



INTERNATIONAL
CODE
COUNCIL®

ENERGY CODES AND BUILDING PERFORMANCE STANDARDS: SUPPORTING ENERGY USE AND EMISSIONS REDUCTIONS IN BUILDINGS

January 2023



INTRODUCTION

Building energy codes have an over 40-year history of driving improvements in the energy efficiency of new buildings and major renovations. Since 2006, the *International Energy Conservation Code*® (IECC®) has produced a nearly 40 percent improvement in new residential building energy use, with a 9.4 percent increase in efficiency between the 2018 and 2021 editions alone (*Figure 1*), according to analysis performed by the United States Department of Energy (DOE).¹ Similarly, the 2021 IECC commercial provisions provide site energy savings of 12.1 percent and a 10.2 percent reduction in building-related greenhouse gas (GHG) emissions relative to the 2018 IECC.² *Figure 2* shows that the commercial and residential provisions of the IECC have delivered significant GHG emissions reductions over time—providing cumulative savings of over 700 million metric tons of CO₂ equivalent since the 2009 edition, which is equivalent to the annual GHG emissions of 152 million passenger vehicles³ in the U.S.⁴ Energy codes continue to progress with the inclusion of net-zero energy appendices and guaranteed improvements in future editions of the IECC that drive toward net-zero energy buildings.

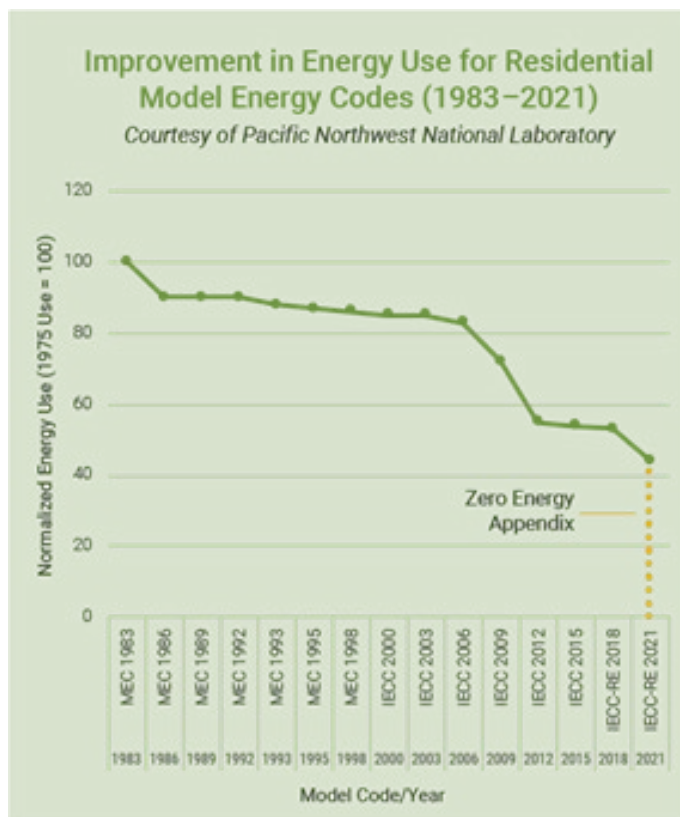


Figure 1. Improvement in Energy Use for Residential Model Energy Codes (1983-2021).

¹ Department of Energy. 2021. [National Cost Effectiveness of the Residential Provisions of the 2021 IECC](#).

² Department of Energy. 2022. [Energy and Energy Cost Savings Analysis of the 2021 IECC for Commercial Buildings](#).

³ Value extracted using Environmental Protection Agency average greenhouse gas emissions per typical passenger vehicle data, <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>.

⁴ GHG savings from the commercial provisions of the 2021 IECC were not available at the time of publication.

While energy codes have made significant progress in reducing the energy use of new and renovated buildings, today's buildings will still represent two-thirds of the global building stock by 2040.⁵ This leaves a significant stock of existing buildings that were built to prior, less-efficient versions of the energy code and that continue to operate without the benefits of updated technologies and practices to reduce GHG emissions and energy usage.

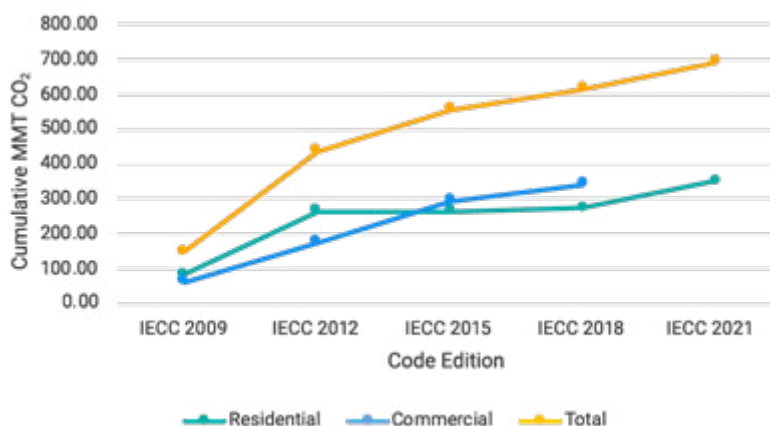


Figure 2. Cumulative CO₂ Savings from Each Edition of the IECC (2009-2021).

The built environment, including buildings and construction, accounts for approximately 40 percent of energy-related GHG emissions, while buildings alone are responsible for 36 percent of final energy consumption globally.⁶ In the U.S., during 2021, buildings and construction accounted for 39 percent of total energy consumption when including electrical and fossil fuel system energy losses.⁷ Approximately 2.75 trillion square feet of buildings currently exist worldwide⁸ and 5.9 million existing commercial buildings in the U.S. comprise 97 billion square feet.⁹

Historically, energy codes have been implemented as a tool to reduce the energy consumption of new buildings and major renovations and alterations. There are performance requirements in some energy codes, but most energy codes do not incorporate requirements that specifically dictate how the building has to perform during its use phase or after the Certificate of Occupancy is issued. Thus, the actual energy performance of existing buildings is not typically governed by an energy code and is not considered from a code perspective unless the owner undertakes a renovation or a stand-alone energy efficiency upgrade (e.g., replacing older existing lighting with new high-efficiency LED lighting fixtures).

Addressing the energy use of the existing building stock can help ensure inclusion of modern building practices and technologies that reduce energy waste and GHG emissions. Further, climate change mitigation goals cannot be met unless the energy use and emissions of existing buildings is reduced. Research has shown that more than \$279 billion could be invested in existing U.S. building retrofits, which would yield more than \$1 trillion in energy savings over 10 years and create over 3.3 million cumulative job-years.¹⁰ If undertaken, these retrofits would reduce total U.S. emissions by nearly 10

⁵ Architecture 2030. 2020. [Why the Built Environment?](#) IEA Energy Technology Perspectives 2020.

⁶ Global Alliance for Buildings and Construction. 2021. [2021 Global Status Report for Buildings and Construction: Towards a zero-emissions, efficient and resilient buildings and construction sector](#). United Nations Environment Programme.

⁷ U.S. Energy Information Administration. 2021. [How much energy is consumed in U.S. buildings?](#) U.S. Department of Energy.

⁸ World Business Council for Sustainable Developments. 2021. [Net-zero buildings: Where do we stand?](#) Arup.

⁹ U.S. Energy Information Administration. 2022. [2018 Commercial Buildings Energy Consumption Survey: Preliminary Consumption and Expenditures Highlights](#). U.S. Department of Energy.

¹⁰ The Rockefeller Foundation and Deutsche Bank Climate Change Advisors. 2012. [United States Building Energy Efficiency Retrofits: Market Sizing and Financing Models](#).

percent and account for a financial savings equivalent of roughly 30 percent of the annual electricity spend in the U.S.¹¹ With buildings being one of the drivers of global GHG emissions, addressing the existing building stock is an important component towards meeting GHG emissions reduction, energy efficiency and climate goals.

Building Performance Standards (BPS) have emerged as a tool for jurisdictions to enforce energy performance requirements in occupied buildings. This resource document provides background on BPS and how they are being implemented, plus opportunities for model energy codes and building code departments to support their implementation more effectively. Coordinating building codes and BPS is key to setting buildings up for long-term success in achieving jurisdictional energy and climate goals.¹²

Enhanced efforts to adopt and enforce modern building and energy codes will ultimately support better building performance and allow jurisdictions to implement more coordinated BPS policies. Jurisdictions play a key role in planning how all buildings will be required to maintain and improve energy and GHG emissions performance over time. A key element to achieving coordination between energy codes and BPS will be to enhance efforts in building energy and emissions modeling and target setting. Collaboration among state and local officials and building, energy and sustainability departments will be crucial to ensure the relationship between energy codes and BPS is understood. Another collaboration needed to coordinate energy codes and BPS are with third party green building certification programs, some of which have worked their way into local law requirements, including LEED, Passive House, and the National Green Building Standard. Collaboration between these networks and entities will also be needed to coordinate policies to effectively enforce an integrated building regulatory activity to meet overarching climate goals.

This resource is intended to help support a holistic approach to the efficient use of energy across the entire life cycle of a building. It provides building code departments and code officials with information on how BPS are developed and implemented and discusses the importance of a coordinated approach across energy codes and BPS.

What Are Building Performance Standards?

BPS typically require existing buildings to meet specified performance levels, particularly for energy use and GHG emissions. BPS allow jurisdictions to establish a series of performance targets to be achieved by all covered buildings at pre-defined intervals. That is, an initial performance target is set which then becomes more stringent over time, ensuring continuous, long-term performance improvements in a jurisdictions' building stock.¹³

BPS policies currently target the existing commercial and multifamily building stock. They typically provide building owners with flexibility in implementing specific technologies and operational strategies customized to accommodate their circumstances and meet established targets. Layered with complementary policies, BPS can assist governments in addressing their goals in key areas impacted by the built environment, including energy efficiency, GHG reductions, a transition to less carbon intensive energy sources, expansion of renewable and zero-carbon energy sources used by buildings, and water efficiency.¹⁴

Benefits of Building Performance Standards

BPS provide a tool to enforce climate and energy-related goals of the existing building stock—similar to the role building energy codes play for new buildings. BPS have the additional benefit of being able to use measured performance data while providing flexibility on how to meet the targets and outcomes established in the policy. This flexibility is important

¹¹ The Rockefeller Foundation and Deutsche Bank Climate Change Advisors. 2012. United States Building Energy Efficiency Retrofits: Market Sizing and Financing Models.

¹² Boyce, A. January 2022. [Effective Building Policies Need to Align Codes and BPS](#). Institute for Market Transformation.

¹³ Institute for Market Transformation. 2022. [Building Performance Standards](#).

¹⁴ U.S. Environmental Protection Agency. [What are Building Performance Standards?](#) ENERGY STAR Program.

given the diversity in the existing building stock. Some cities could cut 30 percent of their urban GHG emissions by 2050 if they implemented strict energy efficiency requirements targeting the existing building stock, and these improvements can provide not only energy performance benefits, but also enhance the resilience of a building.¹⁵

Enhanced energy performance can support passive survivability, or the ability for a building to remain habitable in the face of hazard events or crises, by ensuring enhanced temperature-related comfort during an extended power or fuel outage caused by extreme heat or winter weather events. Reduced energy demand to obtain comfortable temperatures through increased building efficiency can also enhance the resilience of the energy grid. In addition to operational energy, resilience benefits and GHG emissions savings, there is also a significant opportunity to reduce the impact of embodied carbon by improving and reusing existing buildings through BPS policies that enhance energy efficiency.¹⁶ Figure 3, developed by the Institute for Market Transformation (IMT), illustrates the holistic benefits that BPS introduce for communities at large.¹⁷

Building Performance Standards: A Platform for Building Regulation

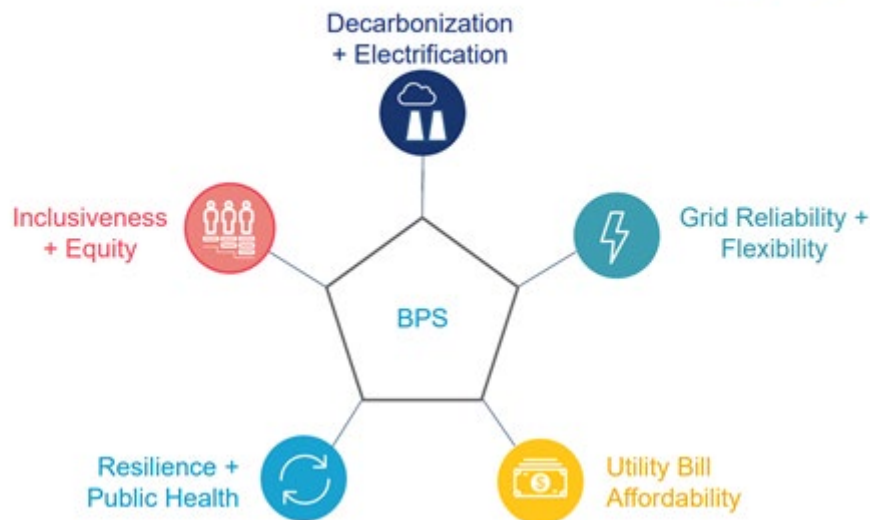


Figure 3. Multi-pronged community benefits introduced by BPS. Source: IMT.

Where Are Building Performance Standards Currently Adopted?

Recognizing the impact that the existing building stock has on the environment and society, BPS have become a policy-intervention tool to combat climate change. The Federal government and certain state and local governments are increasing their commitment to climate change mitigation and have identified their building stock as a core pathway to achieve climate, equity, public health and finance goals. Some state and local governments are implementing BPS, or in some cases Building Energy Performance Standards (BEPS), as a policy mechanism to achieve such goals, which is highlighted in Figure 4. To date, the following jurisdictions have developed and implemented a BPS policy: Boston, MA; Boulder, CO; Chula Vista, CA; Denver, CO; Maryland; Montgomery County, MD; New York City, NY; Reno, NV; St. Louis, MO; Washington D.C.; and Washington State. Other entities that have control over a building stock may also adopt a BPS to meet their specific goals, such as a school district or housing authority. For the same reason, a BPS could also be implemented by private entities such as holders or managers of large building portfolios.

¹⁵ Coalition for Urban Transitions. 2019. [Climate Emergency, Urban Opportunity: How National Governments Can Secure Economic Prosperity and Avert Climate Catastrophe by Transforming Cities](#).

¹⁶ Cheslak, K. 2020. [Delivering Climate Solutions from Existing Buildings: No Time to Waste](#). New Buildings Institute.

¹⁷ Institute for Market Transformation. 2021. [Building Performance Standards: Model Policy Overview](#).

There are a number of other jurisdictions who are in the process of developing or considering BPS. *Figure 4* highlights the jurisdictions that have already implemented BPS, as well as those who are in the process of development or consideration. More information on state and local building performance standards can be found on the DOE's Building Energy Codes Program website [here](#).

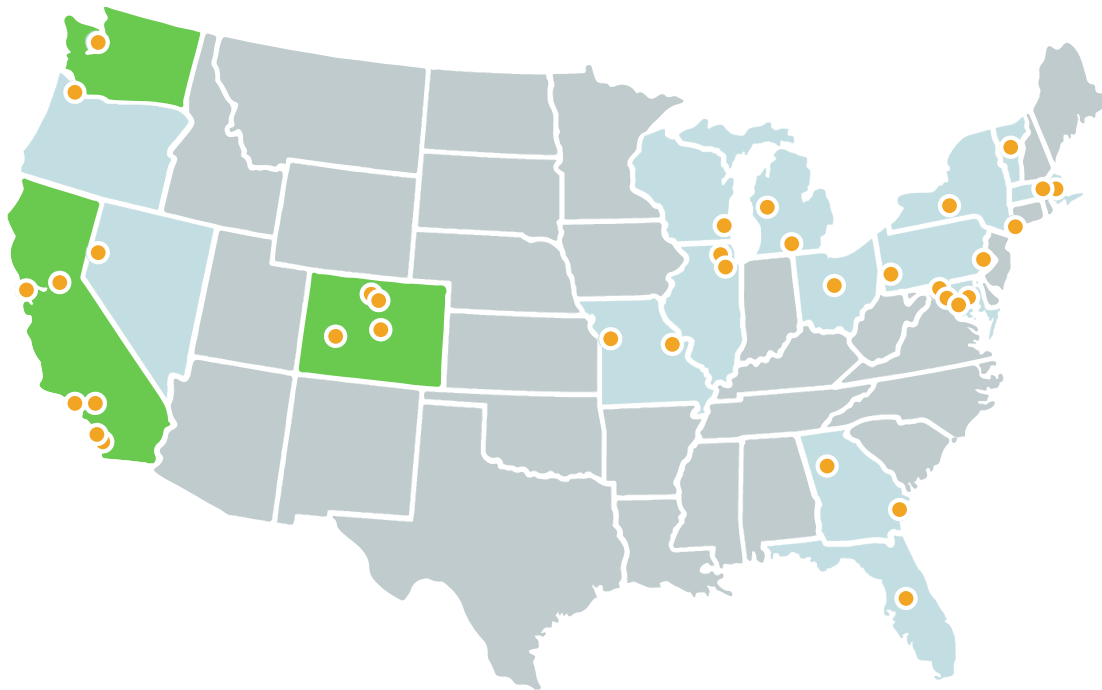


Figure 4. United States National Building Performance Standards Coalition Participants. Source: Building Performance Standards Coalition.

United States Federal Government

The U.S. Administration has set a target to reduce economy-wide GHG emissions by 50 to 52 percent from 2005 levels by 2030. Recognizing the significant role existing buildings play in tackling climate change and meeting GHG emissions reduction goals, as highlighted in *Figure 5* from [DOE, the U.S. Administration launched the Building Performance Standards Coalition](#) in January 2022. The BPS Coalition established a partnership between 33 state and local governments dedicated to delivering cleaner, healthier and more affordable buildings.¹⁸ The Coalition accounts for nearly 20 percent of the nation's building footprint. Participating state and local governments have committed to design and implement building performance policies and programs in their jurisdictions to meet their GHG emissions reduction, resilience and energy efficiency goals.

The Coalition's work will revolve around developing policy roadmaps, convening place-based teams to collaborate in policy creation, identifying and acting on pre-requisites for BPS and complementary policies, and sharing lessons learned to establish a forum of practice. All participating jurisdictions committed to [adopt a building performance policy by Earth Day 2024](#). The Federal Government will also soon make available [\\$1.8 billion under the Infrastructure Investment and Jobs Act \(IIJA\)](#) to help local governments pursue BPS policies.

¹⁸ Coalition members include the State of California; the State of Colorado; State of Washington; Ann Arbor, MI; Annapolis, MD; Aspen, CO; Atlanta, GA; Boston, MA; Cambridge, MA; Chicago, IL; Chula Vista, CA; Columbus, OH; Denver, CO; Evanston, IL; Fort Collins, CO; Grand Rapids, MI; Ithaca, NY; Kansas City, MO; Los Angeles, CA; Milwaukee, WI; Montgomery County, MD; New York, NY; Orlando, FL; Philadelphia, PA; Pittsburgh, PA; Portland, OR; Prince George's County, MD; Reno, NV; Sacramento, CA; Saint Louis, MO; San Francisco, CA; Savannah, GA; Seattle, WA; and Washington, DC.

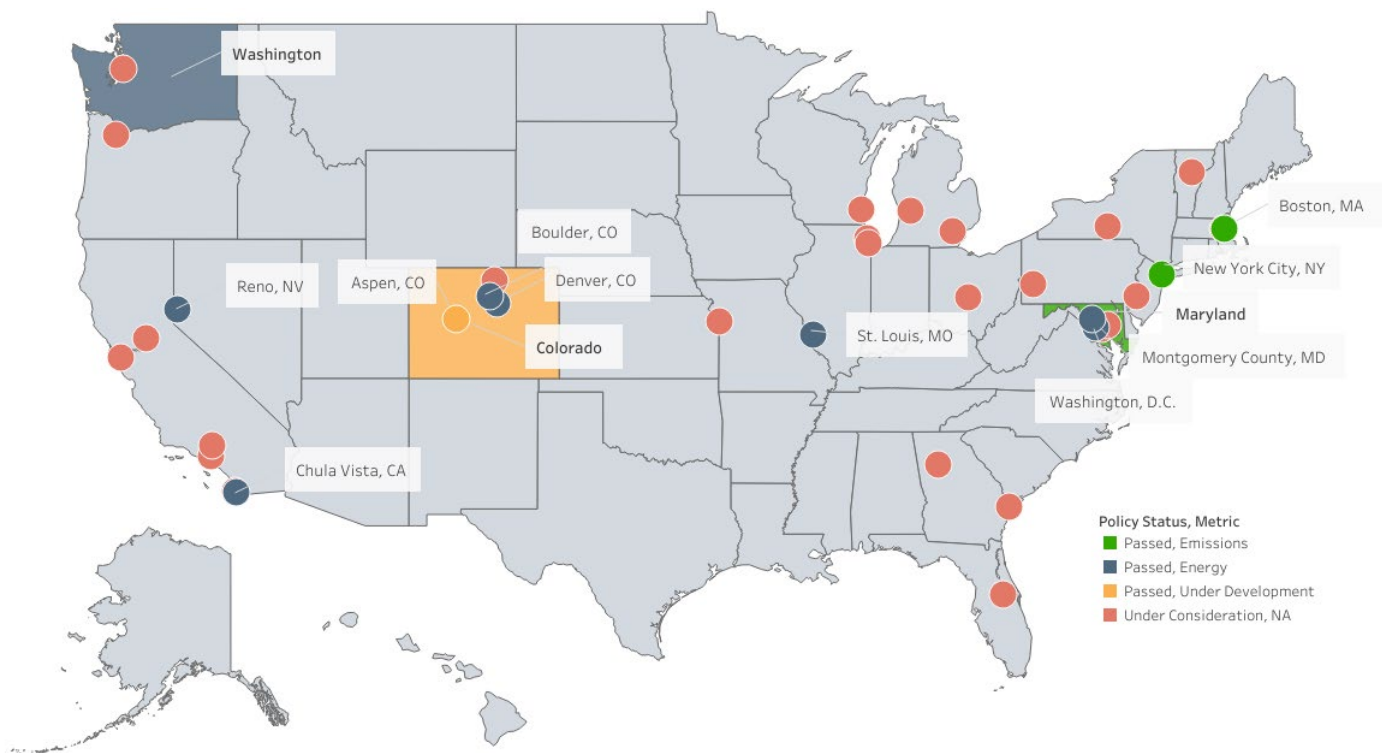


Figure 5. U.S. City and State Policies for Existing Buildings: Building Performance Standards. Source: DOE/PNNL.

Under the newly established [National Initiative to Advance Building Codes](#), the Federal Government pledged to develop the first of its kind [Federal Building Performance Standards](#) to help achieve net-zero GHG emissions across new and existing federal buildings by 2045. The Federal BPS will be an interagency effort, with development occurring through collaborative efforts by the White House Council on Environmental Quality (CEQ), the General Services Administration, DOE, and the Environmental Protection Agency. The BPS will advance the retrofits of existing Federal buildings and establish metrics, targets, and tracking methods to reach the Administration's federal GHG emissions reduction goals. The Federal BPS sets targets for a net-zero GHG emissions federal building stock by 2045 and 50 percent GHG emissions reduction by 2032. A draft standard was submitted to the OMB Office of Information and Regulatory Affairs for review in early June 2022.

On December 7, 2022, the Council on Environmental Quality announced the first Federal Building Performance Standard which establishes a goal to cut energy use and electrify equipment and appliances in 30 percent of the building space owned by the Federal government by 2030.¹⁹ The announcement includes a [proposed rulemaking](#), developed by DOE, to electrify new Federal buildings and those undergoing major renovations. In conjunction with the announcement, the State of California has also signed on to the National Building Performance Standard Coalition. Altogether, these actions will ensure that one quarter of all commercial, Federal and multifamily buildings in the U.S. are now covered by or in the process of being covered by BPS policies.

Based on jurisdictional needs and goals, BPS policies can differ in covered buildings, targets, performance requirements, and compliance. See the *Appendix* for specific nuances and requirements of BPS policies currently implemented throughout the nation. The following sections will highlight the key elements of BPS policies and the ways in which they can differ to meet the unique needs of each jurisdiction developing and implementing them.

¹⁹ The White House. December 2022. [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](#). White House Briefing Room.

Covered Buildings

Many BPS policies are structured to target the specific building types that contribute most to a jurisdiction's energy use or GHG emissions in an effort to achieve local energy and climate goals. The buildings covered by BPS policies can differ by jurisdiction.

Performance Requirements

BPS policies also vary based on the metrics used and the performance targets established. Performance metrics and requirements differ across jurisdictions based on the typology of their existing building stock and current performance. These metrics can be based on onsite or offsite energy use, as well as GHG emissions. Water use and efficiency requirements may also be incorporated into performance requirements of future BPS. The metrics generally used include site Energy Use Intensity (EUI)²⁰, source EUI, ENERGY STAR Score, or Greenhouse Gas Intensity (GHGI).

Compliance Cycle and Pathways

BPS policies differ by compliance requirements. Specifically, policies can have varying compliance cycles based on building types and timeframes, as well as pathways to achieve compliance. Compliance is contingent on the buildings covered by the policy and the performance targets set.

Affordable Housing Provisions

Housing affordability challenges are not only tied to new buildings but also to the existing building stock. Housing affordability is a major element of environmental justice and the ability for communities to thrive. Some jurisdictions have considered provisions to curb the challenges of housing affordability as part of their BPS. As affordable housing programs continue to be refined, more jurisdictions will seek to strategically implement them into their building programs to support climate and equity goals.

Exemptions

Most BPS are extremely focused and targeted by design. While these policies establish requirements for specific building types, fuel types and allowances, and overall performance, they also include exemptions. These exemptions clarify the focus of the regulation within the bounds of its scope by establishing specific obligatory exclusions.



²⁰ **Energy use index** or EUI is a metric that measures a building's energy use as a function of characteristics such as size. EUI is calculated by dividing the total energy consumed by a building in one year by the total gross floor area of a building, and is expressed as energy per square foot per year.

Agencies and Departments Responsible for Implementation

Whereas building code requirements are typically enforced by building and fire code authorities, BPS requirements have found their home in different state and local agencies—and are rarely the same agency or office responsible for code enforcement. This can create a significant disconnect between policies and agencies, leading to frustration for building owners and facility managers. Lessons learned from code department engagement with owners and the building industry, plus the infrastructure for tracking compliance, would be incredibly valuable in creating an effective BPS. These are the current agencies or departments responsible for BPS and building code administration, respectively:

Jurisdiction	BPS Administration Body	Building Code Administration Body
Boston, MA	Air Pollution Control Commission	Office of Public Safety and Inspections
Chula Vista, CA	Department of Buildings Office of Building Energy and Emissions	Department of Buildings
Denver, CO	Department of Energy and Environment	Department of Consumer and Regulatory Affairs
Montgomery County, MD	Department of Public Safety Buildings Division	Department of Public Safety Buildings Division
New York, NY	Department of Environmental Protection	Department of General Services Division of Building Design and Construction
St. Louis, MO	Office of Climate Action, Sustainability & Resiliency	Department of Local Affairs Office of Regulatory Oversight
State of Colorado	Office of Sustainability CLEAN Group	Development Services Department; The Planning Commission
State of Washington	Governor's Energy Office	Governor's Energy Office ²¹
Washington D.C.	Department of Commerce	Department of Community Trade and Economic Development

²¹ Colorado is a Home Rule state and does not have a statewide code adoption. Colorado did however establish the Colorado Energy Codes Support Partnership, consisting of the Colorado Department of Local Affairs, the Colorado Governor's Energy Office, Colorado Code Consulting, LLC, the International Code Council and Energylogic, which provides specific, on-site technical assistance to Colorado local jurisdictions concerning adoption, enforcement and compliance.

Gaps in Coordination Between New and Existing Building Policies

To date, most U.S. BPS have overlooked coordination with new construction and the regulations that oversee those buildings. Development of most BPS policies has focused on addressing the current stock of existing buildings, and has not considered the impact or requirements necessary for new buildings and more explicit coordination with building and energy codes. A new building becomes an existing building the moment construction is completed, or when it receives its Certificate of Occupancy, thus coordination between BPS and buildings codes is needed in order to streamline the compliance expectations to the varying level of prescriptive and performance requirements established in both—ensuring new buildings are not being penalized for not meeting performance targets when the policy requirements were never coordinated in the first place.²²

One possible barrier to coordinating BPS and buildings energy codes is that energy codes traditionally cover the design and construction phases, and do not grant authority to building departments to regulate the energy performance of buildings once they have received a Certificate of Occupancy.²³ It is important to note that in some cases, such as in states that set a statewide code that local jurisdictions cannot amend up or down (also characterized as minimum/maximum states), jurisdictions have no direct control over the development of the state energy code they must enforce. In this way, cities in states that limit local authority to govern energy are now turning to GHG metrics as a workaround to adopt policies, like BPS, not explicitly authorized by state law. Non-coordinated codes and BPS will require different proofs of compliance, increasing administrative burden and creating further confusion of compliance pathways and requirements.

A key challenge to coordinating building energy codes and BPS is that assumptions about occupancy and operational characteristics used for a performance-based approach may be different than what actually occurs in operation. Thus, it is important to parse out if and how much misalignment can occur just due to these factors. Enhanced energy modeling and validation processes will be needed in order to better coordinate the actual performance of buildings once they are operational with the intended occupancy.

The lack of intentional coordination puts both jurisdictions and building owners in an uncertain position, potentially requiring a very costly and possibly uneconomic major retrofit of a building within the early stages of its lifecycle. Effective coordination between BPS and building energy codes will be critical to ensuring requirements are streamlined, compliance is understood and effectively enforced, and economic and material efficiencies are established.

There are important considerations in working towards increased coordination. For example, the assumptions made about occupancy and operational characteristics within the code and during design may be different or change over time based on how a building is actually used.

How Can Jurisdictions Coordinate BPS and Energy Codes?

BPS target the existing building stock which, over time, may fall behind new buildings in performance due to enhanced requirements established in modern building codes. Together, building energy codes and BPS are critical policy mechanisms to achieve climate and energy goals by holistically approaching the entire building stock in jurisdictions. Tying these two tools together as complementary policies, instead of thinking of them as separate entities, will be essential to establish holistic policy approaches to address GHG emissions and energy reductions in both new and existing buildings. Another opportunity to explore is the streamlining of building code and BPS compliance processes to reduce the compliance burdens for both building owners and code officials or inspectors. In this way, building regulatory frameworks will better streamline compliance processes and support achievement of jurisdictional climate goals.

²² Cohan, D. and K. Cheslak. 2022. [Raising the Standard: Building Performance and the Reshaping of Urban Energy Regulation](#). Institute of Market Transformation and New Buildings Institute.

²³ Cohan, D. and K. Cheslak. 2022. [Raising the Standard: Building Performance and the Reshaping of Urban Energy Regulation](#). Institute of Market Transformation and New Buildings Institute.

Recommendations on coordinating BPS and Energy Codes

It is important to consider and integrate equity into all building policies, including those that target existing buildings. Jurisdictions and policymakers should target companion policies to strengthen access, inclusion and support toward compliance for under-resourced buildings.²⁴ Ensuring underrepresented and disadvantaged communities are supported, and not inadvertently harmed, by climate policies, like BPS, will yield equitable outcomes in sustainable development, human health and climate resilience for all community members. These equity considerations should be coordinated amongst building policies as they are key components of energy and climate goals.

To further ensure energy and climate goals are met, jurisdictions will need to target the entire lifecycle performance of a building by coordinating BPS and building energy codes through enhanced policy-making and local departmental coordination, and metric and target alignment.

Performance-based codes can include targets coordinated with BPS. By targeting performance-based outcomes in energy codes that set requirements to enhance energy efficiency and decarbonization, policymakers can ensure code language and provisions coordinate with implemented BPS policies.²⁵ Building codes and BPS metrics generally differ, considering most commercial building energy codes use energy costs while BPS typically use site energy or GHG emissions. Implementation of performance-based compliance pathways in codes could more effectively coordinate codes with BPS by shifting energy modeling metrics to EUI or building GHG emissions. Conversely, BPS policies can also include prescriptive retrofit packages as an alternate compliance path when performance targets are not met. It is important that careful considerations are given to coordinate the prescriptive requirements in the two policies and their triggering mechanisms.²⁶

Although performance-based codes require departmental resources and technical expertise, there are other strategic ways to coordinate the two policies. Potential solutions for jurisdictions to improve the performance-based code compliance pathway is to develop training programs and standards or guidelines to support the industry with finetuning energy modeling to better predict actual performance. Establishment of a validation process is necessary to ensure engineers routinely evaluate and continuously improve their energy modeling assumptions and results.

Because most building codes and BPS are often developed and enforced by different departments, and through different processes depending on the state, coordination between code departments and local officials with energy and sustainability departments is a key step toward the more effective coordination of the requirements and enforcement criterion of the two policies.²⁷ In many cases, energy codes and BPS face similar regulatory and compliance issues due to a lack of departmental resources and technical expertise. Removing departmental redundancy may aid in the resource and technical expertise areas, as well as coordination between the two policies. It is important for coordination and engagement to occur at the onset of BPS development and implementation to ensure smooth adoption and implementation. Coordination of rulemaking, compliance review, and enforcement processes for energy codes and BPS regulations will be critical to avoid burdening building owners and operators once a building becomes occupied.²⁸

²⁴ Bugnion, V., N.L. Long, R. Mitchell, H. Bergmann, A.C. Swindler, and E.M. Beers. 2022. [Building Performance Standards to Drive Market Transformation. Clearly Energy, National Renewable Energy Laboratory, Lawrence Berkeley National Laboratory, and U.S. Department of Energy.](#)

²⁵ Boyce, A., K. Cheslak, and J. Edelson. 2022. [The New Challenge for New Construction: The Intersection of Energy Codes and Building Performance Standards.](#) Institute for Market Transformation and New Buildings Institute.

²⁶ Bugnion, V., N.L. Long, R. Mitchell, H. Bergmann, A.C. Swindler, and E.M. Beers. 2022. [Building Performance Standards to Drive Market Transformation. Clearly Energy, National Renewable Energy Laboratory, Lawrence Berkeley National Laboratory, and U.S. Department of Energy.](#)

²⁷ Although there is not an explicit recommendation for jurisdictions coordinating BPS in minimum/maximum states, it is important to note that building energy code and BPS coordination will look different in home-rule min/max states.

²⁸ Boyce, A., K. Cheslak, and J. Edelson. 2022. [The New Challenge for New Construction: The Intersection of Energy Codes and Building Performance Standards.](#) Institute for Market Transformation and New Buildings Institute.

Coordination between policymakers and enforcement departments will also help coordinate target setting to ensure new buildings are aligned to meet BPS targets once they become occupied. Policymakers should set expectations of when and how long new buildings should meet BPS targets; one proposal suggests that new construction should meet the BPS targets for 10–20 years without energy retrofits and improvements except for retro-commissioning and operational corrections.²⁹ This can be done by establishing performance data from buildings complying with modern building codes as the baseline, which will then inform BPS policy design and future code changes. If data shows that BPS targets will not be met by new buildings through code compliance, high-performance code provisions should be considered during the code adoption process.³⁰

A key element to achieving this coordination is to expand efforts in building energy and emissions metering to create complimentary target setting. Incorporating basic energy and emissions metering and feedback systems into code requirements can provide operators and tenants with actionable information that can inform management of building performance. Further enhancing the detail of actionable information, implementation of energy and emissions submetering by major system and occupancy can provide performance data that allows operators and tenants to not only understand their energy usage but identify opportunities to improve energy usage to meet BPS requirements.³¹ Although energy metering and system commissioning have been integrated into model energy codes, these controls must be successfully configured post construction and aligned with performance outcomes to ensure buildings are meeting the goals of both policies through the entire lifecycle of the building.

The Code Council encourages interested stakeholders to participate in local public engagement opportunities as part of the building code and BPS development processes to ensure coordination between the two policies. Interested stakeholders should voice the need for coordination across the respective administrative bodies. Building code departments are also encouraged to engage with their jurisdiction's BPS administrative body during the development and ongoing implementation of these policies. Elected state and local officials should also follow the work of the National BPS Coalition to maintain understanding of lessons learned and best practices for implementing BPS policies, as well as for coordinating BPS with existing building energy code provisions. In doing so, jurisdictions can develop coordinated rulemaking, compliance review, and enforcement processes for energy codes and BPS policies to ensure jurisdictions' energy and emissions reduction goals are realized.

Stakeholders Engagement Process

The International Code Council engaged relevant energy stakeholders, including designers, engineers, trade associations, research organizations and government officials, during the development of this educational resource. Interested stakeholders provided feedback on a draft released for comment in October 2022. Comments received during the stakeholder engagement process have been addressed to the extent practical. Participation in stakeholder feedback does not indicate support of the content of this resource. The content may not reflect the policies or positions of the individuals or organizations.

²⁹ Bugnion, V., N.L. Long, R. Mitchell, H. Bergmann, A.C. Swindler, and E.M. Beers. 2022. [Building Performance Standards to Drive Market Transformation. Clearly Energy, National Renewable Energy Laboratory, Lawrence Berkeley National Laboratory, and U.S. Department of Energy.](#)

³⁰ Ibid.

³¹ Boyce, A., K. Cheslak, and J. Edelson. 2022. [The New Challenge for New Construction: The Intersection of Energy Codes and Building Performance Standards.](#) Institute for Market Transformation and New Buildings Institute.

APPENDIX

This appendix highlights the nuances of BPS from jurisdictions across the nation who have implemented policies to date. The specific strategies employed by some of the leading jurisdictions are outlined in the following sections.³² Note, this is not an exhaustive list of currently implemented BPS policies.

Policy Type

Boston, Massachusetts	The City of Boston enacted its Building Emissions Reduction and Disclosure Ordinance (BERDO) in 2021, which covers all municipal buildings as well as all commercial and multifamily buildings greater than 20,000 square feet (ft ²) and specified multifamily buildings with 15 residential units or more. The policy also covers instances of multiple buildings on the same parcel totaling 20,000 ft ² or 15 or more units.
Denver, Colorado	In 2021, the City of Denver passed the Building Decarbonization Policy , Bill 21-1310, which includes a BPS for its largest buildings. The policy covers all commercial and multifamily buildings 25,000 ft ² or larger.
Montgomery County, Maryland	Bill 16-21 enacted the County's Environmental Sustainability – BEPS program in 2022, which covers public, commercial, institutional and multifamily buildings 25,000 ft ² or larger.
New York City, New York	New York City's Local Law 97 , a pillar of NYC's 2019 Mobilization Act, establishes requirements for its Building Carbon Performance Standard, which covers commercial and multifamily buildings 25,000 ft ² or larger.
Washington, D.C.	The District's BEPS Program was set forth in Title III of the Clean Energy DC Omnibus Act of 2018 . The policy uses a tiered approach based on date: ▪ On January 1, 2021, all privately owned buildings 50,000 ft² or larger and District-owned buildings 10,000 ft² or larger ▪ Beginning January 1, 2027, all privately owned buildings 25,000 ft² or larger ▪ Beginning January 1, 2033, all privately owned buildings 10,000 ft² or larger
Washington State	Washington established the State Energy Performance Standard, enacted through House Bill 1257 – Clean Buildings Act in 2019, which covers non-residential commercial buildings 50,000 ft ² or larger. Beginning in 2031, the policy will also cover multifamily buildings 20,000 ft ² or larger and add commercial buildings 20,000 ft ² to 49,999 ft ² .

³² Information in this section was gathered from the Institute of Market Transformation's Comparison of U.S. Building Performance Standards June 2022 White Paper: <https://www.imt.org/wp-content/uploads/2022/06/06.22-BPS-Matrix.pdf>.

Performance Requirements

Boston, Massachusetts	Boston uses annual GHGI emissions per square foot (tCO ₂ e/ft ²) as its metric. Performance targets are set by each building type on an emission intensity basis which is calculated by multiplying the building GHG emissions target by the building's gross floor area. ³³ The policy requires buildings to meet their targets annually beginning in 2025, with the targets becoming more stringent every 5 years. Boston also has an opt-in 'glide path' target, which consists of achieving a 50 percent emissions reduction by 2030 and a 100 percent reduction by 2050 using a 2005 or later baseline.
Denver, Colorado	Denver uses weather-normalized site EUI for its performance metric. Covered buildings must meet a maximum site EUI target that is based on occupancy type by 2030, with interim performance targets set for 2024 and 2027 to ensure progress toward the final 2030 target. Interim targets are set based on the building's trajectory from its 2019 baseline site EUI performance to the final 2030 site EUI target for its property type.
Montgomery County, Maryland	Montgomery County uses site EUI for its performance metric. Currently the County has three proposed target settings: energy efficiency (EE) target based on energy end uses, zero net carbon-compatible (ZNC) target, and a mid-point between EE and ZNC targets. In the County's BEPS Technical Report Executive Summary , the ZNC target that includes electrification and cleaning the grid was identified as the most efficient path to achieve the County's Climate Action goal to aggressively reduce GHG emissions by 2035.
New York City, New York	NYC uses annual GHG emissions (tCO ₂ e/ft ²) for its performance metric, with targets for a building's GHG emissions becoming more stringent every 5 years. The performance limits are set for each building by multiplying the corresponding building type's GHG emissions intensity limit (tCO ₂ e/ft ²) by the building's gross floor area (ft ²). NYC calculates building GHG emissions by multiplying the total energy consumption of each fuel type consumed on-site by the corresponding GHG coefficient for that specified fuel type (tCO ₂ e/kBtu), then totaling the resulting emissions.
Washington, D.C.	The District uses the ENERGY STAR score or an equivalent performance metric and requires the BEPS to be at least as stringent as the District median ENERGY STAR score for buildings of each property type. The policy also directs the department to assign a metric based on GHG emissions by 2023. The District Department of Energy & Environment (DOEE) will issue new performance standards every six years and is required to set campus-wide standards for educational campuses and hospitals.
Washington State	Washington uses weather-normalized site EUI as its performance metric. Washington requires EUI targets to be no greater than the average EUI for the building's occupancy type with adjustments for unique energy-using features, which are initially based on ASHRAE Standard 100-2018. The proposed rules set the first target at 15 percent below average EUI for the specified building type.

³³ Blended average for multi-use buildings.

Compliance Cycle and Pathways

Boston, Massachusetts	Boston's compliance cycle begins annually in 2025 for buildings 35,000 ft ² or larger and annually in 2030 for those between 20,000 ft ² and 34,999 ft ² , with GHG emissions targets becoming more stringent every 5 years following until achievement of net-zero carbon in 2050. Under the compliance pathways, buildings must meet the GHG emissions targets based on use type or the glide path. Compliance can be met by any combination of energy efficiency, electrification, or onsite renewables strategies. Buildings may also use Renewable Energy Credits (REC) to offset GHG emissions from electrical demand.
Denver, Colorado	Covered buildings must comply with interim performance targets in 2024 and 2027, leading up to a final performance standard in 2030 – maintaining each level of performance afterward. The policy allows a building to deduct energy produced from onsite or offsite solar from its measured site EUI. The regulation also includes a prescriptive compliance pathway for covered buildings between 25,000 ft ² and 100,000 ft ² that requires electrification of at least 70 percent of the heating and water heating loads and verification of LED usage for lighting. Denver will issue regulations on alternative compliance options such as adjusted compliance timelines and performance targets.
Montgomery County, Maryland	Montgomery County has set a tiered compliance approach based on building size and use time. The compliance cycle will be every 4 years beginning in 2024 for County-owned and commercial buildings 50,000 ft ² or larger; 2026 for County-owned and commercial buildings between 25,000 ft ² and 50,000 ft ² ; 2026 for residential buildings 250,000 ft ² or larger; and 2027 for residential buildings between 25,000 ft ² and 250,000 ft ² . Building owners may propose an alternative compliance plan to be considered by the Building Energy Improvement Board.
New York City, New York	Covered buildings have an annual compliance cycle beginning in 2024, with GHG emissions limits becoming more stringent every 5 years. As an alternative compliance pathway, buildings can use RECs and offsets to compensate for exceeding their GHG emissions limits. There is also an energy conservation measure prescriptive pathway for buildings not covered by Local Law 97's GHG emissions limits. Adjustment to annual GHG emissions limit compliance (up to three years) can be granted to a building by the Office of Building Energy and Emissions Performance in accordance with the policy's exceptions.
Washington, D.C.	The District has set a compliance cycle of 5 years with a 1-year buffer to provide a recalculation period to set standard targets for the next compliance cycle. If compliance is met at the beginning of the compliance cycle, then a building does not have regulatory requirements during that cycle. However, if a building does not meet the standard at the beginning of the cycle then the building must 1) reduce site EUI by 20 percent before the end of the compliance cycle; 2) comply prescriptively; or 3) meet the standard by the end of the cycle if the standard for the property type is better than the national median.
Washington State	The State of Washington's policy requires its standard to be updated in 2029 and every 5 years thereafter. Under law, the Department of Commerce has authority to create a conditional compliance method for all buildings that do not meet the set performance target. The alternative compliance method requires building owners to complete energy audits and implement investments in measures that provide a savings-to-investment ratio of 1.0 or greater.

Affordable Housing Provisions

Boston, Massachusetts	Boston allocates earnings from its enforcement program to the Equitable Emissions Investment Fund for investments in local carbon abatement programs. This program targets affordable housing units and environmental justice communities by undertaking projects that reduce carbon emissions and operational costs of buildings for disadvantaged populations throughout the city. The Fund is controlled by a Board with two-thirds of its members nominated by environmental justice community organizations.
New York City, New York	NYC allows buildings with at least 35 percent rent-regulated units to choose the prescriptive pathway. NYC Housing Authority is also working to ensure aggregate GHG emissions are drastically reduced in buildings it owns, manages or built on Authority-owned land, setting reduction targets of 40 percent by 2030 and 80 percent by 2050 relative to 2005 baselines.
Washington, D.C.	The District's regulation provides DOEE with the authority to establish exemption criteria for qualifying affordable housing buildings, delaying compliance with the BEPS requirements without restriction considering the owner has acceptable circumstances as determined by the regulation. In coordination with the DC Sustainable Energy Utility and the Green Finance Authority, DOEE must establish an incentive and financial assistance program to support qualifying affordable building owners and affordable housing providers meet BEPS requirements.

Exemptions

Boston, Massachusetts	Boston's BERDO does not apply to state, county or federal buildings as they are outside the jurisdiction of the city. The policy also includes exemptions for newly constructed buildings, buildings with permits for demolition and buildings facing qualified financial distress.
Montgomery County, Maryland	Montgomery County's BEPS does not cover single family homes. Other exemptions include buildings used for warehousing, self-storage, manufacturing and industrial purposes, or transportation, communication and utilities. The BEPS also does not cover buildings with 10 percent or more total floor space used for public assembly.
New York City, New York	NYC's BPS targeting GHG emissions includes exemptions for industrial facilities used for generating electric power or steam, City buildings, NYC Housing Authority buildings, rent-regulated accommodations, real estate owned by religious corporations used for public worship, and properties owned by a housing development fund pursuant to the Private Housing Finance Law. The BPS also does not cover dwellings less than three stories that consist of attached, detached or semi-detached housing where owners are responsible for heating, cooling and hot water.

Washington, D.C.	The District's BEPS allows buildings to delay compliance with energy performance requirements by demonstrating financial distress, change of ownership, vacancy, major renovation, pending demolition, or another qualifying circumstance per regulation criteria.
Washington State	The State's BPS does not cover historical buildings in which requirements would compromise historical integrity. It also includes exemptions for buildings with an average occupancy less than 50 percent, primary industrial and agricultural use types, qualified financial hardship, and no certificate of occupancy for a year prior to the compliance date.