NOTE: This document is a draft based on a literature review and input from stakeholders. It is provided as a draft for public comment and not for citation. *Comments may be submitted (ideally in underline and strike through) by November 7, 2022 to jsollod@iccsafe.org.*

Energy Codes and Building Performance Standards: Supporting Energy Use and Emissions Reductions in Buildings

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 provided a nearly 40 percent improvement in residential energy use, with a 9.4 percent increase in efficiency between the 2018 and 2021 editions alone (*Figure 1)*. Similarly, the 2021 IECC commercial provisions provide site energy savings of 12.1 percent and a 10.2 percent reduction of greenhouse gas (GHG) emissions relative to the 2018 IECC. *Figure* 2 shows that the commercial and residential provisions of the IECC have delivered significant GHG emissions reductions over time—providing savings of over 700 million metric tons of CO_2 equivalent since the 2009 edition, which is equivalent to the annual emissions of 187 coal-fired power plants.[1] Energy codes continue to progress with the inclusion of zero energy appendices and guaranteed improvements in future editions of the IECC that drive toward zero energy buildings.

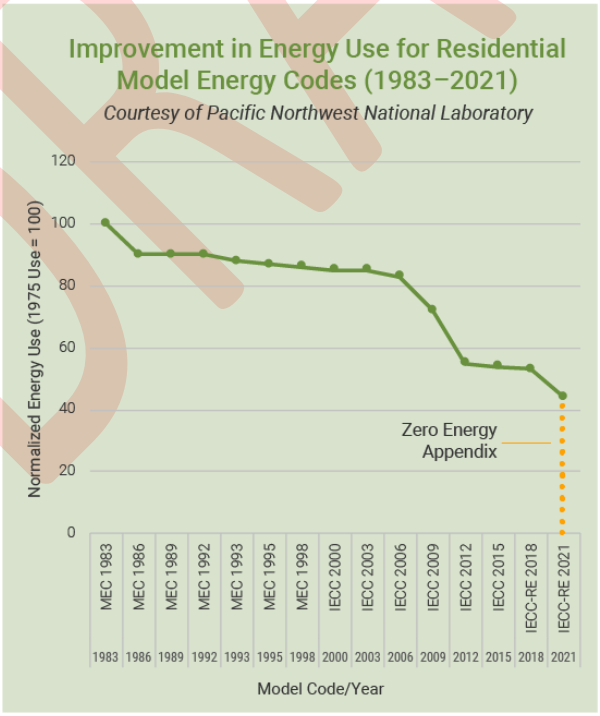

Figure 1. Improvement in Energy Use for Residential Model Energy Codes (1983-2021).

[1] 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, these buildings replace less than 2 percent of the building stock annually, leaving a significant stock of existing buildings built and operated without the benefits of updated technologies and practices to reduce emissions and energy usage.

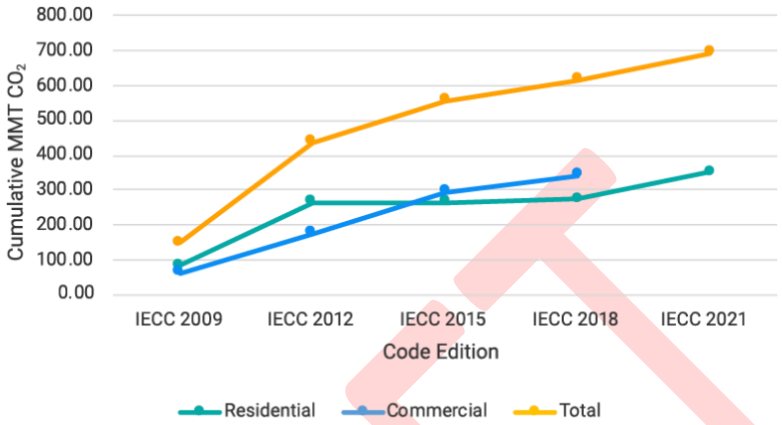

Figure 2. Cumulative CO_2 Savings from Each Edition of the IECC (2009-2021).

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. In the United States, during 2020, buildings accounted for 40 percent of total energy consumption when considering electrical systems and energy loss. Approximately 2.75 trillion square feet of buildings currently exist worldwide and 5.9 million existing commercial buildings in the U.S. comprise 97 billion square feet.

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 as a whole has to perform over time. Traditional energy codes govern the design and construction of new and existing buildings and do not require the building to perform in any specific way once the Certificate of Occupancy is issued. This means the energy use of existing buildings is not typically addressed by an energy code and is not considered unless the owner undertakes a renovation.

There is a critical need to address the energy use of the existing building stock and ensure the inclusion of modern building practices and technologies that are driving energy efficiency and emissions reduction. Further, climate mitigation goals cannot be met unless the energy use 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. If undertaken, these retrofits would reduce emissions by nearly 10 percent and account for a savings equivalent of roughly 30 percent of the annual electricity spent in the U.S. With buildings driving global emissions and

clear avenues for improvements, it is vital to address the existing building stock to meet emissions reduction, energy efficiency and climate goals.

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

Enhanced efforts to adopt and enforce modern building and energy codes will ultimately support better performance and pave the way for jurisdictions to implement better aligned BPS policies. Jurisdictions play a key role in planning how all buildings will be required to maintain and improve energy and emissions performance over time. A key element to achieving alignment between energy codes and BPS will be to enhance efforts in building modeling and target setting. Collaboration across state and local officials and building, energy and sustainability departments will be crucial to ensure the relationship between energy codes and BPS are understood and policies are aligned to effectively enforce an integrated building regulatory scheme to meet overarching climate goals.

What Are Building Performance Standards?

Building Performance Standards (BPS) are policies—typically in the form of multiple comprehensive standards—that require buildings to meet specified performance levels by targeting the performance of various aspects of a building. These targeted performance areas generally include energy, gas, and water use as well as GHG emissions and peak energy demand. BPS contain 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.

BPS currently target the existing commercial and multifamily building stock while providing building owners with flexibility in implementing specific technologies and operational strategies customized to accommodate their circumstances and meet established targets. Layered with complimentary policies, BPS address governmental 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 energy, and water efficiency.

Benefits of Building Performance Standards

BPS provide an opportunity to address climate and energy-related goals, ultimately enhancing a community's resilience, through the existing building stock—similar to the role building energy codes play for new buildings. BPS provide flexibility on how to meet the targets and outcomes established in the policy. Cities could cut 30 percent of all urban emissions by 2050 if they

implemented energy efficiency requirements targeting the existing building stock. These improvements can provide not only energy performance benefits, but also enhance the resilience of a building. 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 better indoor air quality and enhanced temperature-related comfort during an extended power outage caused by extreme heat or winter blackout. 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 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. *Figure* 3, developed by the Institute for Market Transformation (IMT), illustrates the holistic benefits that BPS introduce for communities at large.

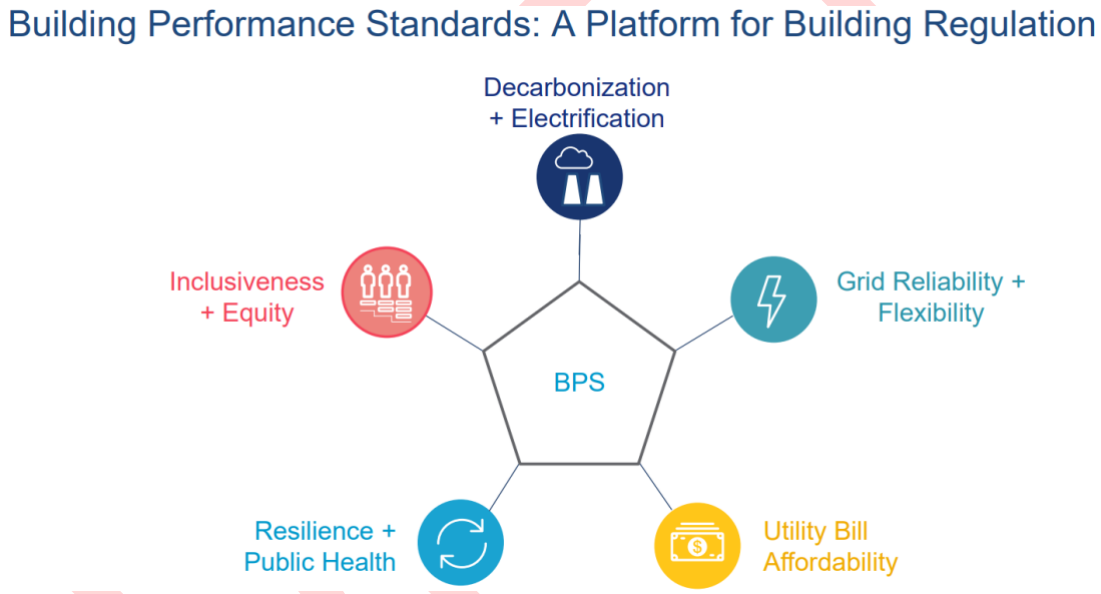

Figure 3. Multi-pronged community benefits introduced by BPS (IMT).

Where Are Building Performance Standards Adopted?

Recognizing the impact that the existing building stock has on the environment and society, BPS have become a prominent policy intervention to combat climate change. Federal, state and local governmments are increasing their commitment to climate mitigation and have identified their building stock as a core pathway to achieve climate, equity, public health and finance goals. State and local governments are implementing BPS or BEPS as policy mechanisms to achieve such goals. *Figure 4* highlights the jurisdictions that have already implemented BPS. The specific strategies employed by some of the leading jurisdictions are outlined in the following sections.[2]

[2] Other jurisdictions that have implemented BPS to date include the City of Boston, the City of Chula Vista, the District of Columbia, and the State of Colorado.

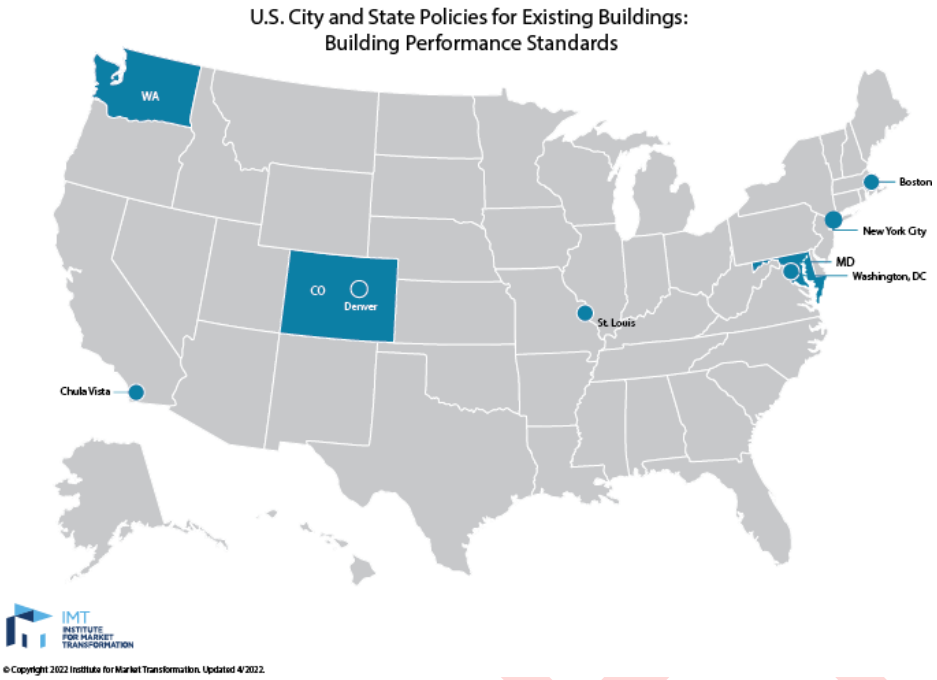

Figure 4. U.S. City and State Policies for Existing Buildings: Building Performance Standards.

Policy Type

Many BPS policies are structured uniquely to target the specific building types that contribute most to a jurisdiction's emissions in an effort to achieve local energy and climate goals. BPS policies can differ by jurisdiction based on the buildings covered by the policy. Some examples of this include:

- Boston, Massachusetts: The City of Boston enacted its Building Emissions Reduction and Disclosure Ordinance 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 ft^2 or larger and District-owned buildings 10,000 ft^2 or larger
    - Beginning January 1, 2027, all privately owned buildings 25,000 ft^2 or larger
    - Beginning January 1, 2033, all privately owned buildings 10,000 ft^2 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.

Performance Requirements

Building Performance Standards also vary based on their requirements. These policies establish metrics such as set targets or standard goals that provide a basis for measuring performance. Performance metrics and targets 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. In some cases, there can also be metrics included for water use and efficiency requirements. The metrics generally used include site Energy Use Intensity (EUI)[3], source EUI, ENERGY STAR Score, or Greenhouse Gas Intensity (GHGI). These are examples of policy performance requirements:[4]

- Boston, Massachusetts: Boston uses annual GHG emissions (tCO_2e/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 emissions target by the building's gross floor area.[5] 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 – achieving 50 percent emissions reduction by 2030 and 100 percent 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)

[3] 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.

[4] 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.

[5] Blended average for multi-use buildings.

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 target to achieve the County's Climate Action goal to aggressively reduce greenhouse gas emissions by 2035.

- New York City, New York: NYC uses annual GHG emissions (tCO_2e/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 building emissions intensity limit (tCO_2e/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 ($tCO_2e/kBtu$), then totaling the resulting emissions.
- Washington, D.C.: The District uses the ENERGY STAR score or an equivalent performance metric.[6] The policy also directs the department to assign a metric based on emissions by 2023. The BEPS must be at least as stringent as the District median ENERGY STAR score for buildings of each property type.[7] 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 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.

Compliance Cycle and Pathways

Building performance policies differ by compliance requirements. Specifically, policies can have varying stringencies of 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. These are examples of varying compliance requirements tied to existing policies:

- 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 emissions targets becoming more stringent every 5 years following until achievement of zero carbon in 2050. Under the compliance pathways, buildings must meet the emissions targets based on use type or the glide path.[8] Compliance can be met by any combination of energy efficiency, electrification, or onsite renewables strategies.

[6] Source EUI for buildings is ineligible for ENERGY STAR.
[7] For buildings eligible for an ENERGY STAR score.
[8] The glide path sets compliance at 50 percent emissions reduction by 2030 and 100 percent by 2050.

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.[9] 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^2or 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 emissions limits becoming more stringent every 5 years. As an alternative compliance pathway, buildings can use RECs and offsets to compensate for exceeding their emissions limits. There is also an energy conservation measure prescriptive pathway for buildings not covered by Local Law 97's emissions limits. Adjustment to annual 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. DOEE, the regulatory body, also must provide a prescriptive pathway that is comparable to the performance pathway's 20 percent energy savings requirement.
- 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

[9] Buildings that follow the prescriptive compliance pathway are still required to meet the final 2030 target.

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

The affordable housing crisis is 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. Examples of housing affordability provisions in performance standards include:

- 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 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

Most BPS and BEPS 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. Examples of BPS and BEPS exemptions include:

- Boston, Massachusetts: Boston's BEPS does not apply to state, county or federal buildings. 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 in a building without walls.
- New York City, New York: NYC's BPS targeting carbon 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 BEPS 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.

More information on state and local building performance standards can be found on the Department of Energy's Building Energy Codes Program website here.

United States Federal Government

The U.S. Administration has set a target to reduce economy-wide emissions by 50 to 52 percent from 2005 levels by 2030. Recognizing the significant role existing buildings play in tackling climate change and meeting 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.[10] The Coalition accounts for

[10] Coalition members include 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.

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 emissions reduction and resilience 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.

Under the newly established National Initiative to Advance Building Codes, the Federal Government will develop the first of its kind Federal Building Performance Standards to help achieve net-zero 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, 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 emissions reduction goals. The Federal BPS sets targets for a net-zero emissions federal building stock by 2045 and 50 percent emissions reduction by 2032.

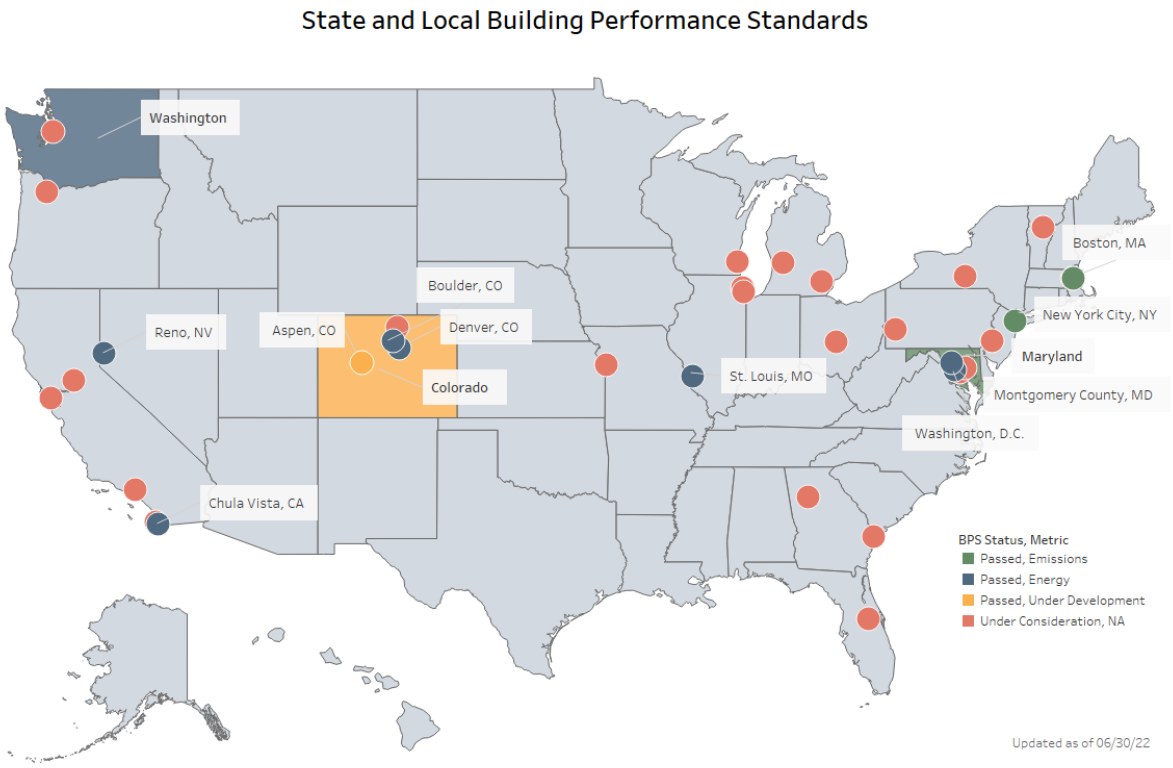

Figure 5. United States National Building Performance Standards Coalition Participants.

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 from building owners. Lessons learned from code department engagement with owners and the building industry, plus the infrastructure for tracking compliance, could be incredibly valuable in creating an effective BPS. These are the current agencies or departments responsible for BPS administration:

- Boston, MA – Air Pollution Control Commission
- New York, NY – Department of Buildings Office of Building Energy and Emissions Performance
- Washington, D.C. – Department of Energy and Environment
- St. Louis, MO – Building Division
- Montgomery County, MD – Department of Environmental Protection
- Denver, CO – Office of Climate Action, Sustainability & Resiliency
- Chula Vista, CA – Office of Sustainability CLEAN Group
- State of Colorado – Colorado Energy Office
- State of Washington – Department of Commerce

Gap in Alignment Between New and Existing Building Policies

To date, most U.S. BPS have overlooked alignment with new construction and the regulations that oversee those buildings. BPS policies are solely focused on addressing existing buildings and leave the regulatory requirements for new buildings up to building and energy codes. A new building becomes an existing building the moment construction is completed, thus BPS and buildings codes need to be aligned 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 aligned in the first place. For example, in Washington, DC, one in ten new office buildings and three in ten new multifamily buildings will fall below the BPS threshold.

A major barrier to aligning BPS and buildings codes is that codes traditionally cover the design and construction phases, and do not grant authority to building departments to regulate the performance of buildings once they have received a Certificate of Occupancy. In this way, states that limit local authority to govern energy are now turning to carbon metrics as a workaround to allow localities to adopt policies, like BPS, not explicitly authorized by state law. Misaligned codes and BPS may require different proofs of compliance, increasing administrative burden and creating further confusion of compliance pathways and requirements. The lack of intentional alignment puts both jurisdictions and building owners in an uncertain position,

potentially requiring a major retrofit of a building within the early stages of its lifecycle. Aligning 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.

How Can jurisdictions Align BPS and Energy Codes?

BPS target the existing building stock which, over time, falls behind 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 emissions and energy reductions in both new and existing buildings. In this way, building regulatory frameworks will better streamline compliance processes and support achievement of jurisdictional climate goals.

Recommendations on aligning BPS and Energy Codes

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

It is increasingly important to identify opportunities to leverage performance-based codes to include targets aligned 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 align with BPS. Building codes and BPS metrics generally differ, considering most commercial building energy codes use energy costs while BPS typically use site energy or direct emissions. Implementation of outcome-based or performance-based codes would align codes with BPS by shifting energy modeling metrics to site energy or direct 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. Although performance-based codes have proven problematic due to regulatory and compliance concerns, lack of departmental resources, and technical expertise, there are other strategic ways to align the two policies.

Because building codes and BPS are developed and enforced by different departments, coordination between code departments and local officials with energy and sustainability departments is a key step toward the alignment of the requirements and enforcement criterion of the two policies. Coordination and engagement should occur at the onset of BPS development and implementation to ensure smooth adoption and implementation. Alignment 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.

Coordination between policymakers and enforcement departments will also help align target setting to ensure new buildings are aligned to meet BPS targets once they become occupied. Policymakers should set expectations of how long new buildings should meet BPS targets; one proposal suggests new construction should meet the BPS targets for 10–20 years without energy retrofits and improvements except for retro-commissioning and operational corrections. 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.

A key element to achieving this alignment is to expand efforts in building metering to create complimentary target setting. Incorporating basic energy metering and feedback systems into code requirements can provide operators and tenants with actionable information that can inform better management of building performance. Further enhancing the detail of actionable information, implementation of energy submetering by system and occupancy will provide enhanced 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. 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.

Lastly, equity should be integrated 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. Ensuring underrepresented and disadvantaged communities are supported by climate policies, like BPS, will yield equitable outcomes in sustainable development, human health and climate resilience for all community members.