analysis brings to light several factors relevant to the implementation of BPS policies:

- Buildings covered by BPS laws in the four cities account for more than 20 million metric tons of CO₂e each year, based on 2023 energy benchmarking data. New York City, given the size of the city and the scope of its BPS law, represents more than 75% of this total. If successful, these laws could have a significant impact on each city's annual emissions.
- A large percentage of buildings in the four cities already meet the initial BPS targets for building performance, with well over 60% of buildings meeting these targets in Boston, New York City, and Washington, D.C., by number of buildings covered and square footage, based on 2023 benchmarking data (see Table 2).¹¹⁵
- However, there are indications that, at least initially, multifamily housing overall is further from the BPS targets than office buildings, another major category of covered buildings (see Figure 7). In three cities (Boston, Denver, and Washington, D.C.), a smaller share of multifamily housing is currently performing at the level of the initial targets than office buildings (see Figure 7).
- In all four cities, multifamily housing overall tends to be more reliant on natural gas for energy than electricity, as compared with office buildings (see Figure 3). This means that considerable work will be needed to replace onsite combustion of natural gas in multifamily housing to decarbonize this sector. The use of electricity in office, multifamily, and other buildings (Figure 3) indicates that the pace of building

decarbonization will be affected by the pace at which the electric grid is decarbonized.

- BPS programs will likely become more challenging to implement if cities establish and enforce more stringent building targets for future years. For example, in Boston and New York, BPS targets will require significant improvements in GHGI compared with levels when the laws were passed (see Figures 5 and 6).

Each of these findings is described in more detail below.¹¹⁶

B. Which Buildings Are Covered by Local BPS Laws?



Summary: *There are significant variations between the cities in the characteristics of covered buildings across building size, age, energy mix, and current energy performance. Many covered buildings are multifamily buildings heavily reliant on natural gas.*

In total, the BPS laws in the four cities cover over 30,000 properties. After data cleaning and merging energy benchmarking data and covered building lists, New York City's BPS covers by far the largest number, with 23,938 properties. Next is Boston with 3,360, followed by Denver (2,841) and, finally, Washington, D.C. with 1,569. As indicated in Part III, existing BPS laws cover large buildings with different uses, primarily multifamily residential and office. Other uses, accounting for between 20% and 52% of the total, include manufacturing, hospitals, and schools, among others.

The analysis of the BPS-covered buildings in Boston, Denver, New York City, and Washington, D.C. highlights the significant extent to which these laws cover multifamily

residential buildings. Multifamily housing properties are the most numerous type of property covered by BPS policies in the four cities, constituting almost 60% of all covered properties. Figure 2 shows that multifamily housing represents roughly one-third of the total covered floor area in each city, with the exception of New York, where multifamily housing is 64% of total floor area covered by the BPS. Office properties are the second most numerous type, representing between 8 and 29% of the building stock and between 16 and 37% of total square footage. The "other" property type captures all of the other covered properties whose primary use type is not classified as "multifamily housing" or "office."

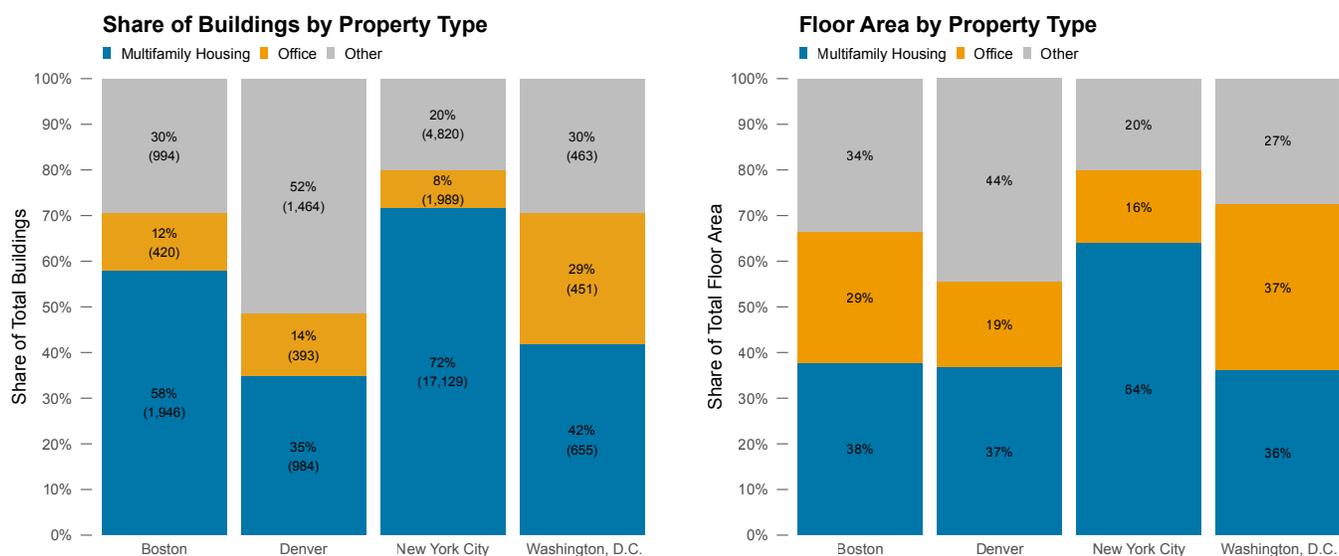


Figure 2. Share of buildings (left) and gross floor area (right) in buildings covered by BPS laws by property type and by city.

Building characteristics of covered buildings varied significantly across the four jurisdictions, as one would expect given the differences in the building stock, densities, and historical development trajectories of each city. Within the category of multifamily buildings, Denver and Washington, D.C. have the largest average building size, at 73,464 square feet and 118,686 square feet, respectively, while New York City and Boston have the oldest average multifamily building stock. Office buildings in Boston and New York City are also the oldest of the group, with the average age between 32 and 57 years older than the other two cities.

The analysis found that the sources of energy used by buildings varies across the different building use-types in the cities we studied. As shown in Figure 3, multifamily housing properties overall tend to rely more on natural gas than electricity for energy, as compared with office properties, which are considerably more reliant on electricity. The extensive use of natural gas in multifamily housing suggests that significant changes will be needed to replace onsite fossil fuel combustion to decarbonize this sector, which, as indicated by Figure 2, accounts for a significant share of the properties covered by BPS policies in the four cities. The extensive use of electricity in office buildings underscores that decarbonizing this sector is especially dependent on decarbonizing electricity supplies.



Figure 3. Average energy mix by property type and by city.¹¹⁷

C. Historical Data Trends on GHGI and Energy Consumption

Summary: GHGI and energy consumption were trending down, on average, before buildings had to comply with BPS policies. This decreasing trend was potentially driven by a number of factors. It is too early to determine the specific impact of BPS laws on GHGI and energy consumption.

Trends in building energy consumption and GHGI before and after BPS policies were adopted may be relevant to the implementation of these laws. Such trends provide context for understanding how far buildings are from meeting current and future targets and identifying trends within building types. Broadly speaking, Marron's analysis (Figures 4, 5, and 6) shows that EUI and GHGI were generally trending downward in covered buildings in the years before each city passed its BPS law. This trend generally continued in the years immediately after the laws were passed, even though compliance was not yet required in any of the cities as of 2023, the last year for which data is shown.

Specifically, Figure 4 shows building performance for each city, in either site or source EUI (representing energy efficiency) or GHGI, as applicable based on the target metric of the respective BPS, beginning three years prior to the BPS adoption year and for all available years following adoption until 2023. For Boston and New York City, the unit is GHGI (in kg CO₂ equivalent per square foot). For

Denver, the unit is weather-normalized site EUI (in kBtu per square foot). For Washington, D.C., the unit is weather-normalized source EUI (in kBtu per square foot). Consumption of all of the energy sources reported in the benchmarking data was converted to kBtu using conversion factors reported in Thermal Energy Conversions from ENERGY STAR Portfolio Manager's Technical Reference document.¹¹⁸ Values shown are median EUIs or GHGIs, with percentage change from the previous year in parenthesis. The data shown in Figure 4 include all covered buildings, regardless of building type. The figure includes buildings covered by alternative compliance pathways and/or eligible for flexibility measures. (Appendix C contains figures showing data broken down for multifamily, office, and other buildings.)

In Figure 4, the blue vertical line indicates the year of BPS adoption. For each jurisdiction, Marron used publicly available benchmarking data to estimate the EUI or GHGI levels over time.

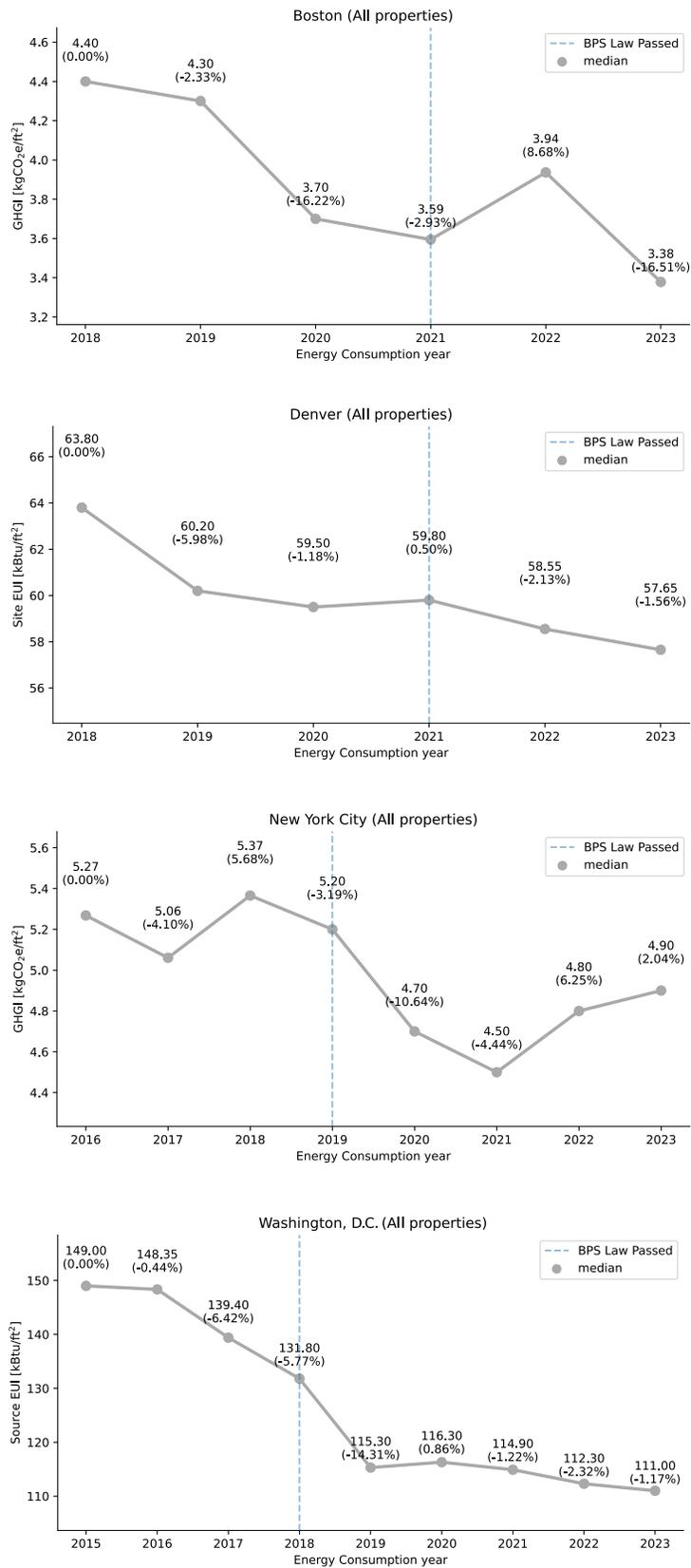


Figure 4. Historical building performance in city-specific units three years pre-BPS adoption and post-BPS adoption until 2023, for all property types, by city.

Likewise, Figures 5 and 6 show historical building performance for each city in the unit of the jurisdiction's BPS in multifamily residential and office buildings looking backwards for all years where publicly available data is available.¹¹⁹ The points represent the median for the property type indicated, and the vertical bars represent the 25% to 75% percentile range for the respective year. The blue line is the year that the BPS was passed.

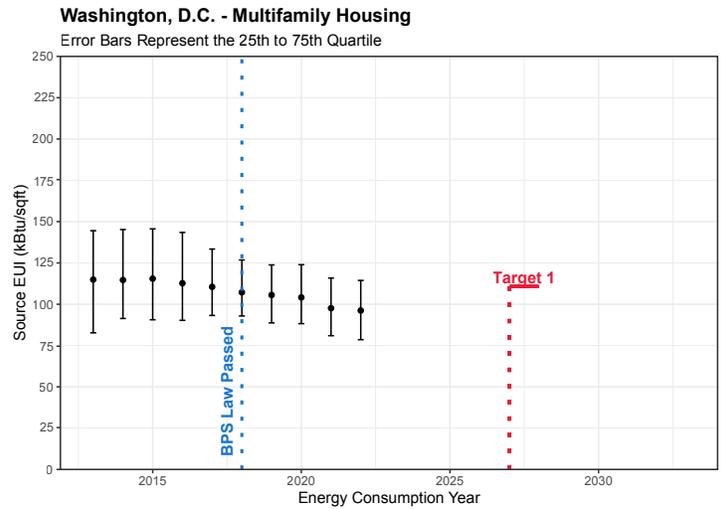
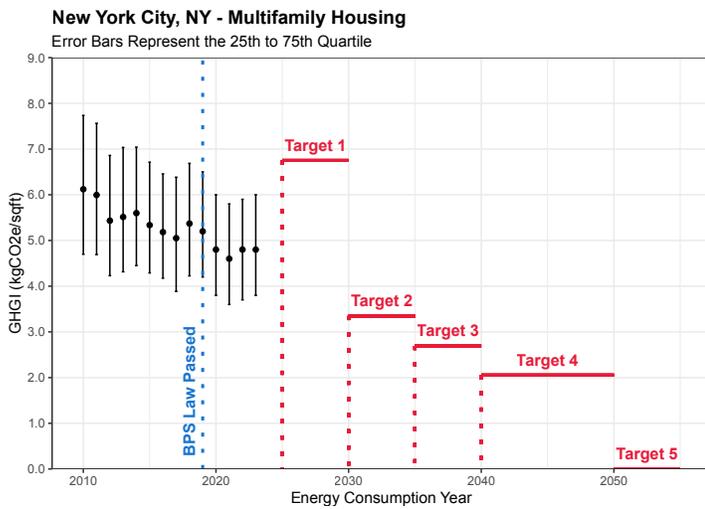
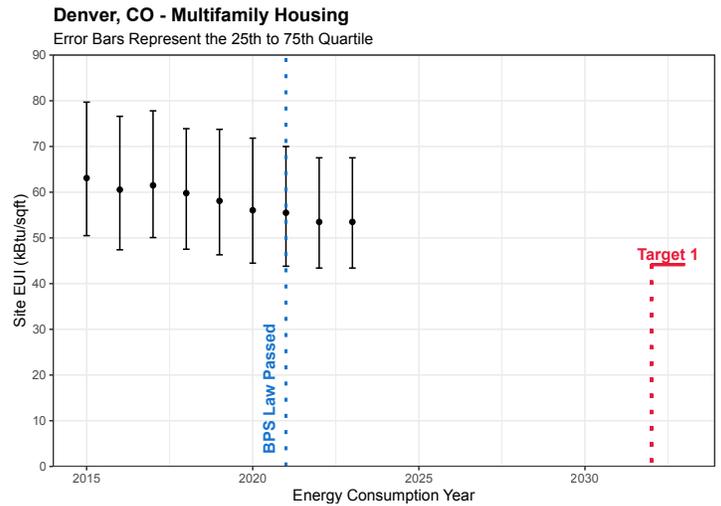
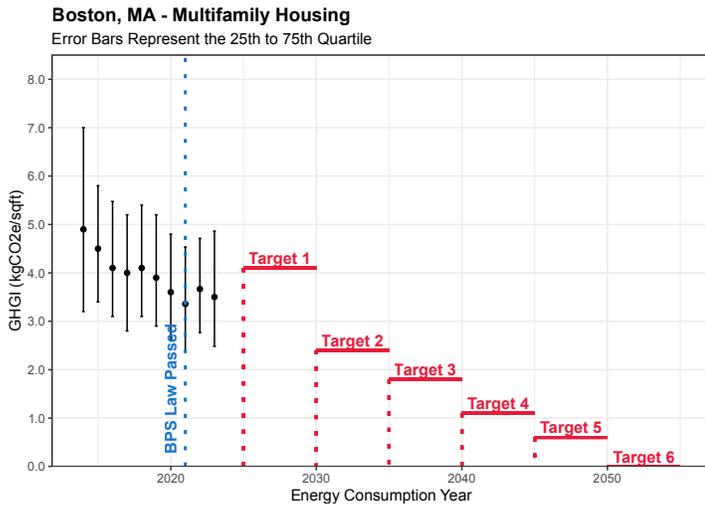


Figure 5. Historical building performance trends relative to city-specific BPS targets for multifamily housing buildings, by city.

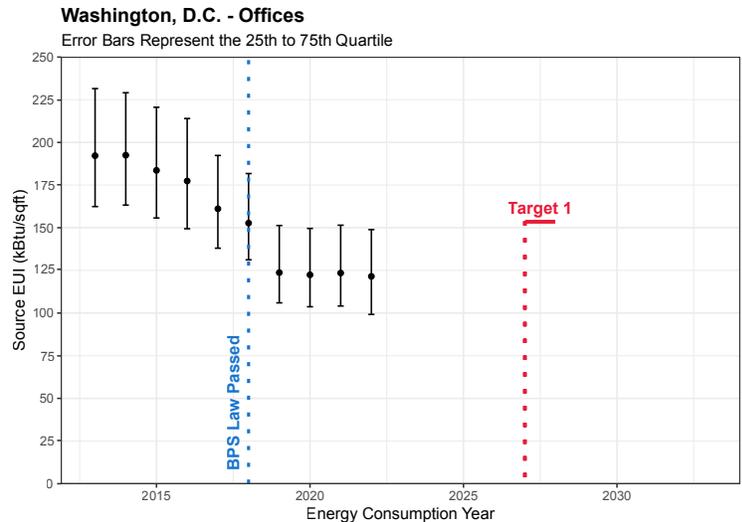
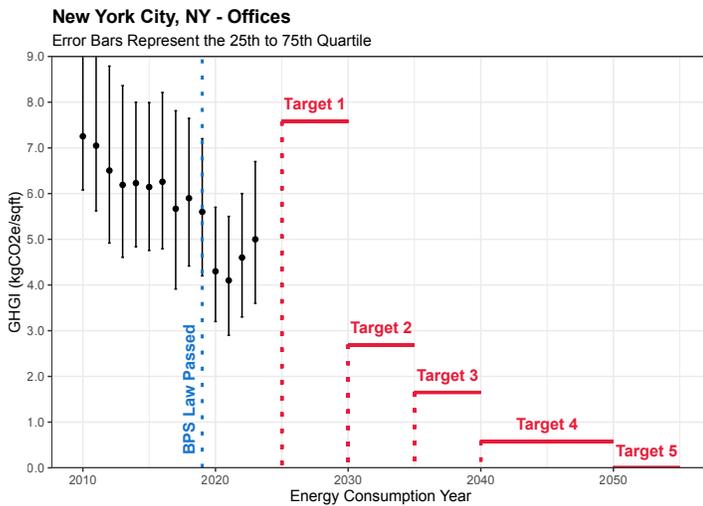
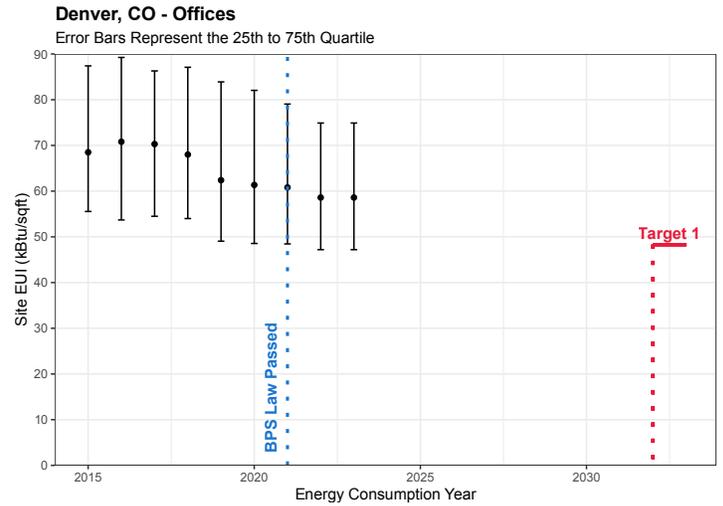
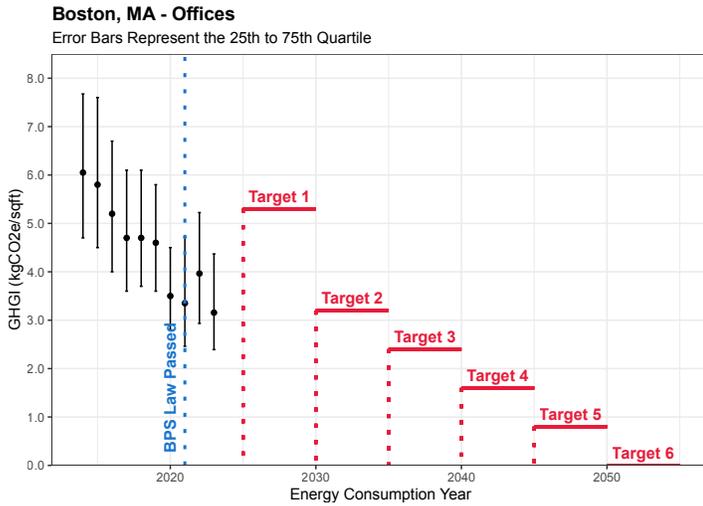


Figure 6. Historical building performance trends relative to city-specific BPS targets for office buildings, by city.

Figures 5 and 6 show an overall declining trend in GHGI (in Boston and New York City) and site EUI in Denver in both multifamily residential and office buildings before these cities passed their BPS laws. Consistent patterns since the laws were passed are harder to discern, although GHGI and energy consumption appear to have generally been decreasing post-BPS passage as well, even though buildings were not required to meet BPS targets in 2023, the final year for which data is presented.

There may be multiple factors driving the general downward trend in building energy consumption and GHGI before BPS compliance was mandated.¹²⁰ Possible reasons may include other policy interventions (such as phasing out the combustion of heavy fuels onsite at buildings), local laws requiring benchmarking and audits by buildings,¹²¹ advancements in technology, state and federal policy providing economic incentives for efficiency or electrification, changes in building operations

and occupancy during the COVID-19 pandemic and aftermath, and (in the case of GHGI measurements) the greening of local electricity supplies. The implications of this general downward trend for future BPS compliance are unclear.

D. How Are Buildings Performing as BPS Laws are Implemented?



Summary: The first targets are generally close to existing building performance, but different categories of buildings meet the targets to varying degrees, and many buildings are far from meeting future targets in some jurisdictions.

Buildings covered by BPS laws in the four cities account for more than 20 million metric tons of CO₂ equivalent (CO₂e) each year, based on 2023 energy benchmarking data. New York City, given the size of the city and the scope of its BPS law, represents more than 75% of this total.

To understand how much covered buildings would have to improve their energy or carbon emissions performance to meet BPS targets, we analyzed how buildings are currently performing in each of the cities relative to the targets that cities have set. Marron's analysis includes all covered buildings in each jurisdiction based on available covered building lists from each jurisdiction, regardless of whether the building may be eligible for alternative compliance requirements that deviate from the default numeric target. As discussed above in Part III and described more fully in our qualitative findings in Part V, local BPS programs, in practice, afford a wide range of flexibility measures that allow buildings to deviate from the targets based on particular factors, and allow some buildings to comply with the laws without having to meet a specific numeric target. The quantitative

analysis includes all covered buildings in each jurisdiction, regardless of whether the building is eligible for flexibility measures¹²² because application of these flexibility measures was fluid at the time that we conducted this study, and there was a lack of publicly-available data on assigned or selected compliance pathways for each building in the four jurisdictions.

Figures 5 and 6 above provide a visual representation of the initial BPS targets for multifamily housing and offices, respectively, in each of the cities, as compared with actual GHGI and energy efficiency metrics of covered buildings.¹²³ The red lines indicate the initial BPS target by building type as set forth by each jurisdiction,¹²⁴ and the length of the red line reflects the respective compliance period for each target.

Figures 5 and 6 suggest that in three out of the four cities (Boston, New York City, and Washington, D.C.), the majority of buildings were already meeting the cities' initial targets at the time the BPS laws were enacted. In other words, the initial targets were set to be less stringent than the existing performance of the bulk of the buildings in these cities. Denver is

the exception, but the first target depicted in these figures takes effect in Denver later than in the other three cities, giving buildings more time to comply.¹²⁵ The figures also indicate that in Boston and New York City, a larger number of buildings are not presently performing at the level of future targets, suggesting that work will need to be performed in a larger number of buildings to get them to reach future performance standards.

Table 2 further highlights the finding that many buildings covered by BPS programs are already meeting the initial BPS targets in each city. Specifically, this table shows the percent reduction in GHGI or EUI required to meet the first target for each building in the sample, based on 2023 benchmarking data. For each individual building, the target was calculated based on the metric provided by the respective

jurisdiction and the floor area of the building. This was then compared to the performance of the building in 2023. For buildings that were not found to meet the BPS standard already, the percent reduction in the target metric unit (GHGI or EUI) was calculated. The percent reduction was then grouped into categories from less than 10% reduction to buildings requiring more than a 50% reduction, which would most likely necessitate deep retrofits or whole-building electrification. In Boston, New York City, and Washington, D.C., over 60% of buildings and covered square footage already meet the first targets. In Denver, a lesser share of buildings and covered square footage meet the first target (almost 42% by number of buildings, and approximately 47% by building square footage), but as noted above, buildings will have more time to meet this standard.

Table 2: Building-specific energy consumption or GHG emissions percent reduction required to meet the city’s first BPS target, by city.

City	% Reduction Needed	Counts (%)	Floor area [mln ft ²] (%)
Boston	meet targets	2,084 (62.02%)	228.84 (71.79%)
	<10%	186 (5.54%)	16.36 (5.13%)
	[10%-25%)	252 (7.50%)	12.44 (3.90%)
	[25%-50%)	358 (10.65%)	10.72 (3.36%)
	+50%	480 (14.29%)	50.41 (15.81%)
Denver	meet targets	1,192 (41.96%)	160.44 (47.29%)
	<10%	559 (19.68%)	66.93 (19.73%)
	[10%-25%)	631 (22.21%)	72.23 (21.29%)
	[25%-50%)	235 (8.27%)	21.02 (6.20%)
	+50%	224 (7.88%)	18.61 (5.49%)
New York City	meet targets	19,843 (82.89%)	2,297.98 (79.99%)
	<10%	1,230 (5.14%)	147.08 (5.12%)
	[10%-25%)	1,276 (5.33%)	208.27 (7.25%)
	[25%-50%)	918 (3.83%)	127.89 (4.45%)
	+50%	671 (2.80%)	91.66 (3.19%)
Washington, D.C.	meet targets	1,000 (63.73%)	200.65 (64.01%)
	<10%	111 (7.07%)	33.79 (10.78%)
	[10%-25%)	118 (7.52%)	20.94 (6.68%)
	[25%-50%)	78 (4.97%)	12.89 (4.11%)
	+50%	262 (16.70%)	45.18 (14.41%)

Figure 7 shows the proportion of properties, by building type, that meet the first BPS targets in each city, based on 2023 benchmarking data. For properties that are not performing at the level of the first target, the figure shows how far away the property is from meeting the target by showing the percent reduction in GHGI (in Boston and New York City) or EUI (in Denver and Washington, D.C.) that would be needed to meet the target for that use category. For example, for Denver office buildings, light pink shows the percentage of properties requiring under a 10% reduction in energy consumption to meet Denver’s 2030 BPS target for office buildings, based on 2023 benchmarking data.

Figure 7 indicates that in Boston, New York City, and Washington, D.C., over 50% of all three categories of buildings—multifamily, office, and other—are already meeting the initial BPS targets. For the buildings that are not already meeting the targets, there is a wide distribution with respect to how far away the properties are from the targets that varies across use type. For example, in Boston and Washington, D.C., more office buildings are meeting targets than multifamily housing. Moreover, among the multifamily housing properties that do not meet the multifamily housing target in those cities, a significant portion would need at least a 25% reduction in GHGI or EUI, respectively, in order to perform at the level of the target, based on the 2023 benchmarking data. On the other hand, most buildings in Denver that do not currently meet the first BPS target would require less than a 25% reduction in site EUI to achieve the standard set by the law.

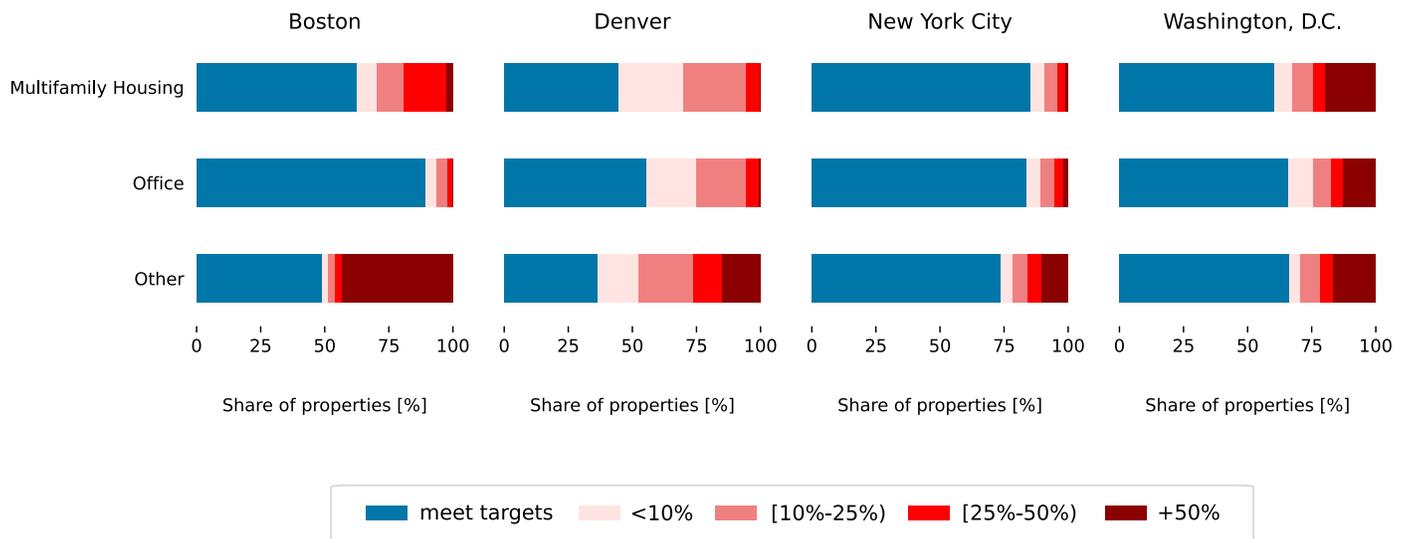


Figure 7. Share of properties by percent reduction of energy consumption or GHG emissions needed to meet the first BPS targets, by property type and city.

Figure 8 shows, for each city, the energy mix of properties, by property type, meeting the city's initial targets for each property type, according to 2023 benchmarking data. It also shows the energy mix of properties that do not meet the city's initial targets, broken down by the level of reduction in GHGI (in Boston and New York City) or EUI (in Denver and Washington, D.C.) that would be needed for the property to perform at the target level for the applicable use type.

Figure 8 suggests that in multifamily housing, a greater reliance on natural gas may be associated with not meeting initial BPS targets, but that energy mix is not solely determinative. In Boston, Denver, and New York City, multifamily housing not already meeting initial BPS targets obtains a smaller share of energy from electricity than multifamily housing meeting the initial targets. However, this pattern does not hold in Washington, D.C., which, like Denver, has an energy efficiency-based standard.

As Figure 3 shows, office buildings predominantly rely on electricity as an energy source, more than multifamily housing in all four cities. Figure 8 does not suggest a clear correlation between meeting an initial BPS target and reliance on electricity in office buildings. In Boston and Denver, office buildings meeting the initial targets are receiving more of their energy from electricity than buildings not meeting their targets. However, in New York City, some office buildings not meeting their targets are more electrified than buildings meeting their targets.

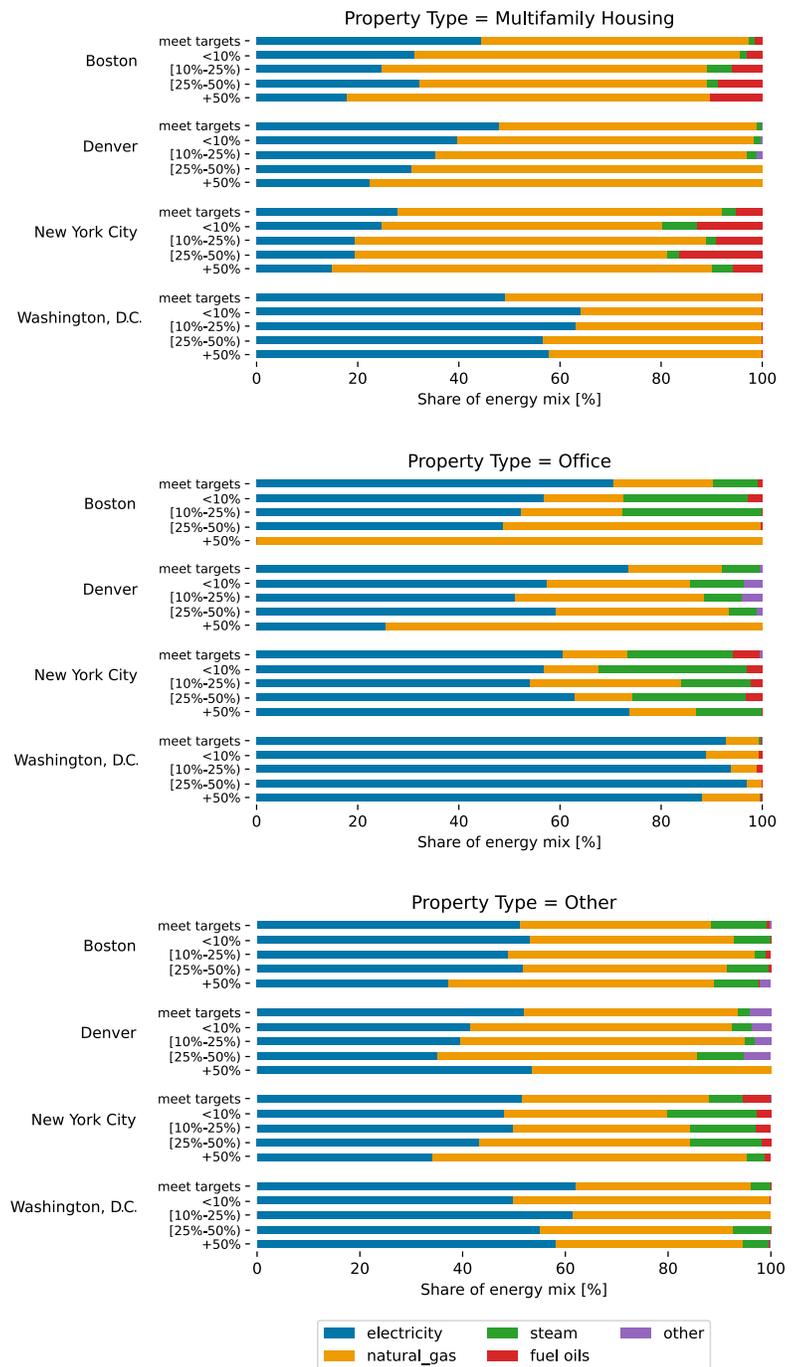


Figure 8: Average energy mix by percent reduction of energy consumption or GHG emissions needed to meet the first BPS targets by city and property type.

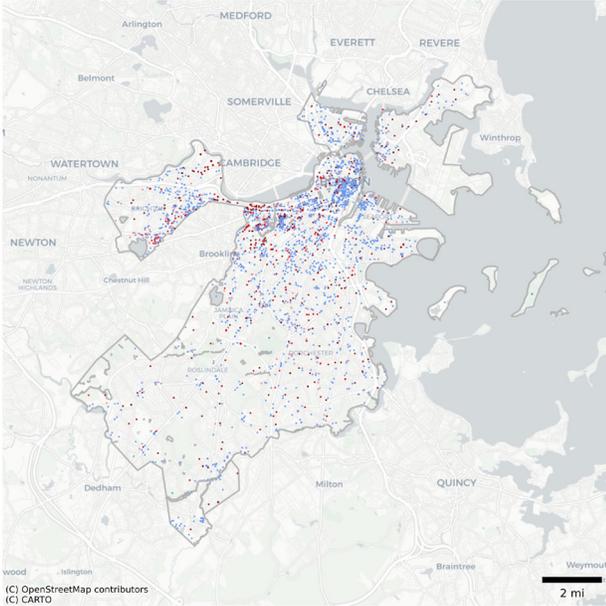
E. Spatial Distribution of Impacts

Summary: BPS laws may have differing impacts on neighborhoods within cities, and spatial concentrations of buildings may create opportunities to target decarbonization efforts.

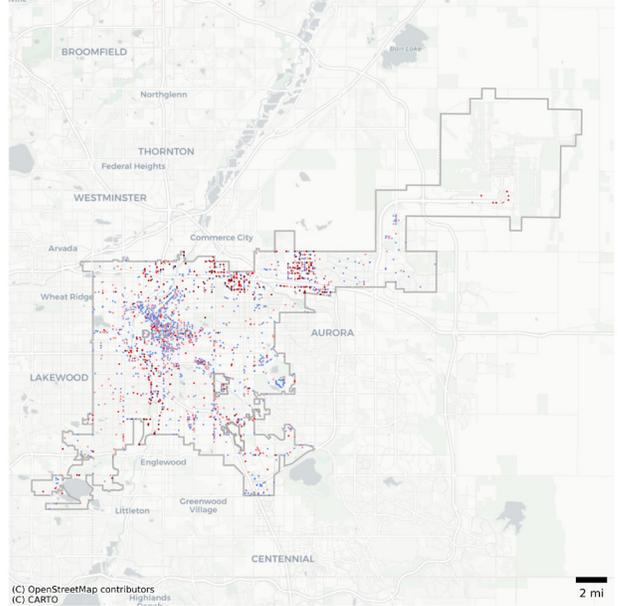
Marron's research further suggests that the effect of BPS laws may not be uniform throughout the cities we studied. Figure 9 shows the spatial distribution of all of the covered properties in the four cities, color coded by the percent reduction needed to meet the first target. The figure highlights the spatial dimension of BPS laws, as many of the buildings covered by the local BPS laws are concentrated in the central parts of cities and close to major commercial hubs. This is related to the fact that BPS laws tend to cover large buildings. For each city, 80% of the total covered buildings are in less than 40% of the total zip codes in that city. For instance, in New York City, 80% of the covered buildings are in 84 out of 244 ZIP codes. Washington, D.C. exhibits the greatest concentration, with a large majority of the covered buildings within fewer than 20% of ZIP codes.

The geographic concentration of covered buildings may be relevant to future assessments of the public health impacts of reducing on-site fossil fuel usage in buildings, in the case of non-electrified buildings. Additionally, a knowledge of the spatial distribution of covered buildings could help cities plan for potential changes to electricity loads resulting in electrification of fossil-fuel reliant buildings, or decreased electricity demand from more energy efficient buildings, as well as targeting resources to areas with high concentrations of under-performing buildings.

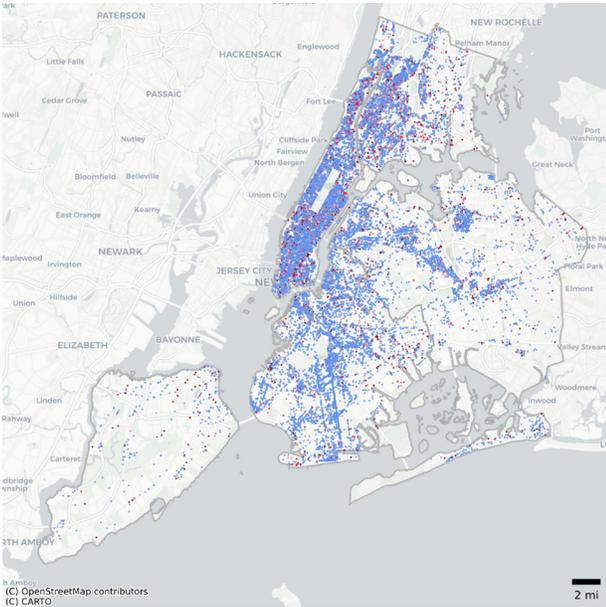
Boston (n=3,360)



Denver (n=2,841)



New York City (n=23,938)



Washington, D.C. (n=1,569)

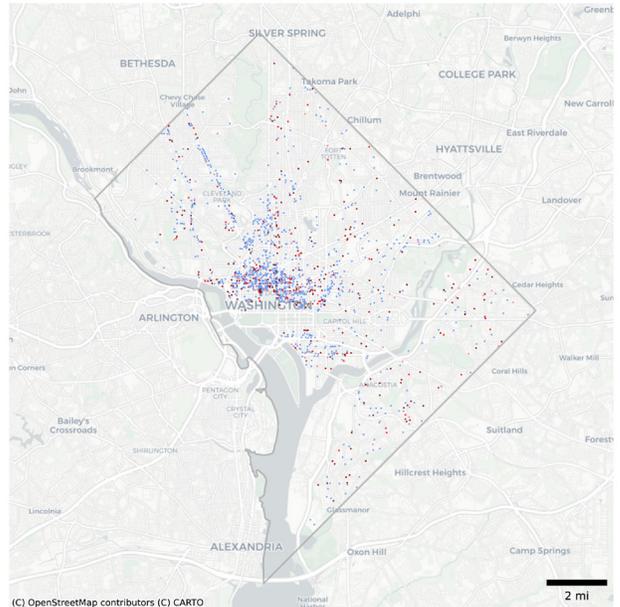


Figure 9. Spatial distribution of covered buildings by percentage reduction of energy consumption or GHG emissions needed to meet the first BPS target.

The findings of the quantitative analysis of these four cities provide useful context for the qualitative findings from the nine cities discussed in Part V. For example, in interviews and convenings we heard concerns that while the initial BPS targets might be manageable for many buildings, future targets required by these laws would be harder for many buildings to meet and pose financial challenges for many buildings. The analysis suggests that compliance may indeed be harder to achieve with future BPS targets compared with initial targets. We also heard concerns about the cost implications of BPS laws for multifamily housing. The significant number of multifamily buildings covered by these laws, illustrated in Figure 2, may explain in part why there are concerns about the costs of these laws in this sector, as well as their reliance on fossil fuels for heating and hot water (Figure

8). In addition, we heard that state policies concerning the GHGI of grid-supplied electricity would affect the ability of local governments to decarbonize buildings. As mentioned above, the significance of electricity as a source of energy in buildings, especially office buildings (see Figure 3), emphasizes the relationship between decarbonizing electricity supplies and BPS compliance, particularly for future targets. The wide variety of performance levels among buildings that are not currently meeting performance targets also cuts against a “one size fits all” approach to implementation. As this report highlights, cities are developing more bespoke approaches to encouraging building decarbonization and energy efficiency. We now turn to qualitative findings about the challenges that local governments are facing as they begin to implement their BPS laws.



V. Key Findings From the Qualitative Research

Overview

Our qualitative research found that the nine local governments we studied are making meaningful strides in the early stages of implementation of local BPS laws. We also found that the local governments are encountering widespread and sizable implementation challenges, resulting in delays and the need for adaptive local responses. To address these significant implementation challenges, jurisdictions have responded in innovative ways. Some of these responses included building more flexibility into BPS programs and relying more on variable timelines and building-specific requirements. For example, jurisdictions have utilized provisions in their local statutes to allow buildings to follow alternative compliance requirements or have offered time extensions or other flexibility measures on an individual and categorical basis. As a result, the impacts of BPS laws on bottom line energy efficiency and GHG reductions are harder to track and assess. It is too early to determine whether the implementation challenges that we observed in this study will affect intended outcomes in later years. Notwithstanding these limitations, the local innovations deployed by local governments in the early implementation of BPS laws sought to strengthen the long-term viability of the programs and have the potential

to yield co-benefits for broader policy priorities, such as affordability and equity goals.

In the following description of our key findings, we discuss a range of implementation challenges that we observed in our study, including data quality challenges, concerns from building owners about the costs of compliance, and questions surrounding how to enforce building decarbonization mandates equitably. We will also describe the pioneering strategies that the local governments deployed in response to these challenges.

It is important to note that the challenges we observed in our study were: 1) playing out at the initial program implementation stage; and 2) occurring in the context of initial BPS standards that the majority of buildings already are able to meet (see Marron's findings in Part IV). The challenges of program implementation will evolve as the programs progress. The labor that local governments put in at the front end to establish new BPS programs will hopefully yield benefits for future implementation efforts. At the same time, new challenges may arise as the jurisdictions move toward more stringent compliance targets that will require more significant, and potentially more costly, retrofits in covered buildings.

This Part V groups our key findings and recommendations into six categories:

- Data challenges and opportunities in moving from benchmarking to BPS
- Shifting program timelines
- Flexibility measures as a response to financial hardship, technical constraints, and equity considerations
- New modes of public engagement to foster equity and affordability in BPS policies
- The role of state and federal policy
- Unresolved questions of enforcement

Finding 1: From Benchmarking to BPS: Data Challenges and Opportunities

Finding 1 Summary: *The transition from benchmarking to BPS was harder than anticipated and involved a lengthy, resource-intensive process of cleaning up data on the part of both local governments and building owners. Although the majority of buildings were already at or close to compliance with the first target in most jurisdictions, translating the raw benchmarking data as it had been reported into a fair and enforceable BPS program was far from easy. However, this process also yielded several benefits to local governments, including better quality benchmarking data and the ability to leverage in-house data literacy toward more impactful implementation.*

A. The Challenges of a Data-Dependent Regulatory Approach

A dominant theme in our quantitative and qualitative research was the difficulty of administering such a complex and data-heavy regulatory approach. In practical terms, under the BPS laws we have studied, building owners and local governments have had to engage in intensive data collection and processing about energy use at the building level before knowing whether a building was covered, what BPS targets a building must meet, and whether any actions would be needed by the building to meet these targets. This required significant expenditures of resources by local governments and building owners before substantive

emissions- or energy-reducing actions could take place. If action was required, building owners then had to perform further work to understand what measures would bring them into compliance with applicable targets—a calculus that often left room for individual choice.

Our interviews suggest that this freedom of choice intrinsic to BPS programs contributed to confusion on buildings' part. The lack of clarity about fixed requirements also created challenges for buildings at the financing stage and an uncertain enforcement landscape for local governments. For example, a BPS policy will set an EUI or GHGI target for categories of buildings, but the building owner

must determine which target applies, what concrete changes to the building would be necessary to meet the target, and what those changes would cost. Where policy flexibility measures were available (as indeed they are in all of the jurisdictions studied), additional types of uncertainty were incorporated into the BPS process, including as to whether a building may qualify for one or more of the flexibility measures, and whether, when, and where emissions reductions would accrue as measures were applied. In each of these scenarios, accurate data was necessary to resolve the issue.

Moreover, despite the fact that many of the jurisdictions in the study had been accumulating benchmarking data from the buildings for several years, we observed widescale problems with the usability of the benchmarking data for purposes of establishing and enforcing a legitimate BPS program. Many jurisdictions had to expend resource-intensive efforts to obtain accurate baseline data in order to set reduction targets for buildings and track performance effectively, and administer a regulatory approach that was itself complex and difficult for local governments to explain and building owners to understand. Additionally, benchmarking data alone did not capture all of the relevant information necessary for BPS implementation, such as whether a particular building was eligible for flexibility measures, or what concrete actions would be needed in the building to reach compliance.

In this regard, our research uncovered several limitations of the existing benchmarking data that generated challenges at various stages of BPS implementation:

Data Accuracy

Concerns with the quality of the benchmarking data were raised throughout the study. Because benchmarking laws were designed to be informational, rather than the basis for enforceable, action-forcing requirements, building owners had not always collected or reported data about their properties with sufficient accuracy. We heard consistently in our qualitative research that in a benchmarking scheme, building owners lacked sufficient incentives to report their data accurately (or to question data supplied to them by utilities) because they were being evaluated based on filing a report in a timely manner, rather than on the accuracy of the report. By contrast, under a BPS scheme, building owners will face potential penalties if they are unable to improve the performance of their buildings based on the data reported.

For example, the local governments we studied reported challenges in obtaining full data for all buildings for purposes of setting GHG reduction or energy efficiency targets. In some jurisdictions, building owners faced obstacles obtaining tenant-level utility data, either due to communication breakdowns with utilities or application of existing privacy laws.¹²⁶ This meant that the information building owners were reporting to the local government might be incomplete. At the time of our study these issues had largely been resolved, but the process for resolving them added delay and complications for implementation. In other jurisdictions, local governments were forced to confront buildings that had evaded compliance with benchmarking laws or work out confusion regarding the legal entity responsible for compliance.

Local governments reported making significant efforts to clean up and verify the benchmarking data underlying their BPS programs. Some cities have relied on tools like the Standard Energy Efficiency Data (SEED) Platform, an open-source database created by a U.S. Department of Energy initiative, to help manage, organize, and analyze the large volume of data submitted to them. The capabilities of SEED have been extended by another platform, the Building Energy Analysis Manager (BEAM), which can be used to perform data quality tests.¹²⁷ Our qualitative research also indicated that local governments are conducting internal audits of data and reaching out to building owners to better understand their challenges in reporting accurate data. In addition to investments in internal data accuracy mechanisms, our research showed that local governments commonly require building owners to obtain third party audits to verify their benchmarking and BPS data.¹²⁸ For example, Boston requires covered building owners to hire third parties to verify their data for the first reporting year, the first emissions compliance year, and every five years thereafter.¹²⁹

Each approach toward data verification carries relative governmental and private-borne costs, as well as potential complications. For example, while third party audit systems have the potential to catch significant data errors, they depend on trained and qualified auditors with knowledge of the local requirements and building stock. Some jurisdictions in our qualitative research reported having to spend additional time and resources rooting out problems with the quality of the third-party auditors who lacked an understanding of the differences between local approaches to the BPS model and variations in BPS requirements between jurisdictions.

Overall, the local governments in our study indicated that despite their limitations, data verification tools were vital and could affect real world outcomes for BPS enforcement. For example, data verification processes that resolved issues about a building's size or baseline energy usage could lead to buildings being newly included or excluded from coverage under the BPS laws, or affect which performance targets applied to particular buildings.

Hidden Definitional Questions

The shift from benchmarking to BPS revealed unresolved definitional questions related to the BPS program implementation. For example, gross floor area (i.e., square footage) is a threshold criterion for coverage under local BPS laws, which generally group buildings by size and exempt smaller buildings. As discussed in more detail in Part III, square footage is also used in many jurisdictions to determine a building's target and whether a building meets the target when a BPS works by calculating the building's energy consumption or GHG emissions relative to the building's size to determine if the building needs to lower that amount to stay within the law.

We heard from multiple jurisdictions that in practice, there was widespread variation in how buildings calculated square footage and gross floor area. This methodology could vary across buildings within a city, or even among city records about the same building. For example, there might be discrepancies in whether the building included or excluded the thickness of exterior walls in their square footage calculations, or whether garages or patios were considered.¹³⁰

Another hidden definitional question that emerged as local governments started up new BPS programs related to the definition of what a “building” is, as compared with how properties are registered in tax lot systems. For example, local governments were confronted with the question of whether a “building” should include multiple buildings grouped together on the same property, or whether to artificially separate structures on a single property that might be served by connected energy systems.

These discrepancies were lurking in the energy-related data buildings were required to submit under their benchmarking requirements, and in many cases, were only uncovered as part of the BPS implementation process. Standardizing the methodology for calculating square footage and defining buildings, and ensuring that calculations across buildings were consistent, were critical tasks for the transition from benchmarking to BPS. Each of these definitional questions required review and analysis by the local government before enforceable requirements could be imposed. Several local governments in our study responded by clarifying these definitions in rules or guidance documents.¹³¹

Data Integration

In the course of our study, we encountered several instances where data integration between benchmarking and other relevant data sets was a concern for local governments. These concerns fell into the following general categories:

Improving accuracy: In order to resolve data availability and accuracy issues, local governments needed building benchmarking data to interface with other data sets. Some of these data sets included property or tax

lot records, which were critical to identifying and helping to resolve issues related to square footage or building ownership. Local governments also needed to coordinate with utilities to resolve data verification issues or data gaps related to the building’s energy usage. In many cases, these issues may not have come up in a benchmarking context but were directly relevant to building owners when it came time to consider tangible changes to the buildings, and to local governments when seeking to build fairness, accuracy, and durability into their programs.

Maximizing impact and applying flexibility

measures: Local governments seeking to make the most of their benchmarking data and implement BPS programs in an informed, effective, and equitable way also sought access to a wide variety of other data sets. These might include data sets that were needed to learn more about the buildings covered by BPS laws in their jurisdictions, such as affordable housing records, mortgage records, or information about relevant building equipment systems or conditions. Such data sets could help these jurisdictions get a picture of which buildings faced financial, technical, or other challenges. They could also help the local government figure out when flexibility measures should apply or direct limited program resources toward implementation approaches that would have the most impact. With such information, local governments could also identify particular areas of priority, such as affordable housing, or understand more detailed and granular information about building conditions that would impede or accelerate compliance. However, in many cases, the local government officials responsible for implementing the BPS programs lacked direct access to these records or encountered incomplete records. Decisions about data infrastructure and data integration

that were made at the time of benchmarking did not always take into account the needs of jurisdictions to evaluate building and neighborhood data holistically when enforcing BPS laws. As a result, government decision-making has had to evolve and adapt without the benefit of hindsight.

B. The Benefits of Data Investments

The investment in data quality necessary for BPS implementation also yielded some benefits for the local governments in our study. Across jurisdictions, we heard in our qualitative interviews with governmental and non-governmental actors that the implementation of BPS laws has had the overall effect of improving the quality of benchmarking data. When faced with the imperative of having to shift from a reporting regime to an action-forcing program, both local jurisdictions and building owners took a closer look at data accuracy issues. Local jurisdictions made investments in data verification. Building owners also had an incentive to improve the quality of the data they were reporting in order to clarify compliance requirements. Technical breakdowns or glitches between and among data sets accessible to building owners, tenants, utilities, local governments, and external platforms were addressed. Overall, this strengthened the quality of the benchmarking data.

Jurisdictions that committed to investments in infrastructure and staff expertise in data analytics reported significant gains in the success and acceptance of their programs. Building government staff expertise on data literacy has also yielded cross-benefits. Local jurisdictions that invested in robust data analytics were better equipped to analyze benchmarking data more broadly to promote related citywide energy and climate goals.

SPOTLIGHT ON NEW YORK CITY

New York City is a leader in utilizing data science to drive better policy outcomes. New York's commitment to data-driven decision making and its innovations in open data infrastructure extend decades and pre-date its BPS, Local Law 97 (LL97).¹³² New York's facility with processing and visualizing large amounts of data has helped the city manage such a data-heavy program as Local Law 97. Specifically, the city has invested in developing tools to leverage the data underlying its benchmarking and BPS programs toward effective program implementation and broader public policy goals. For example, New York City's Building Energy Snapshot tool allows anyone to use a building's street address to look up the building's level of compliance with LL 97, potential penalties for noncompliance, and potential savings from compliance.¹³³ This enables building owners to easily access and understand their requirements, and the wider public to understand and track how New York City's buildings are performing. The tool also connects users with city resources under the NYC Accelerator program, which offers resources, training, and guidance for building owners and service providers on energy efficiency and building decarbonization.¹³⁴ New York City's commitment to the values of open data has also fostered partnerships with academic and nonprofit organizations aligned with the city's goals. For example, the city worked with researchers at NYU and Urban Green Council to develop the NYC Decarbonization Compass tool, which integrates benchmarking data and mortgage lienholder information for buildings covered by LL97 to help inform financing opportunities for building decarbonization.¹³⁵



FINDING 1: RECOMMENDATIONS

- Align benchmarking data definitions and fields with the data that will be needed in BPS implementation. At the design stage, local governments should strive to ensure that key definitions that are foundational to accurate and enforceable BPS programs are clearly and consistently defined across benchmarking and BPS programs as early as possible. Local governments looking to adopt BPS policies should seek to provide as much definitional clarity as possible when they begin planning their programs to ease the transition from benchmarking to BPS.
- Invest in robust data collection and management infrastructure, including both software and staff. In planning for a BPS policy, a local government should identify: 1) the data platforms that will be used to track building performance and compliance; 2) how those platforms will be integrated and managed; 3) what staff expertise will be needed; and 4) how the local government will address reliance on state or federal data infrastructures that are outside the local government's control.
- Integrate data verification systems to promote better data collection and reporting. Local governments considering new BPS policies would benefit from incorporating data quality measures, such as third-party verification requirements, as a part of their preliminary benchmarking programs. Jurisdictions implementing BPS laws can utilize existing resources on best practices for data collection and verification, as collated by IMT and other sources.¹³⁶ Before imposing third party verification requirements, local governments might also take measures to ensure that building owners have access to trained and qualified auditors with knowledge of the local jurisdiction's BPS requirements and building stock.
- Integrate owner-provided benchmarking data with other relevant sources of data, such as property records, utility-provided data, and data on equipment systems. At both the design and implementation stage, local governments should identify and integrate other relevant sources of data on local buildings that will be necessary for effective BPS implementation. Accessing and interpreting this data often requires coordination with multiple agencies at the local, state, or federal levels, as well as utility companies, and policymakers should be proactive in engaging with these stakeholders as practicable. Other agencies at the local, state, regional, and federal level, and utility companies should support this effort.
- Collect and incorporate knowledge on how owners and managers of covered buildings operationalize benchmarking requirements in practice. A real world understanding of the impediments to accurate data reporting by building owners, such as lack of expertise of certain low-resourced building owners, information gaps between landlords and tenants, or misaligned incentives that deter building owners from investing in accurate data collection, would be valuable for promoting data accuracy and building legitimacy in a BPS program.¹³⁷

Finding 2: Shifting Program Timelines

Finding 2 Summary: *The complexity of implementing new BPS programs and the many challenges of retrofitting existing buildings has led to delayed implementation in many jurisdictions.*

BPS policies are a novel regulatory instrument vis-à-vis the community they regulate, not only in how they need to be enforced, but also in that they require sustained engagement between building owners and local governments that is projected to last for several decades. Our study found that BPS policies need significant time to get off the ground, given the steep learning curve for both regulators and the regulated community, the complexities of managing the often-variable needs of individual buildings, and the laws' long-term time horizon. Developing new BPS programs required time to hire and train adequate staff and address the full array of implementation-related tasks. In our study, all of the local governments undergoing this process were tasked with establishing these novel and cost-intensive programs in the context of changing economic and political circumstances.

The local governments we studied overwhelmingly chose to take significant time to develop their programs in response to the many challenges accompanying the transition from benchmarking to BPS. This intentional approach toward implementation, informed by the facts on the ground in each jurisdiction, was done with an eye toward programs' long-term acceptance and durability by prioritizing accuracy, feasibility, and fairness. In most jurisdictions, a key consequence of this process was delay. Many local governments pushed back the date by which most or all building owners were required to meet initial requirements,¹³⁸ while allowing certain building owners even more time to comply by offering

extensions or exemptions under qualifying circumstances.¹³⁹

Our research indicated that the overall delays in BPS program implementation were driven by three main factors:

Programmatic delays: As described above, there were significant time investments needed by the local governments to clean up and verify the benchmarking data in order to move forward with a program that was fair and reliable, ranging from procuring software to implementing third party verification systems. Jurisdictions were also faced with an enormous list of early implementation imperatives associated with standing up new programs, such as hiring and training staff, promulgating rules, and engaging and educating building owners. There were also significant gaps left to program officials that had not been resolved in the legislation, such as setting definitions or establishing criteria for hardship exemptions.

External factors: Some delays were driven by factors external to the BPS programs themselves. In many jurisdictions, it was reported that the COVID-19 pandemic increased vacancy rates and decreased occupancy in commercial buildings, leading to financial hardship for certain building owners and new challenges for local governments.¹⁴⁰ It should be noted that the post-pandemic vacancy effects were not felt equally within or across jurisdictions. Some research indicates that within the cities we studied, central

business districts in Denver, Seattle, and St. Louis were particularly affected.¹⁴¹ In order to address these impacts, some local governments had to take extra time to consult with affected building owners, develop standards for evaluating and determining financial hardship and vacancy rates, and determine which flexibility measures could be applied under the local authorizing legislation, as discussed in more detail in the following section.¹⁴² In other jurisdictions, changes in related state and federal policies or legal challenges citing state or federal preemption were cited as a source of delay, as described in more detail in Finding 6.

Building owner delays: As described in more detail below in Finding 3, the need to develop flexibility measures to respond to constraints

faced by building owners was a significant source of delay. In our qualitative research, we repeatedly heard that building owners needed time to understand and process the new BPS requirements before they would be in a position to start taking compliance actions. For example, building owners needed to identify and understand issues with their own data and access financial and professional resources to perform initial assessments. This required locating a cascading set of service providers (e.g., energy auditors, architects, engineers, and contractors) who were willing and able to help building owners understand whether they were covered by the BPS laws, what their targets might be, what work was needed for compliance, whether this work was technically feasible, and how it would be financed.

FINDING 2: RECOMMENDATIONS

Local governments looking to establish new BPS programs should give robust consideration to the financial, administrative, political, and technical resources that the local government will need to establish and perpetuate a successful BPS program. In order to avoid significant delays or programmatic setbacks, local governments should consider the following at the outset of planning for a BPS program:

- What sources of revenue will be needed to support governmental staffing and data infrastructure necessary to collect, process, and monitor the information submitted by buildings, engage with building owners, and design and implement an effective enforcement strategy?
- Is there a plan for offsetting any of the financial burdens on building owners and tenants equitably at the outset, or responding to changing economic or political conditions, such as shifts in energy policy or volatility in housing and commercial real estate markets and their supply chains?
- How will the local government respond to changes in local leadership or misaligned priorities at the state or federal level with regard to funding, energy policy, or other related policies such as affordable housing, climate, or energy justice?

Finding 3: Flexibility Measures as a Response to Financial Hardship, Technical Constraints, and Equity Considerations

Finding 3 Summary: Across jurisdictions, building owners and tenants raised the following obstacles to compliance: financial and technical issues, equity concerns, and information deficits about BPS standards. Jurisdictions responded to these issues in a variety of ways through their implementation processes. One significant response was to utilize existing statutory provisions in the local BPS laws to offer a range of flexibility measures for owners aimed at addressing conditions on the ground. These included modified requirements based on building type or financial need, energy credits or deductions, and time extensions. Across jurisdictions, we have seen an overall movement away from generally applicable numeric targets and standardized deadlines to more customized, building-level targets that vary in approach and timeframes. Local governments developed explicit and implicit alternative compliance pathways and flexibility measures that adapted to financial, operational, and equity considerations raised during public engagement processes throughout implementation. It is too early to determine the effect of this widescale deployment of flexibility measures on the actual reductions in GHG emissions or energy consumption. However, the local governments' education-oriented approach toward flexibility measures reflected an overall intention to induce tangible and achievable progress by building owners, in lieu of inaction and penalties.

A. How Local Governments Are Using Flexibility Measures During BPS Implementation

As noted above in Parts III and IV, local BPS laws provide a range of tools that local governments can use to build flexibility into their implementation of BPS laws. In this study, we have observed a wide-scale use of flexibility measures and alternative compliance requirements by local governments as they begin implementation. By “flexibility measures” and “alternative compliance requirements” (and variants of these terms) we are referring to circumstances wherein an individual building is not required to meet the default GHGI or EUI limit or ENERGY STAR Score that otherwise would be the performance target for that building’s use type in the default timeframe. The term “alternative compliance pathway”

is sometimes used to describe many of these scenarios by some jurisdictions and in some of the prior literature.

In our study, we observed that regardless of the terminology, the particular contours and applications of flexibility measures and alternative compliance requirements vary by jurisdiction.¹⁴³ While some flexibility measures, such as time extensions, were heavily used in a wide range of jurisdictions (as noted above in Finding 2), some measures were limited to certain jurisdictions. The following chart captures examples of the types of flexibility measures and alternative compliance requirements that we observed in this study that were reported as currently being integrated into BPS program implementation.

Examples of BPS Flexibility Measures and Alternative Compliance Requirements

Approach	Example
Adjustments to BPS timelines	
Categorical time extensions	In Seattle, affordable multifamily housing, buildings with high rental vacancy, and buildings with pre-existing financial distress are eligible for a timeline extension. ¹⁴⁴
Individual time extensions	In Chula Vista, building owners may apply for an extension of BPS deadlines upon an application “demonstrating evidence of substantial hardship.” ¹⁴⁵
Adjustments and credits related to BPS numeric targets	
Performance credits	In Montgomery County, onsite renewable energy, such as solar, is provided a “credit” towards each building’s interim and final performance standard. ¹⁴⁶
Adjusted future targets that consider early action/past performance	In St. Louis, “if at the conclusion of cycle 1, the property’s EUI is at or below the Building Energy Performance Standard (BEPS) for its property type, AND the EUI of the property was reduced by 50% or greater compared to the 2018 Property Baseline, then the property will be in compliance for cycles 1, 2, and 3. The property must achieve both targets—the property type EUI standard and a 50% reduction in the property’s EUI from its 2018 Property Baseline—in order to be in compliance for three consecutive cycles.” ¹⁴⁷
Less-stringent target or custom target based on eligibility criteria	In Denver, the owner of a building that is on Denver’s Historic Landmarks and Districts list, or the National or Colorado State Register of Historic Places, may apply for an adjustment to the 2030 EUI Target. ¹⁴⁸
Targets based on the building’s existing performance	
Target that requires a percent reduction from the building’s existing performance rather than a requirement to meet an externally derived standard.	Washington, D.C. allows covered building owners to choose a “performance pathway,” wherein they must demonstrate a 20% reduction in adjusted site EUI from the beginning of a Compliance Cycle (established through the baseline years) to the end of the Compliance Cycle (measured through the evaluation years). The performance pathway is open to all property types. ¹⁴⁹
Targets that cover multiple properties owned	
Campus or portfolio-based target	In Cambridge, a campus (i.e., 5 or more covered properties with the same owner) may choose to comply with BPS emissions reduction requirements at the level of each covered property, or at the level of the campus group. ¹⁵⁰
Action-based requirements without numeric targets	
Requirements to make particular changes to the building that do not require a numerically derived performance level.	In New York City, houses of worship and certain affordable housing buildings may implement prescribed energy conservation measures, such as repairing heating systems, in lieu of meeting the building-specific carbon limits that would otherwise apply. ¹⁵¹
Requirements that do not require change in a covered building	
Building owners pay into government fund for excess energy use or emissions	In Boston, building owners whose emissions levels exceed the performance target can reach compliance by making an annual “Alternative Compliance Payment,” which funds future decarbonization projects in Boston’s environmental justice communities. ¹⁵²
Renewable energy or alternative compliance credits	In Cambridge, building owners can offset greenhouse gas emissions from their covered properties by purchasing “alternative compliance credits,” which “shall be used by the City solely for City programs and projects that directly reduce carbon emissions, including but not limited to, greenhouse gas reduction projects in Affordable Housing properties . . .” ¹⁵³ Cambridge also allows its largest buildings to use a limited amount of “verified carbon credits,” which are intended to support local emissions reduction projects. ¹⁵⁴

As Duer-Balkind, Koolbeck & Kelley observe in their 2025 article, flexibility measures or alternative compliance requirements are often limited to buildings that meet eligibility requirements.¹⁵⁵ A building owner might need to demonstrate financial hardship, technical constraints, or that the building is being used for an eligible purpose. The local governments in our study deploying these mechanisms needed to expend time and resources to put flexibility measures and alternative compliance requirements into practice. The governments needed to develop the details of the eligibility requirements, as well as the methods of proof that building owners could use to demonstrate eligibility.¹⁵⁶ In the case of target adjustments, the building owner and the local government would need to perform calculations to determine the new target.¹⁵⁷ A building owner might also be required to obtain a third party energy audit or develop a custom application or action plan in situations where the building owner was allowed to perform a set of prescribed tasks in the building, rather than meet a fixed energy reduction target, which must each be reviewed by the local government.¹⁵⁸ Many local governments also imposed ongoing requirements for building owners to demonstrate progress, meet interim milestones, and ultimately demonstrate compliance with the alternative requirements.¹⁵⁹

Each of these steps has added time and complexity to the process for both local governments and building owners. In our qualitative interviews, it was reported that the cumulative effect of layering in flexibility and alternative compliance approaches on top of a BPS scheme that already was highly technical created additional challenges for building owners and local governments. Such complexity added confusion, at times, during program implementation and generated the need for more education and outreach about

the varying requirements that were not always intuitive. However, despite these challenges, the flexibility measures and alternative compliance requirements were largely seen as necessary by both local regulators and regulated entities.

B. Reasons for the Wide-Scale Deployment of Flexibility Measures

Our qualitative research uncovered many factors driving local government agencies implementing BPS policies to utilize the legislative authority they were given to offer building owners flexibility measures and alternative compliance requirements. In some instances, these mechanisms were viewed by both building owners and local governments as necessary responses to the real-world circumstances that precluded strict implementation of fixed numeric targets and timelines. The following are some of the most commonly-cited reasons for the deployment of flexibility measures and alternative compliance requirements.

Financial Hardship and the Costs of Meeting BPS Targets

Addressing Financial Hardship

To comply with a BPS law, building owners may need capital for a range of tasks, including both preparatory work (such as audits and assessments of existing conditions, energy efficiency upgrades, and electrification opportunities) and substantive construction projects to achieve applicable building performance standards. In our study, building owners expressed major concerns about high costs of compliance across building typologies and ownership structures. These concerns are consistent with published estimates. For example, Washington, D.C. has cited costs

of over \$1.3 million for a sample multifamily building to comply with its BPS law,¹⁶⁰ and New York City estimates it will cost building owners \$12-15 billion to comply with its 2030 BPS limits.¹⁶¹

Many of the jurisdictions that we studied have incorporated consideration of financial hardship directly into their use of flexibility measures and alternative compliance requirements. For example, Denver can temporarily pause a building owner's obligations where a building is subject to a qualified tax lien sale or has demonstrated solvency concerns.¹⁶² Boston, meanwhile, offers both short- and long-term hardship compliance plans where building owners are involved in bankruptcy proceedings or other demonstrable financial hardship.¹⁶³ In New York, a building owner can apply for adjustments to their building's emission limits where the owner can demonstrate one of several measures of financial distress tailored to the building's type, including enduring certain sustained increases in condominium fees above the rate of inflation or having a debt service coverage ratio of less than 1.15.¹⁶⁴

Aligning with Capital Cycles

In addition to the high costs of compliance, misalignment between a building's capital cycle and the timing of BPS requirements was reported as an issue for some building owners. In particular, we heard that many building owners lack access to relatively low-cost capital and sufficient technical resources to meet their targets in the laws' original timeframes. Building owners and developers noted that the time at which capital may be most favorably available to undertake efficiency or decarbonization projects may be out of sync with BPS deadlines. For example, it was reported that many commercial and market-rate multifamily buildings operate with only a limited pool of

liquid capital on hand. Refinancing existing debts or raising additional capital through new loans or equity requires time, and new loans may contain less favorable terms depending on market dynamics. Taking on additional debt may be particularly complicated if a building already has raised and spent capital in planning for other necessary upgrades to equipment or systems.

In response to these challenges, some jurisdictions have made accommodations for these realities. For example, in Boston, buildings can apply for a Hardship Compliance Plan that authorizes an alternative emissions reduction timeline that takes into account the end of life of major building systems or other planned major renovations in the building.¹⁶⁵ This provides an avenue for some building owners to better sequence compliance with BPS requirements with the timing of their buildings' capital cycles.¹⁶⁶

Equity Considerations and Special Circumstances

Jurisdictions considered building typology and use, energy intensity, and equity when establishing and applying flexibility mechanisms and alternative compliance requirements. For example, at the design stage, many jurisdictions have provided affordable housing providers, houses of worship, and other public-oriented building operators with unique forms of accommodation due to concerns about disrupting their societal benefits.¹⁶⁷ During the implementation of these programs, the need to protect and preserve affordable housing has been an ongoing locus of concern.

Attention to the special needs of multifamily housing was driven by a variety of factors. Many of the cities we studied are separately

experiencing housing or energy affordability crises. Affordable housing and environmental justice advocates that we spoke with were concerned about the impacts that BPS implementation might have on housing prices, rents, tenant-borne energy costs, gentrification, and overall costs on tenants. Our findings aligned to some extent with prior research on how BPS policies might impact low-income and environmental justice communities. For example, Diezmartínez et al. (2024) found in Boston that advocates are worried that environmental justice communities will not reap benefits of BPS compliance and instead be burdened by the cost of implementing BPS through rent increases or displacement.¹⁶⁸ In a study conducted by IMT, the Natural Resources Defense Council NRDC, and Elevate, the authors formed a Community Advisory Committee made up of community-based organizations in Chicago and Los Angeles, two cities in the process of developing BPS policies. Through their convening sessions, the authors learned that community groups were concerned that the cost of BPS compliance could be passed on to tenants by their landlords through rent increases, potentially forcing tenants to leave or face eviction. There was also concern that tenants will be displaced by their landlords so that they can carry out the required retrofits without a place to live in the interim or a right to return.¹⁶⁹

In our interviews with environmental justice advocates and affordable housing experts, a need to consider the people living in the covered buildings throughout BPS program implementation was emphasized. In the affordable housing sector, habitability requirements for tenants often are insufficiently covered by existing rent rolls and public sources of financing, leaving potentially deep deficits for owners and developers and mounting deferred maintenance obligations. Housing

with structural deficiencies due to deferred maintenance may experience hazards such as mold, asbestos, lead, or pests, and require weatherization or repairs and remediation prior to decarbonization investments, which requires additional capital. Processes and approaches that reflected nuance and allowed the lived experiences of people experiencing housing, economic, and energy insecurity to be considered when applying flexibility measures were strongly favored. It was emphasized that residents, owners, and developers of affordable housing may very much value energy efficiency, decreased air pollution, and climate resilience planning. Therefore, blanket exemptions for affordable housing could undermine other important public policy goals associated with reducing air pollution from fossil fuel-burning appliances, such as public health or environmental justice. Rather, intentional planning and implementation around cost-bearing and cost-shifting should include community input at all stages.

The local governments that we studied responded to these concerns in a variety of ways, including the use of flexibility measures and alternative compliance requirements. For example, Boston and New York City have developed funds to which building owners can contribute to offset their BPS GHGI reduction obligations while allowing the cities to fund emissions reducing projects in affordable housing buildings elsewhere in the two cities. New York City has established the Affordable Housing Reinvestment Fund (AHRF), which permits covered buildings to reduce their potential fine amounts by purchasing GHG offsets that are backed by decarbonization projects in affordable housing buildings participating in the city's Resilient and Equitable Decarbonization initiative (REDi).¹⁷⁰ In Boston, covered buildings can make alternative compliance payments in lieu of undertaking

their own decarbonization projects; these payments in turn can pay for decarbonization projects in environmental justice communities, through the city's Equitable Emissions Investment Fund.¹⁷¹ Boston's BERDO Review Board, which includes community representatives, decides which projects the Fund will finance. More examples of the local governments' responses to these challenges are described in Finding 4.

Recognizing Early Movers and Accommodating Other Policy Goals

Some jurisdictions have developed flexibility mechanisms in order to avoid penalizing building owners who had acted proactively to reduce their emissions or energy consumption or to adopt beneficial electrification. For example, St. Louis has an Early Adopter pathway, under which a building can be deemed in compliance with both its first and second BEPS targets if it a) has an EUI score at or below the standard for the building's property type at the end of its first compliance period and b) the building has reduced its EUI by 20% or more relative to its 2018 baseline. (If a property has reduced its EUI by 50% or more, then it is deemed compliant with the first three compliance periods).¹⁷² Meanwhile, in Denver, regulators have developed an electrification incentive that provides a building with a 10% final target reduction where at least 80% of the building's on-site energy use is supplied by electrical sources.¹⁷³ As another variation, in Boston, Individual Compliance Schedules allow building owners to take advantage of emissions reductions that they achieved prior to 2021 and adjust their emissions obligations based on their building's baseline emissions, rather than the default emissions standard applicable to their building type.¹⁷⁴

In addition, several jurisdictions have adopted mechanisms that accommodate or encourage building owners' adoption of measures that serve related (if sometimes distinct) environmental goals—notably, measures that support increased deployment of clean energy sources. Thus, for example, New York City permits buildings to take deductions against electricity emissions for on-site solar power generation and on-site energy storage.¹⁷⁵ Montgomery County permits buildings utilizing its BEPS program's performance pathway to take an allowance for on-site renewable energy generation, as part of the calculation of those buildings' interim and final standards.¹⁷⁶

C. Pairing Flexibility Measures With Educational Goals

Many of the local governments we spoke with indicated that engagement with building owners and “meeting them where they are at” were central tenets of their approach to implementing BPS programs. It was important to local governments that flexibility measures be a means of obtaining action from building owners that would not otherwise happen under a stricter, infeasible standard, rather than a means of weakening requirements. For this reason, educating building owners about the goals of the BPS laws and the different flexibility measures available was a key component of program implementation. Local governments invested in deep outreach and education efforts to incentivize building owners to choose to take action toward building decarbonization and energy efficiency, including by taking advantage of flexibility measures that worked for them, rather than merely paying fines.

SPOTLIGHT ON WASHINGTON, D.C.

One key challenge for local governments implementing BPS laws is the variation in expertise found across buildings in their jurisdictions. Large Class A commercial buildings may have in-house sustainability teams that can devote time, skills, and resources toward compliance. By contrast, condominium and cooperative boards, nonprofits, Class B and C commercial buildings, and a range of other building owners often lack resources to develop or hire technical expertise needed to reach compliance. Local governments considered these disparities when crafting and applying flexibility measures by providing extra time or support for building owners who lack the resources to hire in-house sustainability managers. Local governments then faced the challenge of educating building owners who lacked awareness of basic BPS requirements about the various flexibility measures that were designed to support them. Failure to do so ran the risk that building owners who most needed the flexibility measures would not know about them.



Washington, D.C. showed notable innovation in addressing this variation in in-house expertise among buildings covered by Washington, D.C.'s BEPS law. The District took a proactive approach of setting an initial deadline wherein building owners were affirmatively required to select a compliance pathway that worked for them before performance requirements took effect. This offered an opportunity for the city to educate building owners about the various compliance pathways in a more efficient and equitable way. The District also published and disseminated a range of educational materials geared toward audiences with different levels of prior expertise. In addition, the D.C. Department of Energy and Environment holds weekly “Office Hours” online, where covered building owners and consultants can talk directly to a program official about questions or concerns directly related to their property.

D. Uncertain Impacts of Flexibility Measures

As evidenced by the examples above, local governments have sought to address a variety of public policy goals during the implementation phase by offering multiple flexibility mechanisms that allowed for accommodation of financial, technical, equity, and other circumstances. The extent and variety of the flexibility measures offered by local governments, and the fact that many different

building scenarios are covered, is indicative of the complexity of building decarbonization when considered in the context of real-world conditions.

While local governments' flexibility measures were largely developed as a part of public engagement processes—such as listening sessions, public hearings, and advisory boards—the cumulative effect of these mechanisms on emissions and energy intensity is uncertain. These approaches have generally

had the effect of moving BPS programs away from standardized GHG reduction or energy efficiency metrics with uniform timeframes and toward building-specific approaches. It is possible that some buildings will be able to meet their adjusted requirements without meeting the numeric GHG or energy reduction targets described in the laws, or within the original timeframes. Hardship provisions, time extensions, beneficial deductions, and alternative compliance pathways make it more difficult to track and assess the ability of BPS programs to meet their underlying policy goals and may hinder the long-term impact of BPS programs in driving on-site changes to buildings' infrastructure and reducing actual emissions. For example, while a time extension may be an equitable way of responding to a building that needs to align retrofit projects with a mortgage cycle, each year that the building is allowed to emit higher levels of GHGs will have cumulative impacts on localized public health and the climate. More research is needed to determine whether these shifts will

impact the jurisdiction's ability to reach their original GHG reduction or energy efficiency goals.

Given the variation in how each jurisdiction has approached flexibility mechanisms, it is difficult to establish generalizable takeaways from our qualitative and quantitative research about future outcomes. It is too early to determine whether the application of a flexibility mechanism to a building in challenging circumstances will lead to a greater or lesser reduction in GHGs or energy consumption than if the building had not been offered a flexibility mechanism. It should also be noted that, based on our qualitative interviews, the designation and application of flexibility measures is fluid, as local governments respond to real-time feedback from owners and other stakeholders as they work through the initial compliance period. This makes it infeasible to accurately predict the true impact of flexibility mechanisms on bottom line GHG emissions or energy efficiency.

FINDING 3: RECOMMENDATIONS

While BPS laws are intended to produce many benefits, our research indicates that the costs of reducing GHG emissions and energy consumption in buildings, and who bears these costs, are central and ongoing concerns for governments, covered buildings, and communities. Therefore, local governments considering or implementing BPS policies should take a proactive approach to understanding the BPS policies' various costs in addition to their benefits, including who stands to bear these costs (such as building owners and tenants), and their financial circumstances, and other measures of equity and inequity within the buildings sector.

The following recommendations are intended to help local governments assess costs and benefits of compliance at the front end of BPS design and implementation, before flexibility measures are needed. We also present some recommendations for local governments that are already using flexibility measures as a response to the real-world challenges faced by building owners. Under Finding 4, we include additional recommendations to help local governments address equity considerations related to the costs of compliance.

- To the extent feasible in designing BPS programs and incorporating flexibility measures, local governments should consider the costs and benefits of such policies, and who will bear these costs and enjoy the benefits. For example, within the local jurisdiction, what are the costs that implementing a BPS might impose, and will building owners bear these costs, or will they pass them onto tenants? Will there be benefits that tenants or owners will enjoy, such as lower energy costs or reduced exposure to local air pollutants? For example, how would centering the perspectives of people living in affordable housing inform an analysis of the benefits of reducing on-site burning of fossil fuels, the need to fund pre-electrification work, such as weatherization or structural repairs, or the timing or sequencing of BPS requirements?
- Local governments should develop and incorporate knowledge of regulated buildings' financial circumstances when planning and implementing a BPS, and consider new policies to unlock public and private funding for local building decarbonization. Local governments should understand how buildings covered by their BPS laws are financed and integrate the practicalities of building financing as they exist within particular building typologies and circumstances (e.g., residential cooperatives and condominiums, affordable housing buildings, and class B and C commercial office buildings) into the design and implementation of BPS laws. Possible approaches may include: 1) aligning the timelines for BPS requirements with capital cycles; 2) finding new and innovative ways of injecting private or public capital into high emitting buildings; 3) otherwise including perspectives from banks, insurance companies, and other mortgage lenders in BPS program planning, and seeking to help them infuse climate considerations into the underwriting process;¹⁷⁷ 4) addressing barriers to merging public and private funding streams; and 5) considering funding for pre-electrification remediation and structural repairs in sub-standard housing. Local governments considering new BPS laws should learn from local governments with existing BPS laws that are already experimenting with some of these approaches in their implementation strategies as an adaptive response to the challenges of making BPS programs financially and operationally feasible.
- As compliance data accumulates, local governments should monitor and disclose data about the impacts of flexibility measures on energy efficiency and GHG targets on a building-specific and citywide scale.

Finding 4: Local Innovation: New Modes of Public Engagement and Cost-Shifting to Foster Equity and Affordability in BPS Policies

Finding 4 Summary: Local governments have attempted to incorporate distributional, procedural, recognitional, and substantive notions of fairness and equity as they have developed and implemented their BPS policies. In particular, many jurisdictions have attempted to incorporate the perspective of various constituencies (including both “cost-bearers” and communities intended to benefit from BPS programs) into policy implementation, through both formal public engagement processes (such as rulemakings and advisory boards) and more informal ones (such as public information sessions and individual meetings with building industry representatives, building owners, service providers, and environmental and housing justice advocates). Jurisdictions have deployed a wide range of innovative strategies to bridge financial and technical gaps faced by particular building owners, such as resource hubs, direct financial assistance, and other modes of alleviating costs based on feedback from building owners. The experiences of local governments that currently have BPS policies suggests that a broad and balanced approach to engagement can help foster public trust, and that a variety of approaches toward engagement may promote the long-term durability of the programs.

A. New Modes of Public Engagement to Meet Local Needs

Throughout BPS implementation, local governments have adopted a range of public engagement processes, including both formal processes, such as rulemaking and stakeholder advisory boards, and informal processes, such as public information sessions and individual meetings with industry groups, specific building types, and service providers.

Local governments have undertaken a range of approaches that reflected the circumstances faced by building owners and the level of available governmental resources. For example, in addition to formal public engagement efforts under rulemaking processes, New York City has employed a variety of outreach efforts including establishing a help desk with agency partners, as well as building a website to make a deep pool of technical knowledge available to the public. These initiatives were bolstered by a

multi-year campaign of newsletters, webinars, and public events to connect with building owners, operators, and service professionals. Other jurisdictions provided weekly “office hours” to covered building owners to help answer questions and solicit feedback to improve the programs in an informal setting. Smaller jurisdictions, such as Cambridge, have targeted outreach toward entities with significant energy demands that pose particular challenges, such as hospitals and educational campuses.

In order to strengthen and “ground-truth” BPS programs, some jurisdictions formed community advisory committees with representation from a variety of perspectives, such as building managers across typologies, affordable housing and environmental justice perspectives, and individuals with technical expertise.

We heard from building owners, developers, and affordable housing providers that the various local public engagement processes

were helping to build public trust, equity, and practicability into the implementation of BPS laws in the jurisdictions that we studied.

SPOTLIGHT ON BOSTON

Boston's BERDO Review Board is an independent board established to help implement the city's Building Emissions Reduction and Disclosure Ordinance. The Board's nine volunteer members "oversee the implementation of BERDO and work to ensure environmental justice communities benefit from BERDO decarbonization efforts."¹⁷⁸ The Board is notable in numerous respects. First, it includes membership from individuals with perspectives beyond the traditional real estate community. Board membership must include:



- Six nominated by community-based organizations;
- Two nominated by any individual or organization, including self-nomination; and
- Ex-officio membership by the Chair of the Boston City Council's Environmental Justice, Resiliency, and Parks Committee, or their designee.

Second, unlike typical community or technical advisory boards that solely make nonbinding recommendations to decision-makers, the BERDO Review Board is granted authority to make substantive decisions regarding program implementation. The Board is authorized to:

- Administer flexibility measures, including reviewing, accepting, or denying applications;
- Make key funding choices regarding how Boston's Equitable Emissions Investment Fund will be spent to support projects aimed at reducing building emissions. The emissions fund was originally sourced with \$3.5 million from the city of Boston and will receive funding in later years from fines and alternative compliance payments.¹⁷⁹ The BERDO Review Board is tasked with using the fund to prioritize "Environmental Justice populations and communities disproportionately impacted by air pollution;"¹⁸⁰
- Initiate enforcement through notices of violations that may incur penalties; and
- Make recommendations for changes to BERDO regulations and policies.

Interviewees in our study reported that Boston's choice to include representation of affordable housing and environmental justice perspectives on an independent board that has actual decision-making authority promotes equity and authenticity in program implementation. Individuals with such expertise have greater knowledge of local circumstances and could better evaluate hardship applications.

B. Bridging Financial and Technical Gaps

As noted above, a major challenge in implementing BPS laws is the cost of retrofitting buildings to comply with the laws. Retrofits also require technical expertise that building owners, especially smaller-scale multifamily residential and commercial building owners, may lack.

In addition to using the flexibility measures described in Finding 3, local jurisdictions have made significant efforts to offer financial and technical assistance to building owners by following two general strategies, as described below.

Resource hubs and technical assistance.

Several local governments have established resource hubs and exchanges to help link building owners and service providers with one another. Some hubs and exchanges also offer technical advice for compliance projects and help identify existing public and private sources of funding. For example, New York City utilizes the NYC Accelerator within the city's Mayor's Office of Climate and Environmental Justice.¹⁸¹ The NYC Accelerator provides free technical assistance to building owners and property managers regarding energy efficiency and electrification projects that can help achieve compliance with Local Law 97 targets,¹⁸² helps building owners understand their options for financing Local Law 97 compliance work,¹⁸³ and maintains a directory of service professionals who can provide further assistance for buildings and/or execute compliance projects.¹⁸⁴ In Washington, D.C., the D.C. Department of Energy and Environment provided funding for an independent entity—the Building Innovation Hub—to assist local building industry professionals in serving buildings covered by the District's BEPS, as well as provide informational resources to building owners and other stakeholders

regarding BEPS compliance and financing options.¹⁸⁵ Like the NYC Accelerator, the Building Innovation Hub maintains a directory of service providers qualified to undertake BEPS compliance tasks.¹⁸⁶ In addition to direct governmental support, the Building Energy Exchange and IMT, in partnership, have helped to support resources hubs around the country to help facilitate technical assistance. For example, St. Louis's Building Energy Exchange (known as BE-Ex STL) offers a range of services, including professional training and education.¹⁸⁷

Additionally, several local governments have sought to defray particular costs of compliance by offering direct technical assistance, training, or audit services. For example, Seattle's Office of Sustainability and Environment (OSE) provides a Building Emissions Navigator, which is a free program that provides technical support and relevant training to building owners and managers to help them comply with both Seattle's Building Emissions Performance Standard (Seattle BEPS) and the State of Washington Clean Buildings Performance Standard (WA CBPS) laws.¹⁸⁸ Program recipients can receive virtual and in-person group training, virtual drop-in hours, along with emissions reduction planning assistance for target audiences. In an effort to make assistance as seamless as possible, St. Louis allows building owners to easily book an online consultation with an Energy Analyst to directly answer a range of questions.¹⁸⁹ Washington, D.C. has developed several resources for building owners to bridge gaps related to technical assistance. For example, Washington, D.C.'s Affordable Housing Retrofit Accelerator serves multifamily buildings covered by its BEPS requirements that meet the definition of "affordable." Services include technical and financial assistance for energy audits, energy modeling, and building upgrades.¹⁹⁰

SPOTLIGHT ON MONTGOMERY COUNTY

The Montgomery County Green Bank is one of the most innovative local financing solutions that we encountered in our study.¹⁹¹ The Green Bank is an independent, 501(c)(3) nonprofit that supports energy efficiency, clean energy, and climate-resilient projects in the county. Among other initiatives, the Green Bank supports property owners covered by Montgomery County's BEPS requirements through a multi-pronged, vertically integrated approach. It offers direct lending, facilitates transactions with private and public investment partners in the region through loans and credit enhancements, and provides technical assistance to facilitate retrofits. The Green Bank originates from 2015 Montgomery County legislation that authorized county tax revenue to provide seed funding to the green bank in support of green energy and energy efficiency goals.¹⁹² A decade later, the Green Bank has grown considerably.¹⁹³ The Green Bank leverages public money toward creative solutions to “unclog” issues that building owners experience from the private lending market to facilitate transactions, negotiate savings for tenants, and promote energy efficient and green energy upgrades. To maximize impact, the Green Bank incorporates equity considerations.¹⁹⁴ While open to all, it provides particular value to buildings that face challenges accessing sources of public or private financing, such as buildings that lack resources or buildings that do not qualify for existing rebates and incentives.



Financing tools. Some local governments have utilized direct financial assistance from local, state, or federal sources to support the retrofits necessary to comply with BPS mandates. Financial support may come through green banks, grants, assessments, or designated investment funds.¹⁹⁵

Notably, our study also found that not all financial tools to support retrofits are as effective or accessible as expected or intended. For example, many local governments with BPS policies offer Property Assessed Clean Energy (PACE) programs,¹⁹⁶ which are intended to help building owners access the capital needed for building energy efficiency, electrification, and climate resilience retrofits. In exchange

for the upfront capital provided through PACE programs, participating building owners accept long-term property tax assessments on their buildings, which then repay their loan amounts. Loans typically are paid back on a schedule reflecting the useful life of the equipment or systems installed with PACE financing.¹⁹⁷ In our study, we heard numerous concerns from a range of building owners about the limitations of PACE programs as they work in practice. One key problem of PACE lending in jurisdictions with BPS policies is that it only is available to certain kinds of buildings—usually commercial buildings (through C-PACE programs).¹⁹⁸ In addition, although a commercial building nominally may be eligible to participate in a C-PACE program, in practice

SPOTLIGHT ON DENVER

Denver followed a robust public and community engagement process to shape its approach to technical and financial assistance for buildings covered by its BPS, the Energize Denver Building Performance Requirements. After numerous rounds of review, Denver established its Equity Priority Buildings Program to help guide where it directs resources.²⁰¹ This program identifies buildings based on a multi-factor approach that considers lack of access to financial resources and climate vulnerability. A wide range of buildings may be eligible for the Equity Priority Buildings Program, including



affordable housing, income qualified condominiums, nonprofits, and certain commercial buildings. Denver has developed a buildings equity index that incorporates indicia of vulnerability, including but not limited to extreme weather and air pollution risk, socioeconomic status, infrastructure quality, access to information, and language barriers.²⁰² Once a building qualifies as an equity priority building, the building owner may access a suite of services, including benchmarking assistance, onsite ASHRAE Level 2 Audits, and navigation services, such as tenant engagement and financial coaching. Denver intends to offer rebates to program participants in the future. In our qualitative research, we heard that the Equity Priority Buildings program created opportunities for affordable housing providers, nonprofits, and entities covered by the BPS, who might not normally interface with the city, to ask questions about compliance with other local laws or access to city resources

beyond Energize Denver. Denver’s “no wrong door of government” approach to implementing the Equity Priority Buildings Program was praised by individuals familiar with the program.

its owners still may not be able to use C-PACE financing because existing lenders for the building may refuse to consent to the owners’ encumbering the building with new debt that is senior to the debts held by the existing lenders (as the new debt is paid back through a tax assessment).¹⁹⁹ These and other issues limiting the availability of PACE financing for many buildings were confirmed by some of the local government officials we spoke with who were

responsible for sharing resources on financing tools with buildings covered by BPS laws. Therefore, while PACE programs are available in many of the jurisdictions we spoke with, the local governments are also exploring other sources of financing for building owners.²⁰⁰

FINDING 4: RECOMMENDATIONS

By engaging those most directly affected by BPS policies in program implementation, local governments are better positioned to adapt to real world circumstances, obtain key information about what drives building owner behavior necessary for program success, and promote equity goals. Without such engagement, BPS policies risk losing public trust, momentum, or the ability to deliver on the underlying policy goals during the implementation phase. In our study, we have seen two major responses to these imperatives in existing jurisdictions, which we recommend for replication in jurisdictions considering new BPS policies or seeking to strengthen existing ones:

- **Financial and technical support.** Jurisdictions can seek to level the playing field for building owners facing particular hardships in a variety of ways: 1) resource hubs and exchanges to help pair building owners with existing public and private sources of funding; 2) direct assistance in the form of green banks, grants, rebates, assessments; or 3) offsets of particular costs of compliance by offering technical assistance or audits. Further research is needed about the strengths and limitations of each of these approaches, barriers to accessing them, and how local governments can design programs and policies to unlock private financing for building decarbonization to promote equity and affordability. Moreover, further financial support for local financing assistance programs is strongly needed from state and federal governments, as well as from the private sector.
- **Procedural equity.** Jurisdictions can incorporate procedures into the design and implementation of BPS laws that nest the perspectives of affected people and communities (including environmentally and socially burdened communities) into governmental decision-making. For example, jurisdictions can form community advisory committees with representation from a variety of perspectives, such as building managers across building types, affordable housing and environmental justice perspectives, and individuals with technical expertise. Jurisdictions can also adopt a range of public engagement processes, including both formal processes (such as rulemaking and stakeholder advisory boards) and informal processes (such as public information sessions and individual meetings with industry groups, specific building types, and service providers). These processes can build “buy-in” from regulated entities during the program’s implementation, and they can also have cross-benefits. For example, public engagement can promote public education goals, foster and sustain public trust, and allow for other positive outcomes in future interactions.

Finding 5: The Role of State and Federal Policy

Finding 5 Summary: *Developments at the federal and state levels have affected the implementation of local BPS laws.*

When implementing BPS laws, local governments must be attuned to their authority under state and federal law and changes in federal and state law and policy. Although BPS laws are generally well-aligned with local home rule authority to regulate buildings, the success of BPS programs is entangled with state and federal policy and financing. As an initial matter, local governments are, as a legal construct, creatures of their states and are continually subject to the possibilities of both state and federal preemption.²⁰³ Further, insofar as local BPS programs seek to promote climate goals through the reduction of GHG emissions associated with buildings, local governments must rely on and adapt to federal and state energy policies that dictate the makeup of electricity grids. Additionally, in order to bridge the financial gaps associated with building decarbonization described in Findings 2 and 3, local governments are often dependent on funding from federal and state governments that possess more extensive revenue-generating tools, such as greater taxation authority.

A. Preemption Concerns

Over the course of our one-year study, some jurisdictions faced lawsuits alleging that local BPS laws were preempted by either federal or state law. For example, NYC successfully defended its local law from a preemption challenge under state law.²⁰⁴ A lawsuit claiming that Denver's BPS law is preempted by the federal Energy Policy Conservation Act remains pending.²⁰⁵

B. Shifting Federal Policy

Recent shifts in federal policy have been an important consideration for the local governments we studied. Federal efforts to directly support the National Building Performance Standards Coalition to promote state and local BPS policies have stalled.²⁰⁶ At the time of our study, statements by the current federal administration suggesting that key federal tools, such as EPA ENERGY STAR Portfolio Manager, might be taken down were concerning to local governments that rely on such federal tools in their BPS programs, although they remain in operation as of the time of this publication.²⁰⁷ We also heard more generalized concerns from local governments that had benefited from the prior administration's explicit support of local BPS efforts, given the current administration's open hostility to local and state climate action and potential legal threats. Similarly, local governments seeking to promote climate goals by incentivizing building electrification alongside a shift toward clean energy grids expressed concern regarding the federal administration's efforts to cancel or terminate federal approvals for renewable energy projects relevant to their states.

C. Varying State Approaches and Ongoing Possibilities for Collaboration

The majority of local BPS policies that we studied are being implemented in jurisdictions that are located in states that themselves are broadly interested in reducing GHG emissions

and improving building efficiency. Still, local governments have been navigating varying—and evolving—state approaches to building decarbonization.

In some cases, such as Maryland and Colorado, state laws have expressly accommodated local BPS programs.²⁰⁸ For example, in Colorado, buildings that comply with a local program that meets sufficient standards, such as Denver’s, are deemed in compliance with the state program, provided that the buildings also report benchmarking data to the state.²⁰⁹ Local governments also have participated in state regulatory proceedings to ensure that due priority is given to local governments’ implementation of BPS laws in the development of state climate policies.²¹⁰

States can further support local BPS programs through knowledge development, cost sharing, and state investments related to building decarbonization, including workforce-related investments. One example of this last approach is Washington State’s Building Efficiency and Clean Operations Network (BEACON) Fellowship Project. This program provides training opportunities that are meant to create a network of energy service providers who can assist building owners covered by the state’s Clean Buildings Performance Standard program with compliance planning and projects.²¹¹ Many of these buildings also are covered by Seattle’s BPS, and thus have an additional source of support for their future compliance work with respect to the city’s program.

We note, however, that state policy in a number of cases has run counter to local policy goals animating BPS programs. Some local jurisdictions have had to monitor potential state efforts to preempt local BPS laws, as in the case of a bill introduced in the Missouri legislature.²¹² Meanwhile, some local

governments have had to navigate changes in the state climate policy landscape, including lagging attainment of previously set goals and reductions in future policy stringency and ambition. For example, New York City’s efforts to decarbonize buildings through its GHG-centered BPS are affected by New York State’s decisions regarding electricity supply, including how quickly the state can get renewable sources of energy online to replace the natural gas power plants that currently generate most of the city’s electricity.²¹³ New York City has mitigated the uncertainty about the pace of electric grid decarbonization for covered building owners by establishing carbon coefficients through 2034 that are invariant to the actual GHG-intensity of the electric grid.²¹⁴ In reality, though, the true scale of building-related GHG emissions, which the city’s Local Law 97 defines as including emissions from grid-supplied electricity, cannot be separated from the GHG intensity of grid-supplied electricity. Recently, New York City officials have expressed concern at the state’s “path of delayed action” toward bringing increased renewable energy resources to New York City and the state’s choices to invest in “new polluting fossil fuel infrastructure,” which the city anticipates “will make New York City less affordable, less healthy and less resilient for generations to come.”²¹⁵

D. Local Resilience

Overall, despite the variability and precarity of state policies that can either support or disrupt local BPS programs, and the broad federal retreat from building efficiency and decarbonization, not a single local jurisdiction that we studied has canceled, repealed, or meaningfully pulled back from implementing its BPS law. On the contrary, the local governments that we interviewed demonstrated a resilience and commitment

to move forward with local action to support building decarbonization and energy efficiency goals, notwithstanding the myriad challenges outside of their control. The officials that we spoke with also indicated that their practical and measured approaches toward implementation—with an emphasis on ongoing

engagement with building owners—helped to strengthen the viability and durability of their programs in the current environment.

FINDING 5: RECOMMENDATIONS

- When designing and implementing BPS laws, local governments should be prepared for changes in state and federal policy that might affect their ease of implementation. Peer-to-peer networks, such as those organized by IMT or that occur organically between cities, can help local governments share lessons learned regarding how to navigate common issues (e.g., changes in federal policy or preemption concerns).
- As policy and politics align, state governments should actively consult and coordinate with local governments with existing BPS laws and consider local BPS policies when designing state building decarbonization policies. State governments should also consider leveraging state authority—such as powers of taxation, bonding authority, or regulation of utilities—to design and implement complementary policies in support of local building decarbonization efforts, and take advantage of potential cost-sharing opportunities with local agencies.

Finding 6: Unresolved Questions of Enforcement

Finding 6 Summary: *At the time of this study, none of the jurisdictions had started enforcing BPS performance targets requiring reductions in GHGs or energy consumption. When planning for future enforcement, local governments were primarily concerned with motivating building owners to take direct and concrete actions toward energy efficiency improvements or emissions reductions.*

At the time that we conducted this study, the first wave of BPS laws were reaching their first compliance deadlines, while others have initial deadlines that are several years into the future. Some jurisdictions, such as Washington, D.C., have required buildings to take early interim steps, such as selecting a compliance pathway.²¹⁶ When we undertook this research, we did not have data about which buildings covered by the laws had met their initial BPS performance obligations according to the local governments. Therefore, it is too early to evaluate the impact of BPS laws on building-level changes in energy consumption or GHG emissions.

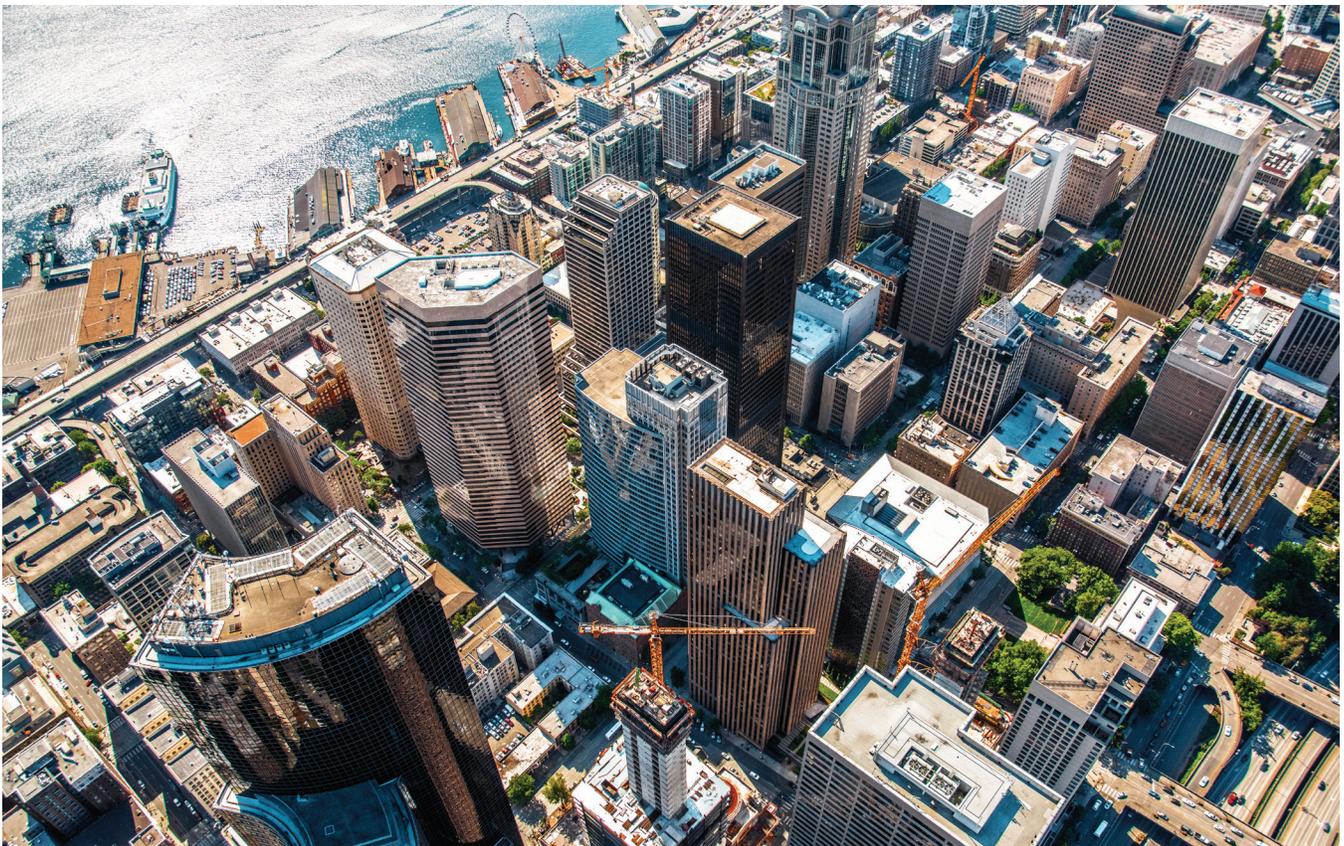
During our qualitative interviews we heard that local governments were considering potential enforcement approaches for non-compliant buildings, but that none of the jurisdictions had yet deployed an enforcement scheme involving violations or penalties for failure to meet building performance mandates (as opposed to reporting requirements). In the course of the study, we repeatedly heard that local governments were primarily concerned with motivating building owners to take direct and concrete actions toward energy efficiency improvements or emissions reductions, rather than immediately collecting penalties. This focus was reflected in the local governments' approach to flexibility mechanisms that effectively delayed or shifted the original targets, on the principle that some achievable action was better than no

action. Some local governments expressed concerns that their penalty schemes were not sufficient to motivate building owners to comply with their laws, rather than paying fines for noncompliance. A variety of enforcement approaches were being considered, including mediation with building owners to facilitate partial compliance, using building permitting authority as a lever to achieve compliance,²¹⁷ and conducting extensive building owner outreach to understand reasons for potential noncompliance.

Some jurisdictions also developed creative solutions to leverage the enforcement side of the program toward greater building decarbonization goals. For example, New York City has developed the Affordable Housing Reinvestment Fund program, which allows buildings covered by Local Law 97's Article 320 to purchase GHG offsets backed by the AHRF's building decarbonization projects in affordable housing buildings as a means of mitigating fines that Article 320 buildings may owe for excess GHG emissions.²¹⁸ It is too early to determine which enforcement strategies will best effectuate the goals of local BPS programs.

✓ FINDING 6: RECOMMENDATIONS

- Local governments should more fully define and disclose the building engagement and enforcement methods they are using, publicly track metrics for these engagement and enforcement methods, and develop data that enables their staff and members of the public to link particular engagement and enforcement methods to energy and GHG intensity reduction results.
- Local governments should provide transparent information about which buildings are in compliance, and which are not, and define what “compliance” means for that jurisdiction. In order to facilitate a better understanding of the local government’s overall implementation approach, information about whether a particular building is in compliance should be paired with data about whether that building reached compliance by following an alternative compliance pathway or through other flexibility mechanisms, such as an extension of time, application of credits, a hardship exemption, or a settlement with the local government. This data about buildings’ compliance should be paired with data about buildings’ actual emissions or energy consumption levels, on both building-specific and jurisdiction-wide scales, so that it is possible to track the effects of flexibility mechanisms on building-level and jurisdiction-level emissions and energy consumption figures.



VI. Issues for Future Consideration

There are crucial knowledge gaps concerning BPS policies that could benefit from assistance by research partners. One looming question that was raised, but left unresolved, in our study was the question of enforcement of BPS laws and the ultimate impact that BPS laws will have on GHG levels and energy consumption. Several jurisdictions that we interviewed expressed uncertainty about what enforcement of these programs would ultimately look like, and whether the laws would result in changes to buildings that would have measurable impacts on GHG levels or energy consumption, or whether building owners would opt to pay fines in lieu of taking substantive action. At the same time, the widespread use of flexibility measures and alternative compliance approaches suggests that many building owners will be able to comply with BPS laws, as they are currently being implemented, without making significant changes to their buildings or, in some cases, any changes at all. Given this picture, it is unclear what the ultimate climate or energy impacts of these laws will be. Further research on these impacts is needed as program implementation develops.

Another key area that requires further attention is how to better align BPS policies with the financial opportunities and financing capabilities of covered buildings, to help reduce buildings' costs of compliance. To accelerate building decarbonization at the local level, researchers, advocates, and local policy makers should explore ways to send clearer policy signals and increase building owners' and operators' incentives to take ambitious, concrete actions. Some advocates—notably, IMT—have recommended or are developing adjustments within the general BPS framework that could help in this regard. For example, IMT's model BPS ordinance supports basing buildings' GHG intensity calculations on on-site and district thermal energy emissions, rather than a combination of on-site emissions and electricity-related emissions,²¹⁹ and the organization is engaged in a multi-stakeholder effort to improve BPS flexibility mechanisms and alternative compliance pathways.²²⁰

However, the ongoing issue of costs that recurred throughout our study raises other unresolved questions related to BPS policies, including:

1. What drives the financial obstacles and incentives for spending on building decarbonization? What are the disincentives for regulated parties to take on debt for compliance? What external factors, such as interest rates and project costs, play a role and what can be done to bridge them?
2. What are the private and public financing resources available to covered building owners? Which of these approaches are working and which are falling short? What legal frameworks are standing in the way of financing for building decarbonization?
3. How can better integration of building financing perspectives—from both lenders and owners—unlock funding for building decarbonization? How can local governments better design and implement law and policy interventions to support sufficient financing?
4. How can considerations of costs associated with BPS programs center people equitably and ensure that cost-shifting does not harm tenants or people experiencing energy insecurity? How can policymakers balance any interventions to finance building decarbonization with measures to mitigate against “green gentrification” or displacement of low-income residents while supporting healthy and sustainable housing and neighborhoods?

More fundamentally, we note that BPS policies put the legal onus and most of the costs of building decarbonization and energy efficiency on building owners, and, by extension, potentially their tenants. Some building owners expressed dismay at expending significant capital in their buildings in the absence of strong complementary local, state, and federal policies to support climate, public health, or affordable energy policy more broadly. There also are concerns among tenant advocates about the costs that tenants might bear through higher rents or cost-shifting by building owners. Given these considerations, local governments considering BPS policies should analyze the comparative merits of BPS programs and non-BPS approaches for achieving the many benefits of reducing building emissions and energy use. These other approaches might spread the costs of improving the performance of particular buildings beyond those buildings’ owners and tenants to larger groups of people, such as electricity ratepayers, utility shareholders, or taxpayers at large. In some cases, other policy options may be less complicated for local governments to implement and for regulated parties to understand.

Other policy options that might be considered instead of, or as complements to, BPS policies include standards for appliances used in buildings. For example, zero-emission standards for buildings’ space and water heating equipment have been deployed (or are under development) in several U.S. jurisdictions.²²¹ These policies build on traditional models of air pollutant regulation that state and local governments have used to manage many stationary sources of nitrogen oxides, ozone, and particulate matter within the framework of the federal Clean Air Act, including power plant boilers and multiple types of industrial equipment.²²² Unlike BPS policies,

zero-emission equipment standards explicitly focus on a key source of buildings' negative environmental impacts, and they provide building owners with a clear prescription for action—namely, substituting non-emitting appliances for current emitting ones.²²³ Other regulatory approaches similarly might set prescriptive requirements, or compel retrofits or other energy-saving measures. However, it should be noted that owners and tenants should be centered in such approaches, as they are essential to successful implementation.

Additional approaches might consider buildings as key infrastructure that the public as a whole should bear some role in updating, and view building decarbonization as an infrastructural change necessitating a systems-wide approach to planning and funding. Along these lines, one approach could be to develop a broad and accelerated public benefit model for completing decarbonization projects, leveraging an approach governments have used to remediate other hazards, such as lead water pipes.²²⁴ To transform local building stocks on the scale needed for effective climate action, a public benefit approach would need to consider how to operate on a neighborhood or city-wide level. Such efforts might be informed by past publicly-organized energy transitions, like the one that saw New York City phase out coal-derived gas for natural gas during the 1940s and 1950s as part of an effort to remediate local smoke pollution.²²⁵

Finally, we emphasize that despite the costs, challenges, and limitations of BPS policies cataloged herein, the implementation approaches that we observed in our study demonstrate notable innovation and durability. Many of our key findings reflect an intentional approach by local governments to move at the pace of public trust, with ongoing, iterative engagement with building owners and

other affected residents and interest groups. Ultimately, the local governments that we studied were able to make meaningful strides towards implementation and avoid existential retrenchment or backlash, despite legal, fiscal, and political headwinds. We hope that our documentation of those efforts will prove useful for local governments seeking to implement new policies in a way that is engaged, adaptive, and responsive to local concerns. We offer these approaches as models worthy of consideration by local governments considering BPS laws, but also as potentially applicable to other policy interventions involving the buildings sector.



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Appendices

APPENDIX A:

Survey of Existing BPS Guidance Documents

Over the last several years, the federal government and non-profit entities have developed various resources to aid states and local governments developing and implementing BPS programs.

At the federal level, in 2022, the Biden Administration created the National BPS Coalition.²²⁶ The Coalition is made up of state and local governments committed to aligning their emission reduction goals and equity efforts, advancing BPS policies in their jurisdictions, and sharing best practices with the group.²²⁷ Participating members have received technical and financial assistance from the federal Department of Energy (DOE) and the Environmental Protection Agency (EPA). Both the DOE and EPA have also produced publicly available guidance documents with recommendations for designing a BPS policy and mitigating risks flowing from such a policy.

For example, over 2021 and 2022, EPA released its Benchmarking and Building Performance Standards Policy Toolkit.²²⁸ This resource provides an overview of benchmarking policies and how to leverage those policies to design and implement BPS programs, identifies areas of coordination between state and local governments, and highlights data access challenges that governments may face.²²⁹ In another paper, also published in 2022, EPA provided recommendations regarding the metrics that governments may use in their BPS policies.²³⁰

DOE worked with researchers at the National Renewable Energy Laboratory in 2023 to publish a guide that identifies the risks of adopting BPS policies (e.g., lack of adequate staff capacity and resources) and ways to mitigate those risks (e.g., considering the staffing of similar sized cities with BPS policies).²³¹ The agency also worked with researchers at the Lawrence Berkeley National Laboratory to create a BPS implementation guide detailing a jurisdiction's key start-up responsibilities, ongoing implementation responsibilities, and staffing considerations.²³²

In the non-profit sector, three organizations—the Institute for Market Transformation (IMT), the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), and the American Council for an Energy-Efficient Economy (ACEEE)—have been key players in advocating for the adoption of BPS policies and developing tools for their successful implementation.

IMT, for example, created a model BPS ordinance to be used by jurisdictions across the country.²³³ IMT has also created a BPS implementation guide directed at governments. This guide describes which departments will likely need to be involved in a BPS's implementation, how to set interim and final standards, and how to incorporate equity considerations into the policy.²³⁴ Recently, IMT published a report documenting best practices for integrating equity into BPS policies looking to jurisdictions that are already doing this work.²³⁵

In a study conducted by IMT, the Natural Resources Defense Council NRDC, and Elevate (2025), the authors formed a Community Advisory Committee made up of community-based organizations in Chicago and Los Angeles.²³⁶ Both cities are in the process of developing BPS policies. The authors sought to bring these groups together over six virtual sessions to discuss areas of concern relating to health and housing. They intend for their findings to be used by governments interested in adopting a BPS policy. Through their convening sessions, the authors learned that there are a few common concerns about BPS policies across the organizations. One such concern was a fear that the cost of BPS compliance could be passed on to tenants by their landlords through rent increases, potentially forcing tenants to leave or face eviction.²³⁷ Another concern is that tenants may be left without a place to live or a right to return when their landlords carry out required retrofits.²³⁸

ASHRAE published a BPS guide in 2023 directed toward local and state policymakers and the “technical stakeholders” responsible for the review and analysis of building data.²³⁹ As a research organization, ACEEE has focused its efforts on publishing reports and white papers about current trends in the development of BPS policies and the impacts of such policies on concerns such as housing affordability.²⁴⁰

Other resources for designing BPS policies include a recent study by Long et al. (2024).²⁴¹ It identifies existing data tools and sets out a workflow process that can be used by governments to prioritize investment in multi-family buildings in disadvantaged communities to enable BPS compliance.

APPENDIX B:

BPS Programs by Jurisdiction

BOSTON, MASSACHUSETTS

Benchmarking Adopted: 2013

Building Performance Standard Adopted: 2021

Buildings Covered: 5,569

Metric: GHGI

Full Time Equivalent Personnel: 8.75

FY 2026 Budget: \$542,500 (Excluding personnel costs)

In May 2013, Boston adopted the Building Emissions Reduction and Disclosure Ordinance (BERDO).²⁴² In its initial design, often referred to as “BERDO 1.0,” this ordinance was a benchmarking policy which required large buildings to report their energy and water use to the city using U.S. EPA’s ENERGY STAR Portfolio Manager.²⁴³ The city then published this data for open access to the public.²⁴⁴

In September 2021, the city adopted “BERDO 2.0.”²⁴⁵ These ordinance amendments transitioned the existing benchmarking policy to a BPS and expanded the number of buildings covered by the program. The ordinance delegates implementing power to the Environmental Department’s Air Pollution Control Commission.²⁴⁶ Rulemaking and implementation of BERDO 2.0 was developed in stages.²⁴⁷

The first phase of implementation focused on developing regulations to govern reporting requirements and data verification, with the goal of enabling reporting to begin in 2022.²⁴⁸ Phase I included significant opportunities for stakeholder input. The city hosted an informal comment period from December 20 – January 14, which included a listening session on reporting and data verification, a listening session on the draft regulations, and two public hearings.²⁴⁹ This was followed by two periods of formal public comment running from January 21 – February 11, 2022 and February 18 – March 11, 2022.²⁵⁰ The process was finalized with the adoption of the Phase I BERDO regulations on March 16, 2022.²⁵¹ These regulations defined the reporting process, including the calculation of gross floor area, building use classification, accounting for vacant spaces, obligations for requesting and reporting information from building tenants, requesting extensions, and third party data verification.²⁵²

The second phase of implementation commenced in two parallel parts. Phase 2.a focused on setting forth regulations regarding the creation and governance of a review board to oversee BERDO’s implementation; the process of changing building ownership designations and reporting for buildings in special circumstances; and development of blended emissions standards.²⁵³ Phase 2.b focused on regulations to define emissions factors and additional compliance measures, like renewable energy purchases.²⁵⁴

Both parts of Phase II included an extensive community engagement process. This included a series of “community leads” meetings (special meetings with community partners focused on aligning BERDO with environmental justice and equity goals), technical working sessions, focus groups, and public hearings.²⁵⁵

Phase II concluded with the adoption of Phase 2.a regulations on December 14, 2022²⁵⁶ and Phase 2.b regulations on January 25, 2023.²⁵⁷

These regulations also helped to effectuate the establishment of the BERDO Review Board. The BERDO Review Board is made up of nine members, including six members who must be nominated by a community-based organization, two members who may be either self-nominated or nominated by any individual or organization, and one member who must be the Chair of the Boston City Council's Environmental Justice, Resiliency, and Parks Committee or their designee.²⁵⁸ The board is empowered to review and accept or deny applications for flexibility measures, make funding decisions for the Equitable Emissions Investment Fund, issue notice of violations subject to penalty, and recommend updates to BERDO regulations and policies.²⁵⁹

The final phase of BERDO regulation development focused on compliance with emissions standards, management of building portfolios, individual compliance schedules, hardship compliance plans, the development of an investment fund, fines, enforcement, and other regulatory topics identified through prior implementation phases. Phase III began with a public engagement process including a listening session, technical working sessions, and public hearings.²⁶⁰ Phase III resulted in the adoption of regulations and policies on December 20, 2023.²⁶¹

Boston's BERDO regulations were further updated on September 17, 2025.²⁶²

CAMBRIDGE, MASSACHUSETTS

Benchmarking Adopted: 2014

Building Performance Standard Adopted: 2023

Buildings Covered: 844

Metric: GHG

Full Time Equivalent Personnel: 2.5 (+ additional consultant teams)

FY 2026 Budget: \$250,000

In July 2014, Cambridge adopted the Building Energy Use Disclosure Ordinance (BEUDO).²⁶³ In its original form, BEUDO created a benchmarking regime, requiring large buildings to report their energy and water use through the U.S. EPA's ENERGY STAR Portfolio Manager. The city then published this data for open access to the public.²⁶⁴

Subsequently, Cambridge began a multi-year period of public outreach and policy research to determine its next step.²⁶⁵ From 2015 to 2022, the city spoke with residents, businesses, and advocates while constructing a proposal for BEUDO amendments.²⁶⁶ These amendments, adopted in June 2023, introduced BEUDO's BPS component, requiring large, non-residential buildings to reduce GHG emissions over time.²⁶⁷ The ordinance delegates implementing power to the Cambridge Community Development Department.²⁶⁸

The development of regulations for BEUDO was broken into three phases:

- Phase I: Emissions and Renewable Energy Offset Calculations (June 2023 – December 2024).
- Phase II: Defining Property Types, Procedures for New and Renovated Properties, and Third Party Verification (May 2025 – August 2025).
- Phase III: Grouping Buildings as Campuses, Procedures for BEUDO Review Board, and Hardship and Deferral Cases (Fall 2025 – Ongoing).

CHULA VISTA, CALIFORNIA

Benchmarking Adopted: 2021

Building Performance Standard Adopted: 2021

Buildings Covered: 600²⁶⁹

Metric: ENERGY STAR Score (or site EUI if building is not eligible for an ENERGY STAR Score)

Full Time Equivalent Personnel: 3.25 (+0.25 for a consultant)

FY 2026 Budget: \$405,000

In 2021, Chula Vista adopted a local ordinance which served two purposes: 1) building upon the state's existing benchmarking program, and 2) establishing a new building performance standard.²⁷⁰ The benchmarking component requires that covered buildings (25,000 square feet or greater) annually report energy use using the U.S. EPA's ENERGY STAR Portfolio Manager.²⁷¹ The BPS component of the ordinance focuses on improving energy efficiency over time, by setting an increasing target based on a baseline ENERGY STAR Score.²⁷²

Chula Vista is currently undergoing a further amendment process and updating related regulations with the goals of making requirements less cumbersome for building owners, increasing data quality, better aligning with best practices, improving compliance rates, and giving building owners more time to comply. These updated regulations are scheduled to go into effect for the 2026 compliance cycle.

DENVER, COLORADO

Benchmarking Adopted: 2016

Building Performance Standard Adopted: 2021

Buildings Covered: 3,156

Metric: Site EUI

Full Time Equivalent Personnel: 6 (+14 contractors)

FY 2026 Budget: \$8,250,000

In 2015, Denver established the Energize Denver Task Force to develop recommendations for the creation of a benchmarking regime.²⁷³ After undertaking a public input process, the taskforce released a set of recommendations in 2016.²⁷⁴ The city adopted its Energize Denver ordinance in December 2016, which established benchmarking requirements.²⁷⁵ In March 2017, the Denver Department of Public Health and Environment's Climate Team adopted the first set of regulations to implement the benchmarking program.²⁷⁶

Further public engagement processes continued in the following years. In 2019 to 2020, the city's Climate Action Task Force developed a set of recommendations based on public feedback which included a BPS policy.²⁷⁷

In 2021, the city set up another Energize Denver Task Force, this time comprising community members and building industry representatives.²⁷⁸ This subsequent Energize Denver Task Force conducted a community engagement process to receive feedback on its draft recommendations from July 19-25, 2021, including two briefings on the draft recommendations hosted by the city as well as an industrial and manufacturing discussion with relevant stakeholders from those sectors. Energize Denver Task Force members also held briefings, discussions, and collected written input from the stakeholders they represented. The city also published a survey to collect wider community input during this time.²⁷⁹ The Task Force released a set of recommendations in August 2021 which included requiring a 30% improvement in energy performance for buildings 25,000 square feet or larger by 2030; a set of proposed alternate compliance pathways; and prescriptive upgrades for buildings between 5,000 and 25,000 square feet.²⁸⁰ These recommendations informed the creation of the Energize Denver amendments (Energize Denver V2), which was adopted in November 2021 and created Denver's BPS program.²⁸¹

Energize Denver V2 designated the newly created Office of Climate Action, Sustainability, and Resiliency (CASR) as the implementing agency of both the benchmarking and BPS programs.²⁸² CASR held an informal public briefing regarding the ordinance in December 2021 and a formal public hearing in January 2022.²⁸³ The first set of rules and regulations for the BPS program were adopted during this hearing.²⁸⁴ CASR's building performance team conducted further stakeholder engagement to inform these rules from April to August 2022.²⁸⁵ After this public engagement process, the city developed technical guidance, which included standardization of targets, increasing access to timeline adjustments and amendments to the application requirements, inclusion of electrification credits, creation of additional alternate compliance pathways, reassignment of building types, and creation of an appeal mechanism for enforcement notices.²⁸⁶

From March to October 2022, CASR's building team conducted additional stakeholder engagement focused specifically on "Equity Priority Buildings," which serve climate vulnerable communities.²⁸⁷ The city then established a compliance assistance program for Equity Priority Buildings 25,000 square feet or larger.²⁸⁸ This program supports owners of Equity Priority Buildings with completing accurate benchmarking, developing retrofit plans and lifecycle cost analysis, assistance in applying for funding and other incentives or resources, and financial support.²⁸⁹

These changes were captured in a new set of rules and regulations which were adopted in November 2022.²⁹⁰

In March 2023, CASR undertook community engagement related to rules addressing manufacturing, agricultural, and industrial buildings over 25,000 square feet.²⁹¹ From October 2022 to March 2023, CASR also undertook outreach with owners of buildings ranging from 5,000 to 24,999 square feet.²⁹² This public engagement process led to another update to the rules and regulations, which were adopted in the summer of 2023.²⁹³ This rulemaking addressed an alternate compliance pathway for manufacturing, agricultural, and industrial buildings as well as small buildings; added new timeline adjustment options; and created additional resources and compliance guides in multiple languages.²⁹⁴

Further updates to the rules were adopted in April 2025, which created a flexibility measure to extend the timeline for compliance to 2032 and adjusted interim compliance deadlines, provided additional timeline extension options and accompanying eligibility criteria, created a compliance hold option, adjusted performance requirements for condos and homeowners associations to better align with capital improvement schedules, reduced penalty rates, and strengthened appeal mechanisms among other changes.²⁹⁵ Concurrent with its rulemaking, Denver has issued various Technical Guidance manuals to building owners, with further details on prescriptive requirements, compliance pathways, alternate compliance options, penalties and enforcement, an appeals process, and various templates for audits, applications, and reporting requirements. The most recent versions were issued in April 2025.²⁹⁶

MONTGOMERY COUNTY, MARYLAND

Benchmarking Adopted: 2014

Building Performance Standard Adopted: 2022

Buildings Covered: 1887

Metric: Site EUI

Full Time Equivalent Personnel: 5.5

FY 2026 Budget: ~\$700,000 (excluding personnel costs)

In 2014, Montgomery County adopted a Building Benchmarking Law.²⁹⁷ This law requires covered buildings to annually report their energy and water use through the U.S. EPA ENERGY STAR Portfolio Manager and also established a Benchmarking Work Group to create recommendations for the implementation of the law.²⁹⁸

In 2021 and 2022, Montgomery County undertook research and community engagement to develop a BPS policy.²⁹⁹ The county held a public hearing on the original bill and joined the White House Council on Environmental Quality's National BPS Coalition.³⁰⁰ The Building Energy Use and Benchmarking and Performance Standards ordinance was adopted thereafter on May 2, 2022.³⁰¹

The law established a formal advisory board, the Building Performance Improvement Board, made up of 15 voting members who advise on implementation of BEPS.³⁰² In 2023, the county began its public engagement process to support the development of regulations. This included a public comment period on draft executive regulations in November 2023, as well as a series of work sessions, focused on discussions with stakeholders.³⁰³ During this period, the deadline for adopting regulations was extended.³⁰⁴

After modifying the proposed regulations based on the community engagement process, final regulations were adopted on February 25, 2025.³⁰⁵

NEW YORK, NEW YORK

Benchmarking Adopted: 2009

Building Performance Standard Adopted: 2019

Buildings Covered: 26,982

Metric: GHGI

Full Time Equivalent Personnel: Implementation is managed by the Department of Buildings' Sustainability Bureau, which staffs 111 positions.

FY 2026 Budget: Unavailable

In December 2009, New York City adopted Local Law 84.³⁰⁶ This local law requires covered buildings to annually report their energy and water usage through the U.S. EPA's ENERGY STAR Portfolio Manager.³⁰⁷

In April 2019, the city adopted Local Law 97, which established New York City's BPS policy.³⁰⁸ The local law empowers the Department of Buildings to act as the implementing agency. In December 2019, pursuant to Local Law 97, the city appointed a 16-member Climate Advisory Board, which established eight climate working groups to develop recommendations to guide the rulemaking process.³⁰⁹

In July 2019 and September 2020, the City Council made technical amendments to Local Law 97.³¹⁰ In November 2020, the local law was further amended to limit the scope of the prescriptive pathway open to affordable housing (buildings with 35 percent or fewer rent-regulated units were not eligible for prescriptive requirements in lieu of carbon caps).³¹¹

Beginning in 2021, the Department of Buildings began publishing resources to support regulated parties' compliance, including a GHG reporting website, guidelines for adjustment, an excel workbook to support calculations, and clarification guidelines for certain types of affordable housing.³¹²

In October 2022, the Department of Buildings released proposed rules for Local Law 97's implementation as well as a list of covered buildings.³¹³ Following an extensive public engagement process, including over 300 Advisory Board and Working Group meetings with more than 100 stakeholders,³¹⁴ the city adopted its first set of final rules.³¹⁵ This rulemaking provided further clarity in defining property types, set a carbon coefficient for 2030, and added emissions limits for future compliance periods and parameters for the use of renewable energy credits.

In September 2023, the Department of Buildings released a new set of proposed rules which included the offering of a new credit for beneficial electrification and defined criteria for determining mitigated penalties. Final rules were promulgated in December 2023.³¹⁶

In the same year, the Mayor's Office also launched "Getting 97 Done," a comprehensive plan to support Local Law 97's Implementation.³¹⁷ This plan focused on identifying and targeting financing for retrofits, providing technical knowledge through the NYC Accelerator, implementing enforcement mechanisms, and working with the state to decarbonize centralized systems.

In September 2024, the Department of Buildings proposed a third set of rules, focusing on a program to support affordable housing retrofits and clarifying adjustments for financially constrained buildings. These rules were promulgated in December 2024.³¹⁸

SEATTLE, WASHINGTON

Benchmarking Adopted: 2010

Building Performance Standard Adopted: 2023

Buildings Covered: N/A

Metric: GHGI kgCO₂e

Full Time Equivalent Personnel: 7 (+3 Additional Staff)

FY 2026 Budget: \$7,000,000

In 2010, Seattle passed the Energy Disclosure Ordinance, establishing a local benchmarking program.³¹⁹ This ordinance requires covered buildings to report their energy and water use through the U.S. EPA's ENERGY STAR Portfolio Manager.³²⁰

In December 2023, Seattle adopted a Building Emissions Performance Standard (BEPS) ordinance.³²¹ This ordinance established the city's BPS policy, setting forth GHG emissions targets that covered buildings would be required to meet over 20 to 30 years.³²²

From July 2024 to April 2025, Seattle’s Office of Sustainability & Environment conducted a series of technical working group meetings as well as focused topical meetings to develop the details of the BEPS program.³²³ These processes resulted in the development of a draft rule, which was released on June 17, 2025.³²⁴ The public comment period continued until July 9, 2025.³²⁵ The final rule was published December 8, 2025.³²⁶

The second rulemaking process is required by the BEPS Ordinance to take place no later than December 31, 2027.³²⁷

ST. LOUIS, MISSOURI

Benchmarking Adopted: 2017

Building Performance Standard Adopted: 2020

Buildings Covered: 497

Metric: Site EUI

Full Time Equivalent Personnel: 3

FY 2026 Budget: Unavailable

In 2017, St. Louis adopted a benchmarking program under its Building Energy Awareness ordinance.³²⁸ This ordinance requires covered buildings to report their energy and water use through the U.S. EPA’s ENERGY STAR Portfolio Manager.³²⁹

In 2020, the city passed a Building Energy Performance Standards law, which established a Building Energy Improvement Board to support implementation of the program.³³⁰ This board includes nine members appointed by the Mayor, six of whom must be residents of the City of St. Louis and three of whom must be residents of the St. Louis region.³³¹

This Board began its implementation process during its first meeting in September 2020.³³² This process included drafting its performance standards throughout 2020 and a public engagement period in Spring 2021. The standards were approved in May 2021.³³³

WASHINGTON, D.C.

Benchmarking Adopted: 2008

Building Performance Standard Adopted: 2018/2019

Buildings Covered: 1,896

Metric: ENERGY STAR Score (or source EUI if building is not eligible for an ENERGY STAR Score)

Full Time Equivalent Personnel: 12

FY 2026 Budget: ~ \$1,000,000 - \$1,200,000

Washington, D.C. was the first jurisdiction in the U.S. to pass an energy benchmarking law. D.C.'s benchmarking program was established by the Clean and Affordable Energy Amendment Act, approved by Congress in 2008.³³⁴ This local law requires covered buildings to report their energy and water usage through the U.S. EPA's ENERGY STAR Portfolio Manager annually.³³⁵

In 2018, Washington, D.C. enacted the Building Energy Performance Standard Program (BEPS), which was approved by Congress in 2019.³³⁶ This local law requires covered buildings to improve their ENERGY STAR Score (or source EUI, for buildings that cannot receive ENERGY STAR scores) over time.³³⁷ The law empowers the Department of Energy and Environment to act as the implementing agency and requires the establishment of a BEPS Task Force to oversee implementation.³³⁸

To support implementation planning, the law also required that the District engage an independent third party to conduct a study of the cost and benefits and provide case studies.³³⁹ It additionally ordered that the Department of Energy and Environment publish a report assessing whether the BPS should be amended to regulate GHGI rather than energy efficiency.³⁴⁰ Both of these studies were published in early 2022.³⁴¹

In June 2019, Washington, D.C. began an extensive public engagement process to guide its rulemaking. In June 2019, the Department of Energy and Environment created several working groups focused on topics including program structure and implementation, financial incentives and funding, technical assistance and training, and energy efficiency strategies.³⁴² Each of these working groups was open to the public. During this time, the Department of Energy and Environment also collaborated with the National Housing Trust and Housing Association of Nonprofit Developers to hold specialized working groups for the affordable housing industry.³⁴³ Feedback from affordable housing stakeholders led Washington, D.C. to create a staff position in 2020 that focused specifically on providing compliance assistance to affordable housing building owners.³⁴⁴

The BEPS Task Force was convened in December 2019 and continues to hold meetings open to the public.³⁴⁵

After soliciting public feedback, Washington, D.C. completed its initial rulemaking for the BEPS program establishing initial performance targets and adding key definitions in 2021.³⁴⁶

In October 2021, D.C. adopted a new rulemaking for its benchmarking program, requiring building owners to undergo third party verification every three years to ensure the quality of their benchmarking data.³⁴⁷ Washington, D.C. also published a draft BEPS Compliance and Enforcement Guidebook for Compliance Cycle 1 on June 18, 2021 and solicited public comments on this draft, followed by a final version that incorporated public feedback.³⁴⁸ D.C. is currently receiving comments on a proposed v1.2 of its BEPS Compliance and Enforcement Guidebook.

On November 5, 2021, D.C. completed further rulemaking for the BEPS Program.³⁴⁹ This rulemaking focused on streamlining the process for building owners to request certain compliance pathways, expanded the criteria for compliance delays and exemptions, and simplified the process for penalty calculations.³⁵⁰ A subsequent set of rules addressing definitions for Class 1, Class 2, and Class 3 infractions were adopted on November 23, 2022.³⁵¹

In 2025, the authorizing law for the BEPS program was further amended by the Council of the District of Columbia.³⁵² The amendments adjusted the timeline for upcoming compliance cycles, moving the start date for the second compliance cycle from 2027 to 2028, and the start of the third compliance cycle to 2034; moved back the annual benchmarking reporting deadline; changed third party benchmarking data verification requirements to be due every six years instead of every three years; created new exemptions for buildings in financial distress; established a new compliance pathway; and codified the one-year delay of compliance due to the COVID-19 pandemic, which was initially done through rulemaking.³⁵³

APPENDIX C:

Quantitative Analysis Supplement

This Appendix 1) identifies the sources of data for the quantitative analyses in the body of the report, and 2) includes supplementary figures showing building performance three years before, and three years after, adoption of BPS policies in the four cities studied quantitatively.

Table C1: Data Sources Used in Quantitative Analysis by Jurisdiction

Data Type	Name	Description	Date Acquired
Boston, MA			
Covered Building List	BERDO Covered Building List ³⁵⁴	Available from the BERDO website, contains the list of properties covered by BERDO and includes BERDO ID, tax parcel ID, and property address.	August 27 th , 2025
2023 Benchmarking Data	2024 Reported Energy and Water Metrics ³⁵⁵	Available from Analyze Boston open data platform, contains building characteristics, energy performance information, and pathway.	August 27 th , 2025
Standards	CO ₂ e Emissions Standards by Building Use ³⁵⁶	Annual emission factors reported in BERDO Ordinance used for calculations of the building-specific standards.	August 27 th , 2025
GHG Conversion Factors	BERDO Emissions Factors List ³⁵⁷	GHG emission factors used for future emissions calculations.	August 27 th , 2025
<u>Auxiliary</u> : Land Use	Parcels (2024) ³⁵⁸	Land use geometry used to obtain geographical coordinates.	August 27 th , 2025
Denver, CO			
2023 Benchmarking Data	Energize Denver 2023 Final Master Dataset ³⁵⁹	Standalone dataset containing, in addition to basic property information, both the property energy performance, targets, and compliance status.	August 1 st , 2025*
New York City, NY			
Covered Building List	Local Law 97 Covered Buildings (CY 2025) ³⁶⁰	Available from LL97 website the CBL provides an up-to-date list of the properties required to comply with the LL97 law, along with parcel ID (BBL), building ID, (BIN), address, and respective pathway.	July 10 th , 2025
2023 Benchmarking Data	NYC Building Energy and Water Data Disclosure for Local Law 84 (2022-Present) ³⁶¹	Data reporting annual energy and water consumption in 2023 of the largest properties in NYC, along with the breadth of other building-level information collected via the EPA's Portfolio Manager website.	July 22 nd , 2025

Data Type	Name	Description	Date Acquired
Standards	Emission Factors by Occupancy Group ³⁶²	Annual emission factors reported in 1 RCNY § 103-14 used for calculations of the building-specific standards.	July 10 th , 2025
GHG Conversion Factors	Emission Coefficients ³⁶³	GHG coefficients from 1 RCNY § 103-14 were used for CY24 and CY30 calculations, and for CY35 and CY40 from Local Law 97: Calculating Building Emissions & Emission Limits presentation. ³⁶⁴	July 10 th , 2025
Washington, D.C.			
Covered Building List	Building Energy Performance ³⁶⁵	This dataset is used by the DOEE as a disclosure of public and private building energy performance under the BEPS Program and is available through Open Data DC platform.	July 27 th , 2025
2023 Benchmarking Data	Building Energy Benchmarking ³⁶⁶	Data tracking buildings' annual energy and water use required by The Clean and Affordable Energy Act of 2008 available through Open Data DC platform.	July 27 th , 2025
Standards	2021 Building Performance Standards ³⁶⁷	Standards established for the 1st cycle of BEPS obtained from Building Performance Helpdesk Knowledgebase platform.	July 27 th , 2025

Supplementary Figures Showing Building Performance Three Years Before and After BPS Adoption Until 2023

Figures X, X1, and X2 show a breakdown of the data presented in Figure 4 (Section IV.C, above) for all property types.

Figure X shows, for multifamily housing, building performance three years pre-BPS adoption and post-adoption until 2023. For each jurisdiction, Marron used publicly available data to estimate the level of GHG emissions or energy efficiency, as applicable, in the buildings covered by the BPS law at the time the BPS law was adopted and three years prior. Marron then tracked any changes in GHG emissions or energy efficiency to date. Available data are up to calendar year 2023.

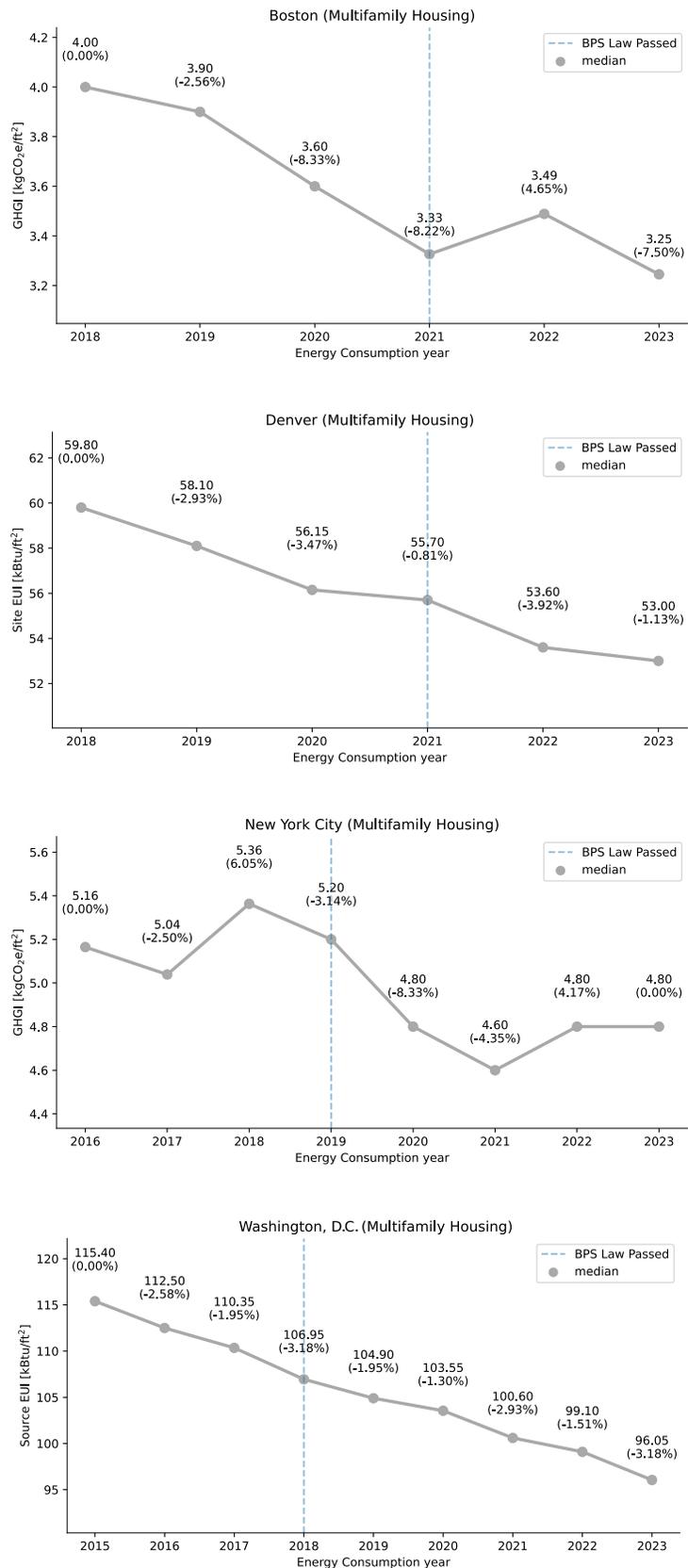


Figure C1. Building performance for three years pre-BPS adoption and post-adoption, for multifamily housing

Figure X1 shows, for offices, building performance three years pre-BPS adoption and post-adoption until 2023. For each jurisdiction, Marron used publicly available data to estimate the level of GHG emissions or energy efficiency, as applicable, in the buildings covered by the BPS law at the time the BPS law was adopted and three years prior. Marron then tracked any changes in GHG emissions or energy efficiency to date. Available data are up to calendar year 2023.

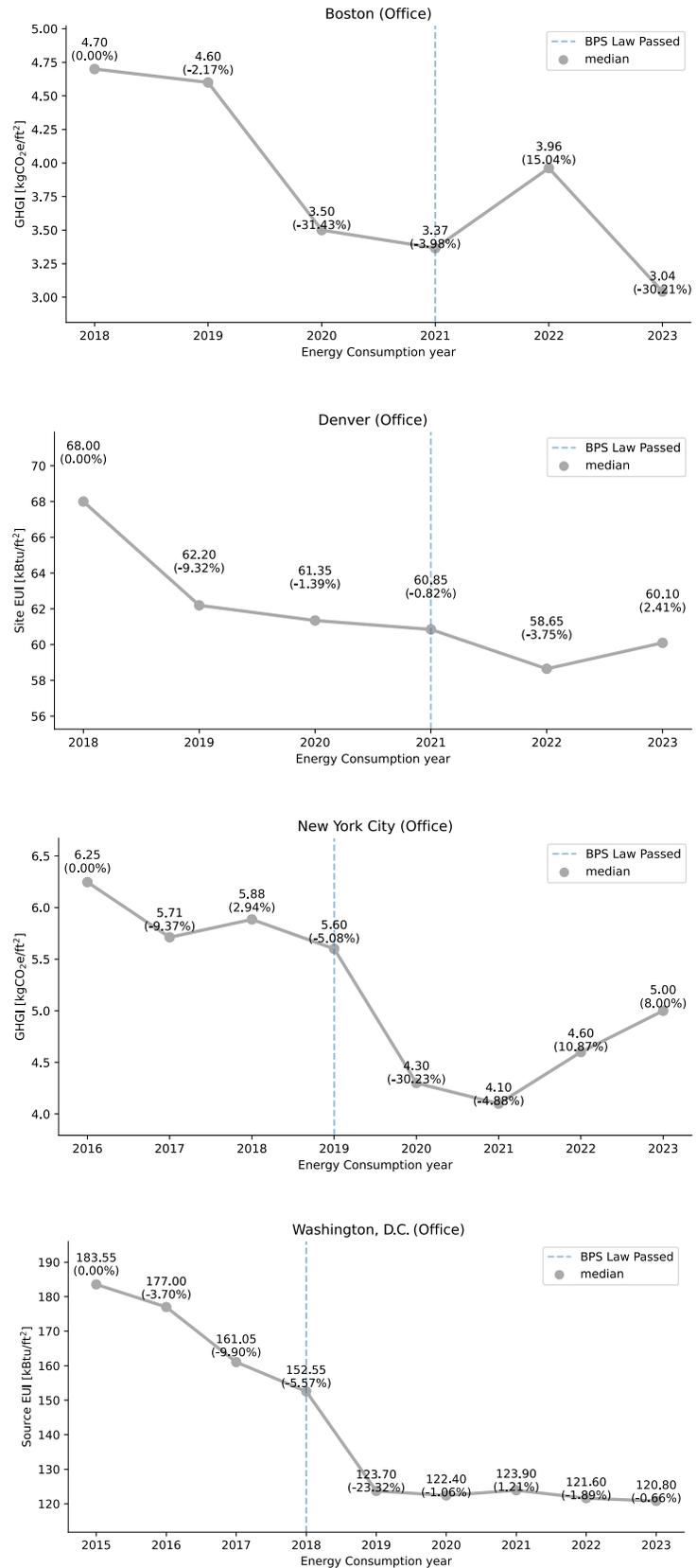


Figure C2. Building performance for three years pre-BPS adoption and post-adoption, for offices

Figure X2 shows, for “other” buildings, building performance three years pre-BPS adoption and post-adoption until 2023. For each jurisdiction, Marron used publicly available data to estimate the level of GHG emissions or energy efficiency, as applicable, in the buildings covered by the BPS law at the time the BPS law was adopted and three years prior. Marron then tracked any changes in GHG emissions or energy efficiency to date. Available data are up to calendar year 2023. “Other” buildings are all other covered building types excluding multifamily residential and office buildings.

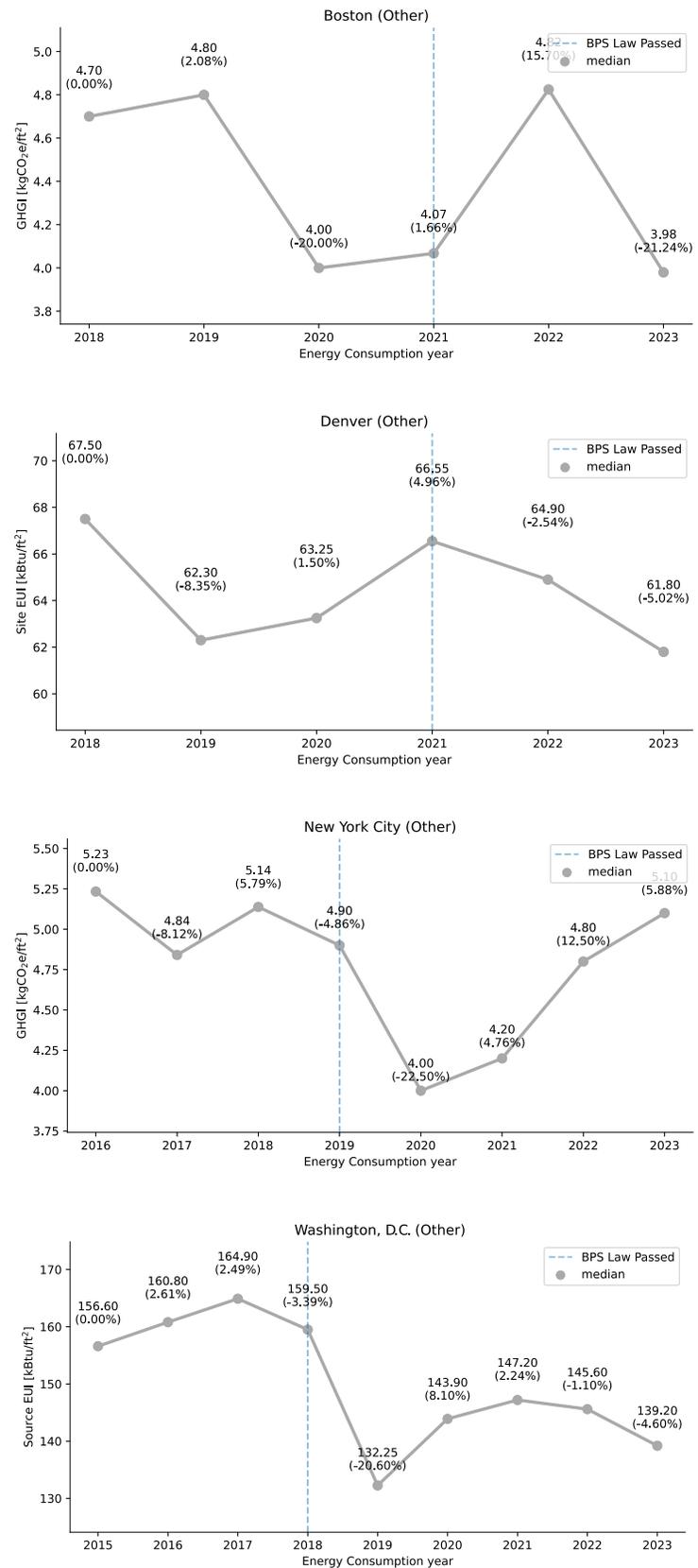


Figure C3. Building performance for three years pre-BPS adoption and post-adoption, for other buildings

The table below shows all data (in units indicated) used in Figures 4, X, X1, and X2, as well as calculated changes in performance year-to-year, in the pre-BPS adoption period, in the post-adoption period, and for all available data. The table includes GHG emissions (GHGI) or energy efficiency (site or source EUI), as applicable.

Table C2: Summary of building performance for three years pre-BPS adoption and post-adoption

City / Property Type	Pre-BPS					BPS	Post-BPS							Pre-BPS to 2023
	-3 years	-2 years	-1 year	Mean YoY % change	Total % change		+1 year	+2 years	+3 years	+4 years	+5 years	Mean YoY % change	Total % change	
Boston						2021								
All	4.40	4.40	3.70	-5.57%	-16.58%	3.67	4.00	3.29				-4.43%	-10.45%	-25.30%
Multifamily Housing	3.90	3.90	3.50	-4.99%	-14.48%	3.34	3.43	2.97				-5.24%	-10.87%	-23.78%
Office	4.70	4.60	3.50	-9.89%	-28.22%	3.37	3.97	3.06				-2.62%	-9.35%	-34.93%
Other	4.90	5.00	4.10	-3.61%	-12.04%	4.31	5.09	4.09				-0.78%	-5.11%	-16.53%
Denver						2021								
All	63.80	60.20	59.50	-2.10%	-6.27%	59.80	58.55	57.65				-1.81%	-3.60%	-9.64%
Multifamily Housing	59.80	58.10	56.15	-2.33%	-6.86%	55.70	53.60	53.00				-2.44%	-4.85%	-11.37%
Office	68.00	62.20	61.35	-3.57%	-10.51%	60.85	58.65	60.10				-0.57%	-1.23%	-11.62%
Other	67.50	62.30	63.25	-0.32%	-1.41%	66.55	64.90	61.80				-3.63%	-7.14%	-8.44%
New York City						2019								
All	5.27	5.06	5.37	-0.33%	-1.30%	5.20	4.70	4.50	4.80	4.90		-1.28%	-5.77%	-6.99%
Multifamily Housing	5.16	5.04	5.36	0.32%	0.68%	5.20	4.80	4.60	4.80	4.80		-1.88%	-7.69%	-7.06%
Office	6.25	5.71	5.88	-3.46%	-10.35%	5.60	4.30	4.10	4.60	5.00		-1.74%	-10.71%	-19.95%
Other	5.23	4.84	5.14	-2.00%	-6.38%	4.90	4.00	4.20	4.80	5.10		1.79%	4.08%	-2.56%
Washington, D.C.						2018								
All	149.00	148.35	139.40	-3.97%	-11.54%	131.80	115.30	116.30	114.90	112.30	111.00	-3.26%	-15.78%	-25.50%
Multifamily Housing	115.40	112.50	110.35	-2.50%	-7.32%	106.95	104.90	103.55	100.60	99.10	96.05	-2.12%	-10.19%	-16.77%
Office	183.55	177.00	161.05	-5.95%	-16.89%	152.55	123.70	122.40	123.90	121.60	120.80	-4.25%	-20.81%	-34.19%
Other	156.60	160.80	164.90	0.65%	1.85%	159.50	132.25	143.90	147.20	145.60	139.20	-2.29%	-12.73%	-11.11%

APPENDIX D:

List of Interviewees From Qualitative Analysis

Between November 2024 and November 2025, the Guarini Center conducted 46 interviews as part of the qualitative research portion of this study. Interviewees included: 1) programmatic officers and staff from local governments with BPS laws or considering BPS laws; 2) state officials; and 3) non-governmental interviewees, including real estate industry representatives, building owners and developers, people involved in national and regional building decarbonization coalitions, technical experts, environmental and environmental justice advocates, and housing affordability advocates and experts. The following individuals and entities have granted their permission to be listed here as interviewees:

Barry Abramson, PE, LEED AP O+M
Principal, Servidyne

Rokas Beresniovas
Head of Partnerships and Business
Development, Montgomery County Green Bank

Lane Burt, PE
Managing Principal, Ember Strategies

City of Cambridge, MA

Andrew Chintz
Financing Specialist, NYC Accelerator

City of Chula Vista, CA

Stephanie Co
Board Member, Building Energy Improvement
Board, City of St. Louis, MO

Department of Environmental Protection
Montgomery County, MD

Claudia Diezmartínez, Ph.D.
Policy and Equity Advisor, City of Boston
Environment Department

Berenice El Gharamti
Buildings Equity Administrator, Office of
Climate Action, Sustainability, and Resiliency,
City and County of Denver, CO

Hessann Farooqi
Executive Director, Boston Climate Action
Network, Boston, MA

Cristine Gibney, LEED AP O+M
Energy Program Analyst, Building Performance
& Enforcement Branch, Data & Benchmarking
Division, District of Columbia Department of
Energy & Environment

Chris Halfnight
COO and Incoming CEO, Urban Green Council,
New York, NY

Adam Hinge
Managing Director, Sustainable Energy
Partnerships

Geoff Hurst

Dr. Sharon Jaye
Building Performance Policy Manager, Office of
Climate Action, Sustainability and Resiliency,
City and County of Denver, CO

Cliff Majersik

Senior Advisor, Institute for Market Transformation (IMT)

Sandra Mallory

Acting Buildings & Energy Director, Office of Sustainability & Environment, City of Seattle, WA

Danielle Manley

Associate Director, Policy, Urban Green Council, New York, NY

Sadie McKeown

President, The Community Preservation Corporation, New York, NY

Katarína Michalová

Program Manager II, Office of Building Performance, City of St. Louis, MO

New York City Energy Efficiency Corporation

New York, NY

Mark Orlowski

Founder & Executive Director, Sustainable Endowments Institute and Organizer, BPS Working Group

Rebecca Poole

Director of Membership and Communication, Council of New York Cooperatives & Condominiums (CNYC)

Laura Popa

Deputy Commissioner of Sustainability, New York City Department of Buildings

Derek Valenti

Building Performance Program Administrator, Office of Climate Action, Sustainability, and Resiliency, City and County of Denver, CO

Mary Wambui

Director of Asset Management, Energy & Residents, Planning Office for Urban Affairs, Boston, MA

Brooks Winner

Building Decarbonization Program Manager, City of Boston Environment Department

Endnotes

- ¹ In some cities, BPS laws do not require buildings to meet BPS compliance targets until after 2025. Even in cities where buildings have had to meet targets beginning in 2025 (based on reported 2024 building data), the process of verifying compliance may still be underway.
- ² In New York City, implementation is managed by the Department of Buildings' Sustainability Bureau, which has 111 positions. New York also has significantly more buildings to regulate than other jurisdictions.
- ³ Energy use in buildings comes mainly from equipment used to meet occupants' space heating, cooling, hot water, ventilation, and lighting. See "Energy Use In Homes," U.S. Energy Information Administration, <https://www.eia.gov/energyexplained/use-of-energy/homes.php> (last updated Dec. 18, 2023); "Energy Use In Commercial Buildings," U.S. Energy Information Administration, <https://www.eia.gov/energyexplained/use-of-energy/commercial-buildings.php> (last updated Jun. 29, 2023). For more information on how buildings use energy and their emissions impacts, see Eric Wilson, U.S. Department of Energy, "Buildings Technology Innovation Opportunities Dashboard," <https://public.tableau.com/app/profile/ericjhwilson/viz/GraphicsforTechInnovationOppforUSBuildingsSector/EnergyGHGmissions>.
- ⁴ "Total U.S. Greenhouse Gas Emissions by Economic Sector in 2022," U.S. Environmental Protection Agency, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions> (last visited Oct. 26, 2025) (reflecting that residential and commercial buildings are the source of 31% of U.S. emissions, when indirect emissions from electricity are taken into account).
- ⁵ Danielle Spiegel-Feld, *Frontiers in Regulating Building Emissions: An Agenda for Cities*, 47 WM. & MARY ENV'T L. & POL'Y REV. 103, 104, N.5 (2022), <https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=1831&context=wmelpr>.
- ⁶ See e.g., City of Boston, "What is BERDO?" <https://www.boston.gov/departments/environment/berdo>; City of Denver, "Energize Denver Building Performance Policy," <https://denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Climate-Action-Sustainability-and-Resiliency/Cutting-Denvers-Carbon-Pollution/Efficient-Commercial-Buildings/Denver-Building-Regulations/Energize-Denver-Building-Performance-Policy>. See also Marshall Duer-Balkind et al., Institute for Market Transformation, LESSONS FROM THE GROUND: IMPLEMENTING BUILDING PERFORMANCE STANDARDS 2 (2024), https://imt.org/wp-content/uploads/2024/08/9-0815_1216_000796-Duer-Balkind.pdf.
- ⁷ Institute for Market Transformation, Natural Resources Defense Council & Elevate, COMMUNITY HEALTH PRIORITIES AND BUILDING PERFORMANCE POLICIES (2025), <https://imt.org/wp-content/uploads/2025/04/BPS-and-Community-Priorities.pdf>.
- ⁸ Since we began this study, three further local governments—Newton, Massachusetts, Evanston, Illinois, and West Hollywood, California—have adopted BPS ordinances. Building Emissions Reduction and Disclosure Ordinance, City of Newton, Mass. Ord. No. C-55 (Jan. 8, 2025), <https://www.newtonma.gov/home/showdocument?id=125861>; Healthy Buildings Ordinance, City of Evanston, Ill. Ord. No. 1-O-25 (Mar. 14, 2025), <https://www.cityofevanston.org/home/showpublisheddocument/100290/638820609699870000>; West Hollywood, Cal. Ord. No. 25-20 (Dec. 1, 2025), <https://ecode360.com/WE5031/laws/LF2547205.pdf>. In addition, Aspen, Colorado has provided a framework for the future adoption of a BPS policy. See Aspen, Colo. Mun. Code § 8.60.120 (providing that Aspen's "Department of Environmental Health and Sustainability shall develop proposed building performance standard guidelines to be considered and adopted by City Council by ordinance," subject to certain criteria).
- ⁹ State-level BPS policies have been adopted in Washington, Oregon, Colorado, and Maryland. See Wash. Rev. Code §§ 19.27A.200–19.27A.250 (providing for Clean Building Performance Standard program); Wash. Admin. Code ch. 194-50 (2024) (regulations implementing Clean Building Performance Standard program); Or. Rev. Stat. §§ 469.275–469.291 (providing for Building Energy Performance Standards program); Or. Admin. R. §§ 330-300-0000–330-300-0170 (regulations implementing Building Energy Performance Standards program); Colo. Rev. Stat. §§ 24-38.5-112, 25-7-142 (providing, in relevant part, for adoption and implementation of a building performance standards program); Code Colo. Regs. § 1001-32 (2023) (implementing benchmarking and BPS programs); Md. Code Ann., Env't. § 2-1602 (providing for development of Building Energy Performance Standards program); Md. Code Regs. §§ 26.28.01.01–26.28.04.03 (2024) (implementing Building Energy Performance Standards program). At the federal level, a BPS policy was adopted under President Biden "to reduce scope 1 on-site fossil fuel use in Federal buildings and facilities," and "set[] a goal for

30 percent of each agency's Federal buildings, measured by square footage, to achieve zero scope 1 emissions from on-site fossil fuel use through building electrification." Council on Environmental Quality, THE FEDERAL BUILDING PERFORMANCE STANDARD 3 (DEC. 2022), <https://www.sustainability.gov/pdfs/federal-building-performance-standard.pdf>; see also The White House, FACT SHEET: Biden-Harris Administration Announces First-Ever Federal Building Performance Standard, Catalyzes American Innovation to Lower Energy Costs, Save Taxpayer Dollars, and Cut Emissions (Dec. 7, 2022), <https://bidenwhitehouse.archives.gov/briefing-room/statements-releases/2022/12/07/fact-sheet-biden-harris-administration-announces-first-ever-federal-building-performance-standard-catalyzes-american-innovation-to-lower-energy-costs-save-taxpayer-dollars-and-cut-emissions/>.

- 10 See "Map: National BPS Coalition Participating Jurisdictions," Institute for Market Transformation, <https://imt.org/resources/map-national-bps-coalition-participating-jurisdictions/> (last updated Nov. 2025) (reflecting both jurisdictions that have adopted BPS policies and jurisdictions that have made a commitment to adopt BPS policies).
- 11 In some cities, BPS laws do not require buildings to meet BPS compliance targets until after 2025. Even in cities where buildings have had to meet targets beginning in 2025 (based on reported 2024 building data), the process of verifying compliance may still be underway.
- 12 In New York City, implementation is managed by the Department of Buildings' Sustainability Bureau, which has 111 positions. New York also has significantly more buildings to regulate than other jurisdictions.
- 13 See, e.g., National Housing Trust & Housing Association of Nonprofit Developers, RECOMMENDATIONS FOR IMPLEMENTING THE DISTRICT'S BUILDING ENERGY PERFORMANCE STANDARD IN AFFORDABLE MULTIFAMILY HOUSING 17–20 (2019), https://nationalhousingtrust.org/sites/default/files/news_file_attachments/BEPS%20Recommendations%20FINAL.pdf (finding from listening sessions with affordable housing owners in Washington, D.C. that, *inter alia*, access to funding was anticipated to be a major barrier to compliance with the District's BEPS, and recommending that the District implement various approaches to accommodate the affordable housing sector's particular needs, including "consider[ing] a delay in compliance if recapitalization is expected within five years of the compliance deadline"); Véronique Bugnion, Andy Winslow & Sydney Abraham, ClearlyEnergy & NEEP, CLIMATE IMPACTS OF BUILDING PERFORMANCE STANDARDS: MEASURING THE PATHWAY TO NET-ZERO 5 (2023), <https://cdn.sanity.io/files/jdma7cia/production/189c69c15afe07df461b117f96f62f0fa7373c0b.pdf> (estimating potential emissions savings from eight BPS policies and finding that "these programs are expected to avoid 337.63 MMT of CO₂e emissions over their respective lifetimes, or 563.52 MMT by 2050 if no updates are made to the program targets"); Abigail Andrews & Rishie K. Jain, *Evaluating Building Decarbonization Potential in U.S. Cities Under Emissions Based Building Performance Standards and Load Flexibility Requirements*, 76 J. BLDG. ENG'G 107375 (2023), <https://doi.org/10.1016/j.job.2023.107375> (finding that "when paired with a greenhouse gas building performance standard [, a load flexibility BPS] leads to a combined 89% reduction (a cumulative savings of 189 MMtCO₂e) across commercial buildings in the 15 cities and one county analyzed," a level of emissions savings that "far exceeds a 2050 80% decarbonization target"); Amanda L. Webb & Colby McConnell, *Evaluating the Feasibility of Achieving Building Performance Standards Targets*, 288 ENERGY & BLDGS. 112989 (2023), <https://doi.org/10.1016/j.enbuild.2023.112989> (finding, based on data from 10 U.S. cities, "that BPS are a high effort, high reward policy tool with 65–85% of benchmarked buildings not meeting the target and median required reductions of around 30–40% leading to a total energy use reduction of 25–45% for most cities and property types," but also that "the majority of BPS savings could be achieved by retrofitting a small number of buildings and these policies could be better tailored to minimize the retrofit effort and maximize the environmental rewards"); Isabel Langlois-Romero et al., *Community-Based Prioritization of Commercial Buildings for Equitable Implementation of Building Performance Standards*, 2024 ACEEE SUMMER STUDY ON ENERGY EFFICIENCY IN BUILDINGS, https://www.aceee.org/sites/default/files/proceedings/ssb24/assets/attachments/20240722160755390_9343c2b6-d77e-4538-b5f5-074435b92c9c.pdf (using community-based participatory research methods to propose new framework for equity prioritization strategy among commercial buildings, using buildings in Aurora, Colorado as a case study). See also Travis Walter & Paul Mathew, *City-Level Impacts of Building Tune-Ups: Findings From Seattle's Building Tune-Ups Program*, 168 ENERGY POLICY 113096 (2022), <https://doi.org/10.1016/j.enpol.2022.113096> (finding that "cities will likely need more energy savings than tune-ups can provide, but they might still implement tune-ups as one low-cost component of a multi-faceted approach to reducing energy use and emissions," and suggesting that "[i]t is possible that a tune-up policy that is coupled with [a BPS] might result in more buildings with increased savings, since such a requirement might encourage building owners and tune-up specialists to get more out of the tune-up").

- ¹⁴ Marshall Duer-Balkind et al., Institute for Market Transformation, LESSONS FROM THE GROUND: IMPLEMENTING BUILDING PERFORMANCE STANDARDS (2024), https://imt.org/wp-content/uploads/2024/08/9-0815_1216_000796-Duer-Balkind.pdf; Marshall Duer-Balkind, Maddie Koolbeck & Cherylyn Kelley, Institute for Market Transformation, THE LANDSCAPE OF BUILDING PERFORMANCE STANDARD PATHWAY ALTERNATIVES: REVIEW OF EXISTING ALTERNATIVE COMPLIANCE PATHWAYS AND RESOURCES TO SUPPORT STANDARDIZATION (2025), <https://imt.org/wp-content/uploads/2025/07/Landscape-of-Building-Performance-Standards-Alternative-Pathways.pdf>.
- ¹⁵ See generally Marshall Duer-Balkind et al., Institute for Market Transformation, LESSONS FROM THE GROUND: IMPLEMENTING BUILDING PERFORMANCE STANDARDS (2024), https://imt.org/wp-content/uploads/2024/08/9-0815_1216_000796-Duer-Balkind.pdf.
- ¹⁶ *Id.* at 4–5. See Part IV, *infra*, for Marron’s broadly similar findings that between 40 to 80 percent of covered buildings currently meet the first BPS targets in the four cities that are the subject of this study’s quantitative analysis.
- ¹⁷ *Id.* at 4.
- ¹⁸ *Id.* at 5–6.
- ¹⁹ *Id.* at 6.
- ²⁰ See generally Marshall Duer-Balkind, Maddie Koolbeck & Cherylyn Kelley, Institute for Market Transformation, THE LANDSCAPE OF BUILDING PERFORMANCE STANDARD PATHWAY ALTERNATIVES: REVIEW OF EXISTING ALTERNATIVE COMPLIANCE PATHWAYS AND RESOURCES TO SUPPORT STANDARDIZATION (2025), <https://imt.org/wp-content/uploads/2025/07/Landscape-of-Building-Performance-Standards-Alternative-Pathways.pdf>.
- ²¹ *Id.* at 8, 25.
- ²² *Id.* at 8, 26.
- ²³ *Id.* at 13.
- ²⁴ Alexander Jarrah, Emily Garfunkel & David Ribeiro, ACEEE, NOBODY LEFT BEHIND: PRELIMINARY REVIEW OF STRATEGIES TO SUPPORT AFFORDABLE HOUSING COMPLIANCE WITH BUILDING PERFORMANCE STANDARDS (2024), www.aceee.org/research-report/b2401.
- ²⁵ *Id.* at iv, 17, 22.
- ²⁶ *Id.* 16–17, 18, 21.
- ²⁷ See generally Claudia V. Diezmartínez, Benjamin K. Sovacool & Anne G. Short Gianotti, *Implementing Climate Justice in Boston’s Building Performance Standard*, 1 NATURE CITIES 628 (2024), <https://doi.org/10.1038/s44284-024-00129-2>.
- ²⁸ *Id.* at 667–668.
- ²⁹ *Id.* at 668.
- ³⁰ City of Boston Code of Ordinances § 7-2.2(B).
- ³¹ St. Louis City Ordinance No. 71132, § 3 (2020), <https://www.stlouis-mo.gov/government/city-laws/ordinances/ordinance.cfm?ord=71132>.
- ³² For examples of direct regulation of on-site pollution sources in buildings, see 15 R.C.N.Y. § 37-02 (requiring at least a 75% reduction rate of particulate matter emissions from commercial char broilers through installation of emissions control devices), § 38-02 (requiring new commercial cook stoves to be fitted with wet scrubbers, electrostatic precipitators, or air filtration devices capable of reducing particulate matter emissions by at least 75%).
- ³³ City of Chula Vista, Ordinance No. 3498 (2021), <https://www.chulavistaca.gov/home/showpublisheddocument/22730/637571124879800000>.
- ³⁴ Clean and Affordable Energy Amendment Act of 2008, D.C. Law 17-250; D.C. Department of Energy & Environment, DC BUILDING ENERGY BENCHMARKING, https://ddoe.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/BenchmarkDC_DDOE-DCSEU_cobranded_flyer.pdf.
- ³⁵ “How ENERGY STAR Works: Our History,” U.S. Environmental Protection Agency, <https://www.energystar.gov/about/how-energy-star-works/history> (last visited Nov. 13, 2025).

- ³⁶ ENERGY STAR Scores range from 1-100, reflecting the building's performance relative to other similar buildings. A score of 50 indicates average performance, while a 75 indicates better performance than 75 percent of all similar buildings in the U.S. See U.S. Environmental Protection Agency, ENERGY STAR PORTFOLIO MANAGER TECHNICAL REFERENCE: ENERGY STAR SCORE, <https://portfoliomanager.energystar.gov/pdf/reference/ENERGY%20STAR%20Score.pdf>.
- ³⁷ Danielle Spiegel-Feld & Katrina M. Wyman, *Building Better Building Performance Standards*, 52 ENV'T L. REP. 10268, 10271 (2022), available at <https://guarinicenter.org/wp-content/uploads/2022/05/2022-05-03-Spiegel-Feld-Wyman-Building-Better-Building-Performance-Standards.pdf>.
- ³⁸ See, e.g., City of St. Louis Rev. Code § 25.71.040(A); City of St. Louis, BEPS COMPLIANCE PATHWAYS FACT SHEET, <https://www.stlouis-mo.gov/government/departments/public-safety/building/building-energy-improvement-board/documents/upload/STL-BEPS-Fact-Sheet-2022-02-08.pdf>.
- ³⁹ Boston and Seattle use kgCO₂e/sqf/year as the relevant metric for GHG intensity. See City of Boston Code of Ordinances, § 7.-2.2(l); Seattle Mun. Code, § 22.925.070. New York City however uses tCO₂e/sqf/year as its metric. N.Y.C. Admin. Code § 28-320.3.
- ⁴⁰ Unlike Boston, New York, and Seattle, Cambridge sets performance targets based on total GHG value, rather than GHG intensity per square foot, and sets a target for each building by calculating the property's baseline emissions and assigning a percentage-based reduction. Cambridge Mun. Code §§ 8.67.010(4), 8.67.100.
- ⁴¹ City of Boston Code of Ordinances, § 7.-2.2(l) tbl. 1.
- ⁴² Carbon conversion factors work by setting a conversion rate to a specified type of power source. For example, buildings generally must differentiate how much of their energy was provided by natural gas, propane, fuel oil, etc. and multiply their usage by the set carbon conversion factor to determine their GHG emissions.
- ⁴³ See Danielle Spiegel-Feld & Katrina M. Wyman, *Building Better Building Performance Standards*, 52 ENVTL. L. REP. 10268, 10272 (2022) (explaining that “[i]f the state decarbonizes the grid more quickly than anticipated, the building caps become easy for many buildings to meet, and questions arise about whether the city should have gone further If, by contrast, the grid decarbonizes more slowly than anticipated, the caps could be too far out of reach. All of this variability makes it exceedingly complicated—if not impossible—for cities to predict the stringency of forward-looking GHG standards.”), available at <https://guarinicenter.org/wp-content/uploads/2022/05/2022-05-03-Spiegel-Feld-Wyman-Building-Better-Building-Performance-Standards.pdf>.
- ⁴⁴ 1 R.C.N.Y. § 103-14(d)(3)(ii). The emissions factor for grid supplied electricity for the 2024–2029 compliance period was set by the underlying legislation. N.Y.C. Admin. Code. § 28-320.3.1.1.
- ⁴⁵ By comparison, Boston not only has provided projected emission factors for electricity, but also has updated annual factors based on ISO New England electric grid data and other information; these annual factors can substitute for the projected factors in determining buildings' BERDO compliance. See Boston Air Pollution Control Commission, BUILDING EMISSIONS REDUCTION AND DISCLOSURE ORDINANCE REGULATIONS § VIII(A)(ii) (2025), https://www.boston.gov/sites/default/files/file/2025/09/2025%20Final%20Regulations_0.pdf; see also City of Boston, BERDO Policies & Procedures § 4(B) (Version 3, Sept. 2025), <https://www.boston.gov/sites/default/files/file/2025/09/2025%20Final%20Policies%20and%20Procedures.pdf>.
- ⁴⁶ The CLCPA provides, in relevant part, that New York State “shall establish a program” to ensure that “a minimum of [70%] of the state wide electric generation secured by jurisdictional load serving entities to meet the electrical energy requirements of all end-use customers in New York state in [2030] shall be generated by renewable energy systems,” and that “by the year [2040] ... the statewide electrical demand system will be zero emissions.” N.Y. Pub. Serv. L. § 66-p(2).
- ⁴⁷ The New York City Department of Buildings (DOB) can adjust these values in future rulemaking. DOB convenes a Local Law 97 Advisory Board in 2029 and can consider the emissions coefficients for year beyond 2034.
- ⁴⁸ See, e.g., Montgomery County Code § 18A.43A.01.04 (site EUI-based standards); D.C. Mun. Regs. tit. 20, § 3530 (ENERGY STAR Score and source EUI standards).
- ⁴⁹ D.C. Mun. Regs. tit. 20, § 3530.
- ⁵⁰ See Constantine E. Kontokosta, *A Market-Specific Methodology for a Commercial Building Energy Performance Index*, 51 J. REAL ESTATE FIN. & ECON. 288, 296–300 (2015), <https://doi.org/10.1007/s11146-014-9481-0>.

- ⁵¹ Cf. *id.*
- ⁵² N.Y.C. Admin. Code § 28-320.3.
- ⁵³ Denver Rev. Mun. Code § 10-404(a). Covered buildings are now entitled to a flexibility measure that extends the 2030 deadline to 2032. See “Rules and Technical Guidance,” Denver Office of Climate Action, Sustainability and Resiliency, <https://denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Climate-Action-Sustainability-and-Resiliency/Cutting-Denvers-Carbon-Pollution/Efficient-Commercial-Buildings/Denver-Building-Regulations/Energize-Denver-Building-Performance-Policy/Buildings-25000-sq-ft-or-Larger/Technical-Guidance-25k-or-more> (last visited Nov. 13, 2025).
- ⁵⁴ Throughout this report, we use the term “flexibility measures” and “alternative compliance requirements” to describe circumstances wherein an individual building is not required to meet the default GHGI limit or EUI or ENERGY STAR Score under the performance target for that building’s use type in the default timeframe. The term “alternative compliance pathway” is used to describe many of these scenarios by some jurisdictions and in some of the prior literature. However, because that term has taken on a variety of interpretations, we have generally avoided it herein.
- ⁵⁵ D.C. Code §§ 8-1772.21(d)–(e).
- ⁵⁶ See generally “BERDO Review Board,” City of Boston, <https://www.boston.gov/departments/environment/berdo-review-board> (last visited Nov. 13, 2025).
- ⁵⁷ Note that there is variability in how jurisdictions define compliance periods (or “cycles”). In some cases, a building is supposed to achieve GHG or energy intensity limits before a compliance period starts (or else face potential penalties for emissions or energy use in excess of the limit that applies for that period), while in others buildings are supposed to come into compliance by not later than the end of a compliance period (and could be assessed penalties for failure to achieve the requisite performance improvement within the timeframe allowed). A building’s “first compliance reporting deadline” therefore can either fall at the beginning or the end of a compliance period, depending on the jurisdiction.
- ⁵⁸ This table indicates the compliance dates listed in the local legislation or regulations authorizing each BPS. As explained in our Key Findings, localities have extended the timelines by which buildings must file reports demonstrating compliance, and extended the timeframes by which buildings must comply.
- ⁵⁹ In this field we aimed to use the most current “Covered Buildings List” as of November 2025. In some instances, the data is reported at the property level.
- ⁶⁰ In preparation for this report, the research team provided local governments with a brief survey. Information in this column was collected through this survey.
- ⁶¹ In preparation for this report, the research team provided local governments with a brief survey. Information in this column was collected through this survey.
- ⁶² An Ordinance Amending the Air Pollution Control Commission Ordinance in Relation to Reporting and Disclosing the Energy and Water Efficiency of Buildings (2013), https://www.cityofboston.gov/images_documents/Signed%20Ordinance_tcm3-38217.pdf.
- ⁶³ Ordinance Amending City Of Boston Code, Ordinances, Chapter VII, Sections 7-2.1 and 7-2.2, Building Energy Reporting and Disclosure (BERDO) (2021), https://www.boston.gov/sites/default/files/file/2023/12/BERDO%202.0%20Final%20Amended%20Docket%200775_1.pdf. See also Nik DeCosta-Klipa, Boston Just Enacted Its “Single Most Impactful Initiative” to Curb Greenhouse Gas Emissions, Boston.com (Oct. 5, 2021), <https://www.boston.com/news/local-news/2021/10/05/boston-berdo-2-0/>.
- ⁶⁴ City of Boston Code of Ordinances § 7-2.2(l), tbl 1.
- ⁶⁵ *Id.* See also City of Boston, BERDO POLICIES & PROCEDURES (Version 3, Sept. 2025), <https://www.boston.gov/sites/default/files/file/2025/09/2025%20Final%20Policies%20and%20Procedures.pdf>.
- ⁶⁶ “2025 BERDO Covered Buildings List,” City of Boston, <https://docs.google.com/spreadsheets/d/1t-XKuedzvlOMf2d-vmL3ztrklDquXv-NdD1RkA-mxZI/edit?gid=1462200890#gid=1462200890> (last visited Nov. 25, 2025).
- ⁶⁷ Building Energy Use Disclosure Ordinance, City of Cambridge Ordinance No. 1360 (2014), https://www.cambridgema.gov/-/media/Files/CDD/Climate/BEUDO/buildingenergyusedisclosureordinance_20141106.pdf.

- 68 Building Energy Use Disclosure and Emission Reduction, City of Cambridge Ordinance No. 2021-26 (2023), <https://www.cambridgema.gov/-/media/Files/CDD/Climate/2023BEUDOAmendmentsFinal.pdf>.
- 69 Cambridge Mun. Code § 8.67.100(2).
- 70 See City of Cambridge, BEUDO REGULATIONS § VII (Aug. 2025), <https://www.cambridgema.gov/-/media/Files/officeofsustainability/BEUDO/phase2beudoregulationsfinal.pdf>.
- 71 “BEUDO 2023 Map,” Cambridge Open Data Portal, <https://data.cambridgema.gov/Energy-and-the-Environment/BEUDO-2023-Map/by2d-ksaf> (last visited Nov. 17, 2025).
- 72 City of Chula Vista Ordinance No. 3498 (2021), <https://chulavista.municipal.codes/enactments/Ord3498?impersonate=public>.
- 73 *Id.*
- 74 Chula Vista Mun. Code § 15.26.050(G); City of Chula Vista, BUILDING ENERGY SAVING ORDINANCE (BESO) POLICY SUMMARY 5 (Jan. 2024), <https://www.chulavistaca.gov/home/showpublisheddocument/27410/638409963775670000>.
- 75 Chula Vista Mun. Code § 15.26.050(F)(3); see also City of Chula Vista, BUILDING ENERGY SAVING ORDINANCE (BESO) POLICY SUMMARY 3, <https://www.chulavistaca.gov/home/showpublisheddocument/27410/638409963775670000>.
- 76 “BESO Interactive Benchmarking Map,” City of Chula Vista, <https://benchmark.chulavistaca.gov/> (last visited Nov. 17, 2025) (updated by Chula Vista).
- 77 “Energize Denver Policy Timeline,” Denver Office of Climate Action, Sustainability & Resiliency, <https://www.denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Climate-Action-Sustainability-and-Resiliency/Cutting-Denvers-Carbon-Pollution/Efficient-Commercial-Buildings/Denver-Building-Regulations/Energize-Denver-Building-Performance-Policy/Energize-Denver-Policy-Timeline> (last visited Nov. 17, 2025).
- 78 *Id.*
- 79 Denver Rev. Mun. Code § 10-404(d)(1). However, under the most recent Energize Denver rules, all covered buildings 25,000 square feet or more are eligible for an automatic timeline adjustment that shifts the program’s 2024 target to 2028, eliminate the program’s interim 2027 target, and shifts the program’s 2030 target to 2032. See Denver Office of Climate Action, Sustainability & Resiliency, RULES & REGULATIONS GOVERNING ENERGIZE DENVER BUILDING ENERGY BENCHMARKING AND PERFORMANCE REQUIREMENTS § 4.7(E) (Apr. 2025), <https://denvergov.org/files/assets/public/v/2/climate-action/documents/energize-denver/rules-and-tg/energize-denver-rules-and-regulations-april-2025-clean.pdf>.
- 80 Denver Rev. Mun. Code § 10-404(a); see also Denver Office of Climate Action, Sustainability & Resiliency, RULES & REGULATIONS GOVERNING ENERGIZE DENVER BUILDING ENERGY BENCHMARKING AND PERFORMANCE REQUIREMENTS § 4.1 (Apr. 2025), <https://denvergov.org/files/assets/public/v/2/climate-action/documents/energize-denver/rules-and-tg/energize-denver-rules-and-regulations-april-2025-clean.pdf>.
- 81 “Energize Denver Final Master Data Set 2024,” Denver Open Data Catalog, <https://opendata-geospatialdenver.hub.arcgis.com/documents/8139237177434111b3ee3207e3ae4404/about> (last visited Nov. 25, 2025). For the purposes of determining this figure, the 2024 Data Set was sorted to exclude those properties classified as “exempt” under column B, Compliance Status.
- 82 Ch. 6, Laws of Montgomery County 2014 (County Council Bill No. 2-14), https://apps.montgomerycountymd.gov/ccllms/DownloadFilePage?FileName=887_1_2301_Bill_2-14_Signed_20140731.pdf.
- 83 Ch. 13, Laws of Montgomery County 2022 (County Council Bill No. 16-21), https://apps.montgomerycountymd.gov/ccllms/DownloadFilePage?FileName=2707_1_20205_Bill_16-21_Signed_20220502.pdf.
- 84 “Covered Buildings and Deadlines,” Montgomery County Department of Environmental Protection, <https://www.montgomerycountymd.gov/DEP/energy/commercial/covered-buildings-deadlines.html> (last visited Nov. 17, 2025).
- 85 Montgomery County Code § 18A-42(a)(2); Code of Montgomery County Regulations § 18A.43A.01.04.
- 86 “DEP’s Private Building Inventory,” Montgomery County, Md. Department of Environmental Protection, <https://targetfinder.mcbeeps.org/building-inventory> (last visited Dec 4, 2025). The Building Inventory was filtered to exclude reporting years 2026, 2027, and 2028 for the purposes of determining this figure.

- ⁸⁷ N.Y.C. Local Law 84 (2009), codified as amended at N.Y.C. Admin. Code, tit. 28, art. 309.
- ⁸⁸ N.Y.C. Local Law 97 (2019).
- ⁸⁹ N.Y.C. Admin. Code § 28-320.3.1.
- ⁹⁰ N.Y.C. Admin. Code § 28-320.3.
- ⁹¹ See “LL97 Greenhouse Gas Emissions Reduction,” N.Y.C. Department of Buildings, <https://www.nyc.gov/site/buildings/codes/ll97-greenhouse-gas-emissions-reductions.page> (last visited Nov. 25, 2025) (under page subheading “Covered Buildings List (CBL)”).
- ⁹² City of Seattle Ordinance No. 123226 (2010), https://clerk.seattle.gov/~archives/Ordinances/Ord_123226.pdf.
- ⁹³ City of Seattle Ordinance No. 126959 (2023), https://library.municode.com/wa/seattle/ordinances/municipal_code?nodetid=1253729.
- ⁹⁴ Seattle Mun. Code § 22.925.070.
- ⁹⁵ *Id.*
- ⁹⁶ As of January 2026, Seattle had not yet released a covered buildings list for its BPS program. For covered buildings related to Seattle’s benchmarking program, see “Seattle Energy Benchmarking Map,” City of Seattle Office of Sustainability & Environment, https://www.seattle.gov/energybenchmarkingmap/#seattle/2024?layer=total_ghg_emissions&sort=total_ghg_emissions&order=desc&lat=47.61&lng=-122.33&zoom=14 (last visited Jan. 12, 2026).
- ⁹⁷ City of St. Louis Ordinance No. 70474 (2017), <https://www.stlouis-mo.gov/government/city-laws/ordinances/ordinance.cfm?ord=70474>.
- ⁹⁸ City of St. Louis Ordinance No. 71132 (2020), <https://www.stlouis-mo.gov/government/city-laws/ordinances/ordinance.cfm?ord=71132>.
- ⁹⁹ City of St. Louis Office of Building Performance, BEPS COMPLIANCE PATHWAYS FACTSHEET 1 (2022), <https://www.stlouis-mo.gov/government/departments/public-safety/building/building-energy-improvement-board/documents/upload/STL-BEPS-Fact-Sheet-2022-02-08.pdf>.
- ¹⁰⁰ City of St. Louis Rev. Code § 25.71.040(A).
- ¹⁰¹ “St. Louis Covered Buildings List,” City of St. Louis Office of Building Performance, <https://www.stlbenchmarking.com/Covered-Buildings-List>.
- ¹⁰² Clean and Affordable Energy Amendment Act of 2008, D.C. Law 17-250 (2008), <https://code.dccouncil.gov/us/dc/council/laws/17-250>.
- ¹⁰³ CleanEnergy DC Omnibus Amendment Act of 2018, D.C. Law 22-257, D.C. Act 22-583 (2019), <https://code.dccouncil.gov/us/dc/council/laws/22-257>. The Council of the District of Columbia adopted the law in 2018. It received Congressional approval in March 2019.
- ¹⁰⁴ D.C. Mun. Regs. tit. 20, § 3530.
- ¹⁰⁵ “Building Energy Performance,” Open Data D.C., <https://opendata.dc.gov/datasets/DCGIS::building-energy-performance/about> (last visited Nov. 25, 2025).
- ¹⁰⁶ See, e.g., Md. Code, Local Gov’t, § 10-202(b)(1) (preventing county governments from issuing a civil fine over \$5000).
- ¹⁰⁷ 1 R.C.N.Y. §§ 103-14(g), 103-14(h). See also LL97 GHG Emissions Violations, NYC Department of Buildings, <https://www.nyc.gov/site/buildings/codes/greenhouse-gas-emissions-reductions-violations.page> (last visited Nov. 13, 2025).
- ¹⁰⁸ Boston Air Pollution Control Commission, BUILDING EMISSIONS REDUCTION AND DISCLOSURE ORDINANCE REGULATIONS § XVIII(c) (2025), https://www.boston.gov/sites/default/files/file/2025/09/2025%20Final%20Regulations_0.pdf. Boston additionally has made provision for fines for failure to comply with reporting requirements, and for failure to accurately report information. *Id.*
- ¹⁰⁹ City of St. Louis Office of Building Performance, BEPS COMPLIANCE PATHWAYS FACTSHEET (2022), <https://www.stlouis-mo.gov/government/departments/public-safety/building/building-energy-improvement-board/documents/upload/STL-BEPS-Fact-Sheet-2022-02-08.pdf>.

- ¹¹⁰ See City of St. Louis Office of Building Performance, THIRD-PARTY DATA VERIFICATION 7 (June 2025 rev.), https://drive.google.com/file/d/1d0FSmlVfAVU50w0-Ed-rmkpY1_MPslmw/view.
- ¹¹¹ See N.Y.C. Department of Buildings, LOCAL LAW 97 (LL97) COMPLIANCE REPORT SUBMISSION PROCESS, <https://www.nyc.gov/assets/buildings/pdf/ll97-compliance-report-process.pdf>.
- ¹¹² *Id.*
- ¹¹³ “Denver Energy Benchmarking & Building Performance Standards,” Touchstone IQ, <https://touchstoneiq.com/denver-energy-benchmarking>.
- ¹¹⁴ See Montgomery County Department of Environmental Protection, MONTGOMERY COUNTY’S BUILDING ENERGY PERFORMANCE STANDARDS (BEPS) EXECUTIVE REGULATION (17-23AM) (Mar. 2025), <https://www.montgomerycountymd.gov/DEP/Resources/Files/energy/commercial/beps-two-pager-regulations.pdf>.
- ¹¹⁵ The figures included in this report representing data in each of the four cities (Boston, Denver, New York City, and Washington, D.C.) include all properties covered by the local BPS laws in those jurisdictions that share the same use type (e.g., multifamily housing or commercial). Properties are included regardless of whether the individual building may be eligible for alternative compliance requirements that deviate from the general targets represented in the figures. The figures illustrate a modeled scenario, wherein all properties, regardless of the building-specific compliance requirements, are analyzed in comparison to the general targets defined by their property type. For example, affordable housing buildings eligible for coverage under Article 321 of New York City’s Local Law 97 are included in the “multifamily housing” data for New York City, even though such buildings would not be required to meet the general targets for multifamily housing.
- ¹¹⁶ A full list of data sources and a more detailed description of Marron’s methodology is found in Appendix C.
- ¹¹⁷ “Other” includes all covered properties in the city whose primary use type is not classified as “multifamily housing” or “office.”
- ¹¹⁸ EPA ENERGY STAR Portfolio Manager, THERMAL ENERGY CONVERSIONS (August 2015), <https://portfoliomanager.energystar.gov/pdf/reference/Thermal%20Conversions.pdf>.
- ¹¹⁹ In determining the values and conversions for Figures 5 and 6, we followed the same methodology as Figure 4.
- ¹²⁰ We did not seek to examine the reasons for these trends.
- ¹²¹ For more on the energy and emissions effects of building energy benchmarking and audits, see Ting Meng, David Hsu & Albert Han, *Estimating Energy Savings from Benchmarking Policies in New York City*, 133 ENERGY 415 (2017), <https://doi.org/10.1016/j.energy.2017.05.148>; Sokratis Papadopoulos, Bartosz Bonczak & Constantine E. Kontokosta, *Pattern Recognition in Building Energy Performance Over Time Using Energy Benchmarking Data*, 221 APPLIED ENERGY 576 (2018), <https://doi.org/10.1016/j.apenergy.2018.03.079>; and Constantine E. Kontokosta, Danielle Spiegel-Feld & Sokratis Papadopoulos, *The Impact of Mandatory Energy Audits on Building Energy Use*, 5 NATURE ENERGY 309 (2020), <https://doi.org/10.1038/s41560-020-0589-6>.
- ¹²² This report does not estimate how many buildings might rely on alternative compliance pathways or other flexibility measures.
- ¹²³ As noted above, the figures in this report include all covered properties within each jurisdiction, regardless of compliance pathway or building-level requirements and are depicted for comparison purposes only. The targets represented in these figures reflect the targets that have been set by each jurisdiction to date. The actual (legally binding) performance mandates for the individual buildings included in these data sets will vary depending on the local program and the particular building characteristics and circumstances. For example, in New York City, Figures 4, 5, and 6 include affordable housing properties eligible for coverage under Article 321 of Local Law 97, which allows such buildings to meet alternative requirements that are different from the general target for multiple dwellings represented in the figures. See N.Y.C. Admin. Code § 28-321.2. In Washington, D.C. the target shown reflects 2021-2026 cycle target. Owners of covered buildings in D.C. that did not meet this target at the beginning of the cycle have had to choose one of multiple compliance pathways to improve their performance, some of which were not strictly tied to achievement of the target at the end of the cycle. See D.C. Mun. Regs. tit. 20, § 3518.1 (2021).

- ¹²⁴ Denver also requires most covered buildings to meet interim targets, which are not depicted in Figures 5 and 6, or in Table 2. In Washington, D.C. the target shown reflects the 2021 cycle 1 target. As noted above, this target is depicted for illustrative purposes. Owners of covered buildings in D.C. that fall below this target may chose compliance pathways that are not based on this target.
- ¹²⁵ The target is set for 2030, but most buildings will have at least until 2032 to comply, based on applicable time extensions. See Denver Office of Climate Action, Sustainability, and Resiliency, RULES & REGULATIONS GOVERNING ENERGIZE DENVER BUILDING ENERGY BENCHMARKING AND PERFORMANCE REQUIREMENTS § 4.7(E) (Apr. 2025), <https://www.denvergov.org/files/assets/public/v/2/climate-action/documents/buildings-and-homes/energize-denver/rules-and-tg/energize-denver-rules-and-regulations-april-2025-clean.pdf>.
- ¹²⁶ See, e.g., “Benchmarking Program Qualifications and Exemptions,” City of St. Louis Office of Building Performance, <https://www.stlouis-mo.gov/government/departments/public-safety/building/building-performance/exemptions.cfm> (describing exemption for owners who are unable to benchmark due to “the failure of either a utility or a tenant (or both) to report the necessary information for the owner to complete any benchmarking submittal requirement”).
- ¹²⁷ Véronique Bugnion, Nicholas L. Long, Robin Mitchell, Harry Bergmann, Alexander C. Swindler & Elizabeth M. Beers, *Building Performance Standards to Drive Market Transformation* 7–52, 2022 SUMMER STUDY ON ENERGY EFFICIENCY IN BUILDINGS, <https://seed-platform.org/resources/Bugnion-2022-aceee.pdf>. Touchstone IQ is another provider of software tools that can be used to manage reporting. Denver uses these products. See “City of Denver Energy Benchmarking,” Touchstone IQ, <https://touchstoneiq.com/governments/our-clients/city-of-denver>.
- ¹²⁸ See e.g., D.C. Mun. Regs, tit. 20, § 3515; Seattle Mun. Code § 22.925.050.
- ¹²⁹ City of Boston Code of Ordinances § 7-2.2(h).
- ¹³⁰ Buildings’ varying approaches may have been due in part to the fact that real estate owners often use several different measures of property area, depending on the context. For example, in addition to the “gross floor area” metric that is supposed to be calculated and entered into ENERGY STAR Portfolio Manager, building owners and managers use metrics such as rentable and useable square footage in measuring and managing their properties. In addition, ENERGY STAR Portfolio Manager itself shows some flexibility in how users are to calculate gross floor area, providing that users should “measure the [gross floor area] between the outside surface of the exterior walls of the building(s),” but that “it is also acceptable to measure from the inside perimeter of the exterior walls if that is more readily available.” “Glossary,” ENERGY STAR Portfolio Manager, <https://portfoliomanager.energystar.gov/pm/glossary#GrossFloorArea>.
- ¹³¹ See, e.g., “How Do I Determine, Verify, or Correct a Building’s Gross Floor Area?,” Building Performance Helpdesk, D.C. Department of Energy and Environment, <https://dc.beam-portal.org/helpdesk/kb/benchmarking/83/>; Denver Office of Climate Action, Sustainability & Resiliency, ENERGIZE DENVER BENCHMARKING AND ENERGY PERFORMANCE REQUIREMENTS FOR BUILDINGS 25,000 SQUARE FEET AND LARGER: TECHNICAL GUIDANCE § 3.2 (Version 3, Apr. 2025), <https://www.denvergov.org/files/assets/public/v/1/climate-action/documents/energize-denver/rules-and-tg/ed-technical-guidance-buildings-25k-sf-v3-april-2025-clean.pdf>.
- ¹³² “Laws and Reports,” NYC Open Data, <https://opendata.cityofnewyork.us/open-data-law/>.
- ¹³³ “Building Energy Snapshot,” NYC Accelerator, <https://accelerator.nyc/building-energy-snapshot>.
- ¹³⁴ NYC Accelerator, <https://accelerator.nyc/>.
- ¹³⁵ “NYC Decarbonization Compass,” New York University Stern Center for Sustainable Business, <https://sites.google.com/stern.nyu.edu/decarbonizationcompass/home>. Members of the study team for this BPS report were not involved in the NYC Decarbonization Compass project.
- ¹³⁶ See e.g., Zachary Hart, Institute for Market Transformation, MANAGING BENCHMARKING DATA QUALITY (2018), <https://imt.org/wp-content/uploads/2018/05/Managing-Benchmarking-Data-Quality.pdf>.
- ¹³⁷ To help support building owners confronting challenges associated with split-incentive barriers, IMT has developed the Green Lease Lenders program, which offers leasing resources to help align incentives between landlords and tenants and assist them in sharing information in support of building decarbonization goals, as well as resources related to performance-based lending. See Green Lease Leaders, <https://greenleaseleaders.com/>; “Performance-Based Leasing,” Institute for Market Transformation, <https://imt.org/performance-based-leasing/>.

- ¹³⁸ See, e.g., D.C. Mun. Regs. tit. 20, §§ 3520.7(g), 3520.8 (2021) (providing one-year delay of compliance obligations to most buildings due to COVID-19 pandemic), subsequently codified at D.C. Code § 8-1772.21(c); Denver Office of Climate Action, Sustainability & Resiliency, RULES & REGULATIONS GOVERNING ENERGIZE DENVER BUILDING ENERGY BENCHMARKING AND PERFORMANCE REQUIREMENTS § 4.7(E) (Apr. 2025), <https://denvergov.org/files/assets/public/v/2/climate-action/documents/energize-denver/rules-and-tg/energize-denver-rules-and-regulations-april-2025-clean.pdf> (providing that “[w]hen submitting benchmarking data or exemption request in the 2025 reporting year, owners will have an option to request and receive a timeline adjustment for any Covered Building experiencing compliance challenges. The adjustment will shift the 2024 target to 2028, eliminate the 2027 target, and shift the 2030 target to 2032.”). In addition to the one-year delay implemented due to the COVID-19 pandemic, D.C.—via new legislation—has provided that the second compliance cycle will begin in 2028 (instead of 2027). D.C. Law 25-307 § 3(b), codified at D.C. Code § 8-1772.21(b).
- ¹³⁹ See, e.g., 1 R.C.N.Y. § 103-14(i)(2) (providing for penalty mitigation in first compliance period for buildings demonstrating sufficient good faith efforts at achieving compliance, including preparing and submitting a decarbonization plan).
- ¹⁴⁰ See, e.g., Kathleen Navin, *Commercial Real Estate in Focus*, On the Economy Blog, Federal Reserve Bank of St. Louis (May 30, 2024), <https://www.stlouisfed.org/on-the-economy/2024/may/commercial-real-estate-in-focus> (observing that the U.S. commercial real estate industry has seen an increase in vacancy since 2020—rising to 19% nationwide in Q1 2024—and reductions of net operating income, and that the industry is facing a “maturity wall” due to a large wave of refinancings due in the 2024-2026 period).
- ¹⁴¹ *Id.*; Jordan Rappaport, *Accounting for Changes in Downtown Office Occupancy Since the Pandemic*, 110(3) *Economic Review* (2025), <https://www.kansascityfed.org/research/economic-review/accounting-for-changes-in-downtown-office-occupancy-since-the-pandemic/>.
- ¹⁴² In D.C., for example, the initial five-year compliance cycle was scheduled to run from 2021 to 2025, with a reporting deadline in 2026. However, due to the COVID pandemic, D.C. implemented a one-year extension for all building owners who submitted a 2020 benchmarking report demonstrating that the building was operational at that time, resulting in a six-year initial cycle for those buildings. D.C. Mun. Regs. tit. 20, §§ 3520.7(g), 3520.8 (2021). Per subsequent legislation, the COVID delay was made to apply to all buildings covered by D.C.’s BEPS in 2021. See D.C. Law 25-307 § 3(c), codified at D.C. Code § 8-1772.21(c). Denver has similarly adjusted the compliance deadlines for its interim targets, in two grouped timeline extensions. In 2023, buildings that had benchmarked their 2022 data received a one-year delay on the first target, making their timeline 2025/2027/2030; 98.5% of buildings received this adjustment. The second adjustment was in 2025. Buildings that benchmarked and marked a checkbox saying they needed an extension were then shifted to a 2028/2032 timeline. According to data from the City of Denver, 65% of buildings were on this later timeline as of December 2025, while 30% were still on the 2025/2027/2030 schedule, and 1% were still on the 2024/2027/2030 timeline; 4% were on customized timeline extensions.
- ¹⁴³ For a more detailed account of the types of flexibility measures and alternative compliance requirements that are available under various BPS laws, see Marshall Duer-Balkind, Maddie Koolbeck & Cherylyn Kelley, Institute for Market Transformation, *THE LANDSCAPE OF BUILDING PERFORMANCE STANDARD PATHWAY ALTERNATIVES: REVIEW OF EXISTING ALTERNATIVE COMPLIANCE PATHWAYS AND RESOURCES TO SUPPORT STANDARDIZATION* (2025), <https://imt.org/resources/the-landscape-of-building-performance-standard-pathway-alternatives/>; Danielle Spiegel-Feld & Katrina M. Wyman, *Toward Tradable Building Performance Standards*, 52 *ENV’T L. REP.* 10356, 10359 (2022), available at <https://guaranicenter.org/wp-content/uploads/2022/05/2022-05-03-Spiegel-Feld-Wyman-Toward-Tradable-Building-Performance-Standards.pdf>.
- ¹⁴⁴ Seattle Mun. Code § 22.925.110(A).
- ¹⁴⁵ Chula Vista Mun. Code § 15.26.050(G).
- ¹⁴⁶ Code of Montgomery County Regulations §§ 18A.43A.01.09–18A.43A.01.10.
- ¹⁴⁷ City of St. Louis Office of Building Performance, *BEPS COMPLIANCE PATHWAY FACT SHEET*, https://www.stlbenchmarking.com/Content/STL_BEPS_Fact_Sheet_2.18.22.pdf.
- ¹⁴⁸ Denver Office of Climate Action, Sustainability & Resiliency, *ENERGIZE DENVER BENCHMARKING AND ENERGY PERFORMANCE REQUIREMENTS FOR BUILDINGS 25,000 SQUARE FEET AND LARGER: TECHNICAL GUIDANCE § 4.5(D)(i)* (Version 3, Apr. 2025), <https://www.denvergov.org/files/assets/public/v/1/climate-action/documents/energize-denver/rules-and-tg/ed-technical-guidance-buildings-25k-sf-v3-april-2025-clean.pdf>.

- ¹⁴⁹ D.C. Department of Energy & Environment, BEPS COMPLIANCE AND ENFORCEMENT GUIDEBOOK FOR COMPLIANCE CYCLE 1 § 3.1 (Version 1.1, 2021), [https://s3.us-east-2.amazonaws.com/dc.beam-portal.org-public-media/media/helpdesk/attachments/kb/Guidebook%20\(9\)/78/BEPS_Guidebook_V1.1_Final.pdf](https://s3.us-east-2.amazonaws.com/dc.beam-portal.org-public-media/media/helpdesk/attachments/kb/Guidebook%20(9)/78/BEPS_Guidebook_V1.1_Final.pdf). For further explanation of the adjusted site EUI metric used in the performance pathway, see “What is Site EUI Adjusted to Current Year?,” Building Innovation Hub, <https://buildinginnovationhub.org/dc-beeps-explainer-what-is-site-eui-adjusted-to-current-year/>.
- ¹⁵⁰ Cambridge Mun. Code § 8.67.100(10).
- ¹⁵¹ N.Y.C. Admin. Code § 28-321.2.
- ¹⁵² City of Boston Code of Ordinances § 7-2.2(m).
- ¹⁵³ Cambridge Mun. Code § 8.67.010(2).
- ¹⁵⁴ Cambridge Mun. Code §§ 8.67.010(31), 8.67.100(5).
- ¹⁵⁵ Marshall Duer-Balkind, Maddie Koolbeck & Cherylyn Kelley, Institute for Market Transformation, THE LANDSCAPE OF BUILDING PERFORMANCE STANDARD PATHWAY ALTERNATIVES: REVIEW OF EXISTING ALTERNATIVE COMPLIANCE PATHWAYS AND RESOURCES TO SUPPORT STANDARDIZATION (2025), <https://imt.org/resources/the-landscape-of-building-performance-standard-pathway-alternatives/>.
- ¹⁵⁶ For example, § 7-2.2(l) of Boston’s Code of Ordinances provides that building owners may request approval of two types of alternative pathways: Individual Compliance Schedules or a Hardship Compliance Plan pursuant to the requirements of §§ 7-2.2 (K) and (L), respectively. For additional information on owner eligibility to apply for these alternative compliance pathways, see Boston Air Pollution Control Commission, BUILDING EMISSIONS REDUCTION AND DISCLOSURE ORDINANCE REGULATIONS §§ XII (Individual Compliance Schedules), XIII (Hardship Compliance Plans) (2025), https://www.boston.gov/sites/default/files/file/2025/09/2025%20Final%20Regulations_0.pdf.
- ¹⁵⁷ Denver, for instance, allows building owners to apply for standard target adjustments to “account for significant variations in operations of the building.” Custom target adjustments may be made if the owner has applied other target adjustments and determines that there is still no viable path to reach the EUI target. See Denver Office of Climate Action, Sustainability & Resiliency, RULES & REGULATIONS GOVERNING ENERGIZE DENVER BUILDING ENERGY BENCHMARKING AND PERFORMANCE REQUIREMENTS § 4.5 (Apr. 2025), <https://denvergov.org/files/assets/public/v/2/climate-action/documents/energize-denver/rules-and-tg/energize-denver-rules-and-regulations-april-2025-clean.pdf>. For additional guidance, see also Denver Office of Climate Action, Sustainability & Resiliency, ENERGIZE DENVER BENCHMARKING AND ENERGY PERFORMANCE REQUIREMENTS FOR BUILDINGS 25,000 SQUARE FEET AND LARGER: TECHNICAL GUIDANCE (Version 3, Apr. 2025), <https://denvergov.org/files/assets/public/v/1/climate-action/documents/buildings-and-homes/energize-denver/rules-and-tg/ed-technical-guidance-buildings-25k-sf-v3-april-2025-clean.pdf>.
- ¹⁵⁸ See e.g., Seattle Mun. Code § 22.925.100(E) (allowing building owners that would face significant hardship in meeting established GHG intensity targets to apply to use “a decarbonization compliance plan for achieving net-zero greenhouse gas emissions or an approved low emissions [GHGI intensity target] by 2041-2050”). See also Montgomery County Code § 18A-42B (providing that if a building owner cannot meet an interim or final performance standard because of “economic infeasibility or other circumstances beyond the owner’s control,” they may submit a Building Performance Improvement Plan for approval detailing potential improvement measures and a plan for implementing such measures).
- ¹⁵⁹ See e.g., Boston Air Pollution Control Commission, BUILDING EMISSIONS REDUCTION AND DISCLOSURE ORDINANCE REGULATIONS § XIII(j) (2025), https://www.boston.gov/sites/default/files/file/2025/09/2025%20Final%20Regulations_0.pdf; Code of Montgomery County Regulations § 18A.43A.01.14.
- ¹⁶⁰ D.C. Department of Energy & Environment, COST AND BENEFIT IMPACT STUDY OF THE BUILDING ENERGY PERFORMANCE STANDARDS PROGRAM 46 (Mar. 2022), https://dc.beam-portal.org/api/v3/media/helpdesk/attachments/kb/BEPS/79/BEPS_Cost-Benefit_Study.pdf.
- ¹⁶¹ N.Y.C. Mayor’s Office of Climate & Environmental Justice, GETTING 97 DONE: A PLAN TO MOBILIZE NEW YORK CITY’S LARGE BUILDINGS TO FIGHT CLIMATE CHANGE 2 (Sept. 2023), https://www.nyc.gov/assets/climate/downloads/pdfs/Getting_LL97_Done.pdf.

- ¹⁶² Denver Office of Climate Action, Sustainability & Resiliency, *ENERGIZE DENVER BENCHMARKING AND ENERGY PERFORMANCE REQUIREMENTS FOR BUILDINGS 25,000 SQUARE FEET AND LARGER: TECHNICAL GUIDANCE § 7.1.1 (Version 3, Apr. 2025)*, <https://www.denvergov.org/files/assets/public/v/1/climate-action/documents/energize-denver/rules-and-tg/ed-technical-guidance-buildings-25k-sf-v3-april-2025-clean.pdf>.
- ¹⁶³ Boston Air Pollution Control Commission, *BUILDING EMISSIONS REDUCTION AND DISCLOSURE ORDINANCE REGULATIONS § XIII(B)(I) (2025)*, https://www.boston.gov/sites/default/files/file/2025/09/2025%20Final%20Regulations_0.pdf.
- ¹⁶⁴ 1 R.C.N.Y. 103-12(c)(3)(iii).
- ¹⁶⁵ Boston Air Pollution Control Commission, *BUILDING EMISSIONS REDUCTION AND DISCLOSURE ORDINANCE REGULATIONS § XIII (2025)*, https://www.boston.gov/sites/default/files/file/2025/09/2025%20Final%20Regulations_0.pdf.
- ¹⁶⁶ While particularized to a given building, individual compliance schedules in Boston still must adhere to certain criteria, including that a building's schedule reduce emissions by 50% by 2030. City of Boston Code of Ordinances § 7-2.2(K)(1).
- ¹⁶⁷ For example, in New York City buildings where more than 35% of the constituent units are rent-stabilized may undertake a discrete set of energy saving measures, rather than comply with the GHGI reduction trajectory that market-rate buildings are subject to. N.Y.C. Admin. Code § 28-321.2. In St. Louis, houses of worship and qualified affordable housing are subject to a six-year compliance cycle instead of the standard four-year one. City of St. Louis Rev. Code § 25.71.040(C)(2)(a).
- ¹⁶⁸ Claudia V. Diezmartínez, Benjamin K. Sovacool & Anne G. Short Gianotti, *Implementing Climate Justice in Boston's Building Performance Standard*, 1 *NATURE CITIES* 628 (2024), <https://doi.org/10.1038/s44284-024-00129-2>.
- ¹⁶⁹ Institute for Market Transformation, Natural Resources Defense Council & Elevate, *COMMUNITY HEALTH PRIORITIES AND BUILDING PERFORMANCE POLICIES (2025)*, <https://imt.org/wp-content/uploads/2025/04/BPS-and-Community-Priorities.pdf>. See also WEACT for Environmental Justice, *HEALTHY HOMES, THRIVING COMMUNITIES: EQUITABLE PRINCIPLES FOR BUILDING DECARBONIZATION (2026)* (outlining the importance of the following principles for equitable building decarbonization: centering and protecting frontline communities, ensuring pre-weatherization and health upgrades in decarbonization and energy efficiency work, enforcing transparency and accountability, empowering communities through education and workforce development, ensuring energy affordability and preventing tenant displacement, and integrating climate resilience throughout building decarbonization planning and implementation), <https://weact.org/wp-content/uploads/2026/01/HHF-Principles-2026.pdf>.
- ¹⁷⁰ 1 R.C.N.Y. § 103-14(e)(3). See also Press Release, NYC Office of the Mayor, Mayor Adams Launches new Program to Help Affordable Housing Projects go Green, Save Green (Sept. 26, 2024); "The Affordable Housing Reinvestment Fund (AHRF) Offsets Program," NYCEEC, <https://nyceec.com/nyc-ahrf-offset-program/>.
- ¹⁷¹ City of Boston Code of Ordinances §§ 7-2.2(G), (M)(1)(d); see also "Equitable Emissions Investment Fund," City of Boston, <https://www.boston.gov/departments/environment/equitable-emissions-investment-fund>.
- ¹⁷² City of St. Louis, *BEPS COMPLIANCE PATHWAYS FACT SHEET 2 (2022)*.
- ¹⁷³ Denver Office of Climate Action, Sustainability & Resiliency, *ENERGIZE DENVER BENCHMARKING AND ENERGY PERFORMANCE REQUIREMENTS FOR BUILDINGS 25,000 SQUARE FEET AND LARGER: TECHNICAL GUIDANCE § 5.7.2 (Version 3, Apr. 2025)*, <https://www.denvergov.org/files/assets/public/v/1/climate-action/documents/energize-denver/rules-and-tg/ed-technical-guidance-buildings-25k-sf-v3-april-2025-clean.pdf>.
- ¹⁷⁴ Boston Air Pollution Control Commission, *BUILDING EMISSIONS REDUCTION AND DISCLOSURE ORDINANCE REGULATIONS § XII (2025)*, https://www.boston.gov/sites/default/files/file/2025/09/2025%20Final%20Regulations_0.pdf.
- ¹⁷⁵ 1 R.C.N.Y. § 103-14(e)(1)–(2).
- ¹⁷⁶ Code of Montgomery County Regulations §§ 18A.43A.01.09–18A.43A.01.10.
- ¹⁷⁷ Research has indicated that a primary impediment to creating viable private funding mechanisms to support BPS implementation is a lack of standardized sustainability measurements and definitions. Policy makers might consider harmonizing BPS policies across jurisdictions to reflect uniform standards of measurement and reporting. See Jamie Horton & Marianna Koval, NYCEDC & NYU Stern Center for Sustainable Business, *BANKING ON CLIMATE: THE MORTGAGE LENDING OPPORTUNITY IN BUILDING DECARBONIZATION*, NEW YORK UNIVERSITY STERN CENTER FOR SUSTAINABLE 23 (2024), <https://edc.nyc/sites/default/files/2024-12/NYCEDC-Banking-on-Climate-Mortgage-Lending-for-Decarbonization.pdf>.

- 178 “BERDO Review Board,” City of Boston. <https://www.boston.gov/departments/environment/berdo-review-board>.
- 179 “Equitable Emissions Investment Fund,” City of Boston. <https://www.boston.gov/departments/environment/equitable-emissions-investment-fund>.
- 180 *Id.*
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- 186 “Find a Qualified Vendor,” Building Innovation Hub, <https://buildinginnovationhub.org/resource/find-a-qualified-vendor/>.
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- 188 Seattle Building Emissions Navigator, <https://www.seattlebuildingsaccelerator.com>.
- 189 “Book a Consultation,” City of St. Louis Office of Building Performance, <https://www.stlouis-mo.gov/government/departments/public-safety/building/building-performance/consultation.cfm>.
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- 191 Montgomery County Green Bank, <https://mcgreenbank.org/>.
- 192 Ch. 35, Laws of Montgomery County 2015 (County Council Bill No. 18-15), codified in relevant part at Montgomery County Code ch. 18A, art. 7 (§§ 18A-44 et seq.), https://apps.montgomerycountymd.gov/ccllims/DownloadFilePage?FileName=966_1_1588_Bill_18-15_Signed_20151006.pdf.
- 193 “Our Impact,” Montgomery County Green Bank, <https://mcgreenbank.org/our-impact/>
- 194 “Leading the Charge in Equity and Clean Energy Solutions,” Montgomery County Green Bank, <https://mcgreenbank.org/leading-the-charge-in-equity-and-clean-energy-solutions/>.
- 195 See, e.g., “Equitable Emissions Investment Fund,” City of Boston, <https://www.boston.gov/departments/environment/equitable-emissions-investment-fund>; NYCEEC, <https://nyceec.com/>; “Steam to Electric Conversion Incentive,” Denver Office of Climate Action, Sustainability & Resiliency, <https://www.denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Climate-Action-Sustainability-and-Resiliency/Cutting-Denvers-Carbon-Pollution/Efficient-Commercial-Buildings/Rebates-for-Building-Decarbonization/Steam-to-Electric-Conversion-Incentive>.
- 196 See “NYC Accelerator PACE Financing,” NYC Accelerator, <https://accelerator.nyc/resources/finance/PACE> (last updated Sept. 11, 2025); “Commercial PACE Financing,” Montgomery County Department of Environmental Protection, <https://www.montgomerycountymd.gov/DEP/energy/commercial/pace.html>; Set the PACE St. Louis, <https://www.setthepacestlouis.com/>; “PACE,” D.C. Green Bank, <https://dcgreenbank.com/pace/>. In some cases, PACE financing is available from a different layer of government, rather than the jurisdiction that has enacted the BPS program. See, e.g., “PACE Massachusetts,” MassDevelopment, <https://www.massdevelopment.com/products-and-services/financing/green-finance/pace/> (statewide agency providing PACE program services to municipalities, including Boston, that have opted into the PACE program); “C-PACER Financing Program,” King County, <https://kingcounty.gov/en/dept/executive/governance-leadership/climate-office/focus-areas/building-decarbonization/cpacer> (county-administered PACE financing program that could be used by eligible buildings in Seattle).
- 197 “What is PACE Financing?,” PACENation, <https://www.pacenation.org/what-is-pace/>; PACENation, PACE HANDOUT FOR PROPERTY OWNERS, https://www.pacenation.org/wp-content/uploads/2016/10/PropertyOwners_2016_10_7.pdf; “Commercial Property Assessed Clean Energy,” U.S. Environmental Protection Administration, <https://www.epa.gov/statelocalenergy/commercial-property-assessed-clean-energy> (last updated July 1, 2025).

- ¹⁹⁸ See, e.g., N.Y.C. Mayor’s Office of Climate & Environmental Justice and N.Y.C. Energy Efficiency Corp., NYC ACCELERATOR PACE FINANCING: PROGRAM GUIDELINES 4 (2021, rev. 2024), https://accelerator.nyc/sites/default/files/2024-08/PACE%20Program%20Guidelines_v3.0_FINAL.pdf (residential condominium units not eligible for C-PACE program unless they currently are owned in common by a commercial entity).
- ¹⁹⁹ See C-PACE Alliance, MORTGAGE LENDER’S GUIDE TO C-PACE: LENDER CONSENT (2024), <https://c-pacealliance.org/wp-content/uploads/2024/09/Mortgage-Lenders-Guide-to-C-PACE-Aug-2024.pdf> (noting that “Prior to closing, existing mortgage holders on the property must consent to the C-PACE financing because the claim for delinquent C-PACE payments is on par with property taxes. This consent functions as a double-check on the project viability. Existing mortgage holders may withhold consent for any reason.”).
- ²⁰⁰ See, e.g., Urban Land Institute, DECARBONIZING NYC Co-OPS 15 (2025), <https://ulidigitalmarketing.blob.core.windows.net/ulidcnc/sites/54/2025/10/Decarbonizing-NYC-Co-ops-NZI-TAP-Report-102125-Final.pdf> (proposing, in study sponsored by the New York City Mayor’s Office of Climate and Environmental Justice, “the creation of a development corporation” that would “assists with or even spearhead implementation of” Local Law 97 compliance projects).
- ²⁰¹ “What is an Equity Priority Building,” Denver Office of Climate Action, Sustainability & Resiliency, <https://www.denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Climate-Action-Sustainability-and-Resiliency/Cutting-Denvers-Carbon-Pollution/Efficient-Commercial-Buildings/Resources-for-Multifamily-Housing-and-Small-Biz/What-is-an-Equity-Priority-Building>.
- ²⁰² “Equity Index 2020 – Neighborhood,” GeospatialDENVER: Putting Denver on the Map, <https://www.arcgis.com/home/item.html?id=f298a05190724b0aaf7f6a76f260aa7d> (last updated May 14, 2024).
- ²⁰³ *Hunter v. Pittsburgh*, 207 U.S. 161 (1907).
- ²⁰⁴ *Glen Oaks Village Owners, Inc. v. City of New York*, 2025 N.Y. Slip Op. 03101, 2025 WL 1458090 (N.Y. 2025).
- ²⁰⁵ First Amended Complaint, *Colorado Apartment Ass’n v. Ryan*, Case No. 1:24-cv-01093-RMR, Doc. 68 (D. Colo. Aug. 29, 2025).
- ²⁰⁶ National Building Performance Standards Coalition, <https://nationalbpscoalition.org/>.
- ²⁰⁷ See Diana Olick, *What the End of Energy Star Could Mean for Commercial Real Estate*, CNBC.com (Aug. 6, 2025), <https://www.cnbc.com/2025/08/06/energy-star-commercial-real-estate.html>.
- ²⁰⁸ 2025 Md. Laws Ch. 844, § 1 (H.B. 49), codified in relevant part at Md. Code, Env’t, § 2-1602(c)(4)–(5); 2025 Colo. Sess. Laws Ch. 216, § 3 (H.B. 25-1269), codified in relevant part at Colo. Rev. Stat. § 25-7-142(8.6)(a)(II).
- ²⁰⁹ Colo. Rev. Stat. § 25-7-142(8.6)(a)(II). Meanwhile, Maryland’s H.B. 49 is tailored to Montgomery County’s BEPS specifically, since the Montgomery County BEPS was the only local BPS program in the state in existence on or before March 1, 2025. Md. Code, Env’t, § 2-1602(c)(4)–(5).
- ²¹⁰ See, e.g., City of New York, *Comments of the City of New York on Pre-Proposal Outline and Affordability Study* (Nov. 14, 2024) (comments by New York City on state agencies’ pre-proposal outline for New York Cap-and-Invest (NYCI) program, emphasizing, *inter alia*, need for NYCI program design to “account for and augment” existing Local Law 97 framework for regulating New York City building emissions), available at <https://www.commentmanagement.com/comment/list/Cap-and-Invest> (search for comment no. 251117, by Rohit Aggarwala).
- ²¹¹ “Building Efficiency and Clean Operations Network (BEACON) Fellowship Project,” Washington State Department of Commerce, <https://www.commerce.wa.gov/cbps/cbps-support-and-resources/beacon/> (last visited Dec. 19, 2025).
- ²¹² H.B. 939, 103d Gen. Assemb., 1st Reg. Sess. (Mo. 2025).
- ²¹³ See Marie J. French, *New York Likely to Miss 70 Percent Renewable Target*, POLITICO (July 2, 2024), <https://www.politico.com/news/2024/07/02/new-york-likely-to-miss-70-percent-renewable-target-00166258>.
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- ²¹⁵ Samantha Maldonado, *State Energy Plan Undermines Emissions Goals and NYC, Experts Say*, THE CITY (Dec. 16, 2025), (quoting Elijah Hutchinson, executive director of the Mayor’s Office of Climate and Environmental Justice), <https://www.thecity.nyc/2025/12/16/new-york-state-energy-plan-peaker-climate/>.

- ²¹⁶ See “Pathway Selection,” Building Performance Helpdesk, D.C. Department of Energy & Environment, <https://dc.beam-portal.org/helpdesk/tickets/submit/3/>.
- ²¹⁷ See, e.g., “FAQs: Violations & Enforcement,” City of St. Louis, <https://www.stlbenchmarking.com/FAQs/#violations-enforcement> (stating that buildings in violation of benchmarking and BEPS requirements “would NOT be eligible for issuance of new residential or commercial occupancy permits”); see also City of St. Louis Rev. Code § 25.71.100 (providing that city may seek legal and equitable remedies in addition to levying fines against buildings that do not comply with BEPS ordinance).
- ²¹⁸ 1 R.C.N.Y. § 103-14(e)(3). See also Press Release, NYC Office of the Mayor, Mayor Adams Launches new Program to Help Affordable Housing Projects go Green, Save Green (Sept. 26, 2024), <https://www.nyc.gov/mayors-office/news/2024/09/mayor-adams-launches-new-program-help-affordable-housing-projects-go-green-save-green>; “The Affordable Housing Reinvestment Fund (AHRF) Offsets Program,” NYCEEC, <https://nyceec.com/nyc-ahrf-offset-program/>.
- ²¹⁹ See Institute for Market Transformation, MODEL ORDINANCE FOR A BUILDING PERFORMANCE STANDARD 7-8, 11 (2021), <https://imt.org/resources/model-ordinance-for-building-performance-standards/> (explaining that “The ONSITE and DISTRICT THERMAL GREENHOUSE GAS EMISSIONS metric is intended to drive beneficial electrification and so does not include off-site GREENHOUSE GAS EMISSIONS resulting from consumption of electricity,” and noting that “The model ordinance does not set a standard for greenhouse gas emissions attributable to electricity purchased from the grid, because emissions on the grid vary constantly over the course of days and seasons.”).
- ²²⁰ See Cheryl Kelley & Marshall Duer-Balkind, Institute for Market Transformation, *Five Takeaways on Making Building Performance Standards Work for Everyone* (Sept. 8, 2025), <https://imt.org/news/five-takeaways-on-making-building-performance-standards-work-for-everyone/>.
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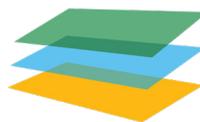
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