Building Performance Standards: Overview for State and Local Decision Makers

EPA's Benchmarking and Building Performance Standards Policy Toolkit aims to inform and support state and local government decision makers who are exploring policies to reduce energy use and greenhouse gas (GHG) emissions from existing commercial and multifamily buildings in their communities. This section of the toolkit focuses on building performance standards (BPS). It provides an overview of BPS requirements and offers information on key decision points. The toolkit includes four sections—each intended to build on the previous section—that focus on different aspects of policy development, including benchmarking and transparency (Section 1), BPS (Section 2), state and local government coordination (Section 3), and data access (Section 4). Each section lists additional resources on the topic.

Table of Contents	

Overview

A BPS is an emerging policy that establishes specific performance levels that buildings must achieve. A BPS may be adopted by state or local governments and applied to existing commercial and multifamily buildings. As of February 2021, multiple state and local governments have passed BPS policies, including Washington, D.C.; New York City; St. Louis, MO; and Washington State; and several more local and state governments are exploring such policies.[i] None have yet been fully implemented.

BPS policies can be designed to improve performance for a variety of building aspects—including energy use, water use, and emissions—and send market signals to encourage investments in energy efficiency and other clean energy technologies and strategies, such as increased use of renewable energy, energy storage, and electrification. State and local governments can work with a broad coalition of stakeholders—including the private sector, utilities, and others—to help building owners[ii] achieve the standards over one or more performance improvement cycles. Additionally, state and local leaders and utilities can provide support, funding, and technical assistance to building owners in need of additional resources.

A **building performance standard** is a policy that requires building owners to meet performance targets by actively improving their buildings over time.

As policy makers establish climate commitments, reducing emissions from buildings is critical for reaching decarbonization goals. In the United States, commercial and residential buildings account for nearly 40 percent of energy consumed and over 30 percent of GHG emissions, and can be a much higher source of emissions in cities.[iii] In Washington, D.C., for example, emissions from the buildings sector made up 73 percent of the District's total emissions in 2018, representing a significant opportunity for a BPS to reduce GHGs.[iv] Many jurisdictions across the country have comprehensive policies in place addressing new building construction, but whole-building performance standards for existing buildings represent a new approach.

Requiring reductions from existing buildings through BPS policies can go a long way toward achieving decarbonization goals, considering that a majority of the commercial and residential building stock that will be standing in 2050 is already built.[v] Additionally, a BPS may influence new construction, given that buildings will be subject to the increasingly stringent standard once in place.

Understanding the Value of Building Performance Standards

Jurisdictions that have established a BPS identify it as a key strategy to help achieve decarbonization goals.[vi] Although it is too soon to evaluate the effectiveness of BPS policies (as none are yet fully implemented), they have the potential to drive a range of actions that reduce emissions, including energy efficiency upgrades, building electrification, and renewable energy growth.

By requiring buildings to meet a specified level of performance, a BPS can establish long-term certainty, helping building owners plan for upgrades that improve their buildings and stimulate the local economy and create jobs. For example, the BPS in New York City is estimated to have the potential to create a $20 billion retrofit market, which would make it the largest in the country, and lead to the creation of more than 140,000 jobs by 2030.[vii]

Clean energy upgrades can reduce power plant emissions, leading to improvements in outdoor air quality and public health in the surrounding community. They can also improve the comfort and productivity of building occupants. As building owners seek to manage indoor air quality, high-efficiency HVAC systems with improved controls have become increasingly important. Clean energy upgrades can also lead to EPA recognition, such as ENERGY STAR® Tenant Space recognition for efficient tenants or ENERGY STAR certification for building owners at the property level.

Stakeholder Engagement

Stakeholder engagement is a critical element of designing and implementing a BPS. Engaging and communicating at all stages of policy development can help state and local leaders align policy objectives with community priorities, gather input from individuals directly affected by the policy, and understand the needs of underserved groups. State and local governments can consider a variety of engagement strategies; see *Stakeholder Engagement Strategies* below.

Stakeholder Engagement Strategies

Identify interested stakeholders

Assemble a comprehensive list of internal and external stakeholders who should be involved in the process. Creating an open process early on can facilitate information sharing, establish a forum for feedback on local circumstances, and provide a contact list of interested stakeholders to keep informed throughout the policy development process. Reaching a wide array of stakeholders, including building owners, developers, utilities, community-based organizations and organizations representing residents' interests, can lead to an inclusive engagement process and facilitate access to data and financial incentives.

Create a structure of engagement

Consider the resources and availability of stakeholders when choosing a structure for engaging the community. Allowing for flexibility (e.g., holding in-person meetings with virtual components, varying meeting times to accommodate work schedules and responsibilities, and sending meeting notes to all interested stakeholders) and setting more than one opportunity to engage can increase participation. Generating a contact list of interested stakeholders can help streamline communication throughout the policy development and rulemaking process.[1]

Allow for ongoing engagement

Consider developing a working group or board to help guide decision making and tailor needs throughout the rulemaking and implementation process. Creating a BPS help desk to offer support and resources to those required to comply can help with continued relationship building and information sharing with stakeholders. Consider creating a network to provide assistance and resources on financing, rebates, and other resources for building owners, developers, builders, and designers throughout the compliance period.[2]

[1]For more detailed information on structuring stakeholder engagement, see the Institute for Market Transformation and Natural Resources Defense Council (NRDC), Engaging the Community in Policy Development (City Energy Project of NRDC and IMT, December 2018), accessed February 2021, https://www.energy.gov/sites/prod/files/2019/02/f59/City_Energy_Project_Resource_Library_Engaging_The_Community_In_Policy_De....pdf.
[2]For example, see "High-Performance Building Hub," Department of Energy & Environment, Washington, D.C., accessed February 2021, https://doee.dc.gov/node/1445901.

Key Considerations for Policy Design

State and local governments have several key decision points to consider when designing a BPS. While existing BPS examples vary considerably, there are core elements that state and local leaders can consider in developing a policy that aligns with jurisdiction goals and accounts for the varied needs of stakeholders.

The remainder of this section provides an overview of the decision points in designing a BPS.

Align and Establish Goals

Goal Alignment

Across the United States, states and cities have established long-term commitments to reduce GHG emissions, with some goals focused on reducing emissions by up to 90 percent by 2050 (see map, *States and Cities with GHG Emissions Reduction Goals*). Many state and local leaders have developed climate action plans that describe objectives and strategies to achieve decarbonization goals. These plans are often informed by an inventory of GHG emissions to assess the amount of emissions attributable to various sectors (see *EPA's State and Local GHG Inventory Tools*). Aligning a BPS with decarbonization objectives can help ensure that the standards outlined for buildings produce the necessary reductions to help meet a jurisdiction's climate goals.

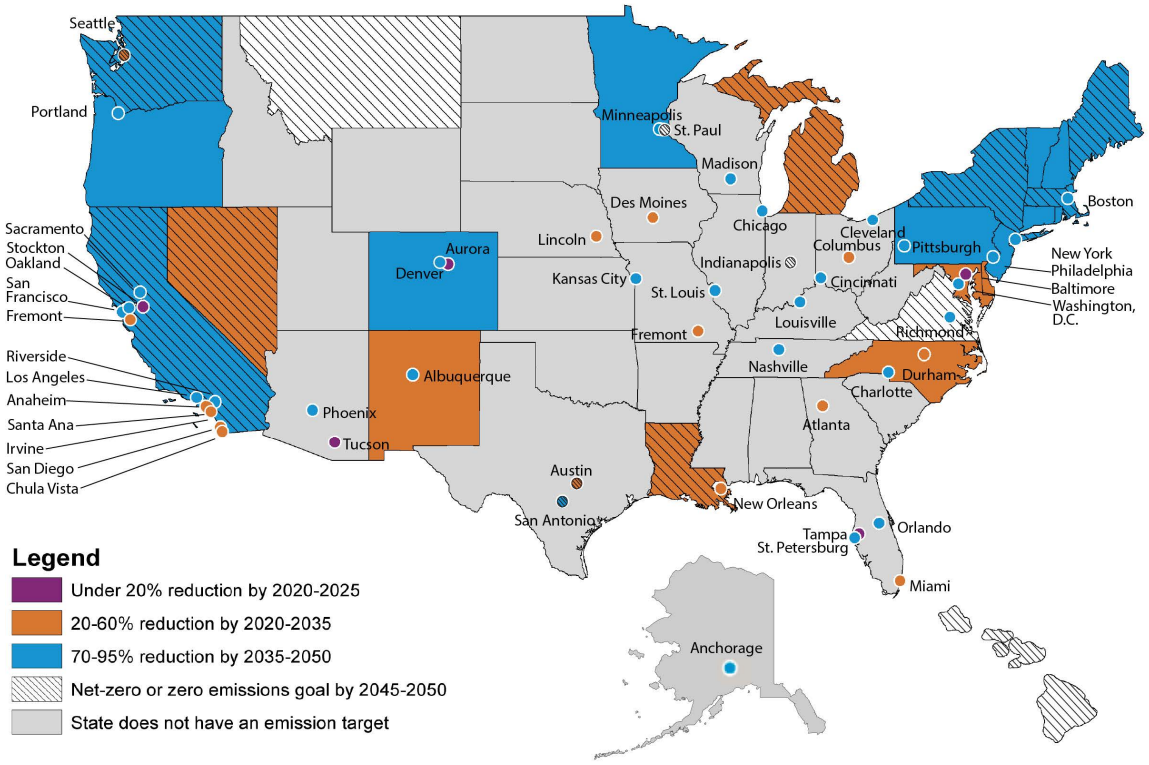
In addition to aligning climate goals, relying on data from an existing benchmarking policy offers decision makers information on the energy performance of existing buildings in their jurisdiction over time, and can help with setting standards for a BPS. Most BPS policies currently enacted rely on benchmarking data to help set the standards and establish a mechanism for data collection.

EPA's State and Local GHG Inventory Tools

EPA's GHG Inventory Tools are interactive spreadsheet models designed to help state, local, and tribal governments develop GHG emissions inventories, and provide a streamlined way to update an existing inventory or complete a new inventory. State and local governments can use these tools to develop GHG emissions inventories that assess the amount of emissions attributable to various sectors and create a simple forecast of emissions through 2050. The results can help to inform policy goals, including establishing building performance standards.[1]

[1] "State, Local and Tribal Inventory Tools," Energy Resources for State and Local Governments, U.S. EPA, last updated October 28, 2020, https://www.epa.gov/statelocalenergy/state-local-and-tribal-inventory-tools.

States and Cities with GHG Emissions Reduction Goals



Notes and Sources: Baseline years of goals and policy type (i.e., legislation or executive order) vary. Some states and cities may also have interim goals not shown. The 50 cities shown here are those of the largest 100 cities in the U.S. that have GHG reduction goals, according to "Pledges and Progress: Steps toward Greenhouse Gas Emissions Reductions in the 100 Largest Cities across the United States," Brookings, Washington, D.C., October 2020, accessed February 2021, https://www.brookings.edu/research/pledges-and-progress-steps-toward-greenhouse-gas-emissions-reductions-in-the-100-largest-cities-across-the-united-states/. The source for state policy goals is: "U.S. State Greenhouse Gas Emissions Targets," Center for Climate and Energy Solutions (C2ES), Arlington, CA, last updated January 2021, accessed February 2021, https://www.c2es.org/document/greenhouse-gas-emissions-targets/

New York City's GHG Inventory and BPS

Emissions from buildings account for about two-thirds of New York City's GHG emissions. New York City's Local Law 97 establishes a BPS that sets GHG emissions caps for the city's largest buildings starting in 2024. The BPS will result in a 40% reduction in building emissions by 2030 from a 2005 baseline and sets emissions intensity limits (metric tons of carbon dioxide eqiuvalent per square foot) for 10 building categories.[1]

[1] "Inventory of New York City Greenhouse Gas Emissions," NYC Mayor's Office of Sustainability, New York City, N.Y., accessed February 2021, https://nyc-ghg-inventory.cusp.nyu.edu/.

Performance Metrics

One of the most critical elements of any BPS is the selection of appropriate metrics on which to base compliance. In general, these metrics fall into two broad categories—energy metrics and GHG metrics[viii]—but many possible variations exist within those categories. For example, metrics could be based on intensity values (e.g., energy per square foot or GHG emissions per square foot) or absolute values (e.g., total energy use or total GHG emissions). Other variations for energy metrics include site or source energy metrics.

Ultimately, jurisdictions must choose the metric or combination of metrics that best align with their key strategies to achieve decarbonization goals. Selected metrics should be easy to understand and implement by the government and building owners. There are potential

benefits and drawbacks to consider for any metric or set of metrics codified in a BPS. Because BPS policies are relatively new and complex, EPA is developing a resource (expected later in 2021) to help jurisdictions identify the most appropriate metrics.

The BPS policies in place as of February 2021 use a variety of metrics:

- Washington, D.C. is using EPA's 1-100 ENERGY STAR Score as an initial assessment to identify which buildings need to make improvements and Site Energy Use Intensity (Site EUI) as the metric for measuring improvements.[ix]
- Washington State is using Site EUI as its metric, with requirements that all buildings achieve certain Site EUI performance levels.[x]
- New York City is using total GHG emissions as its metric, with all buildings receiving an emissions limit based on an emissions rate per square foot multiplied by the building's square footage.[xi]
- St. Louis, MO, is using Site EUI as its metric both to identify buildings that need to comply and to measure improvements.[xii]

Choosing specific metrics for a BPS involves balancing several considerations, such as:

Normalizing for key operational parameters. Jurisdictions may want to adopt metrics that account for significant differences in building operations or activity. For example, Washington, D.C.'s BPS uses the ENERGY STAR score, which adjusts for key drivers of energy use by property type. However, normalization for operational parameters introduces the possibility that absolute energy use or GHG emissions may increase over time, even if operations-adjusted standards are being met.

Recognizing differences in property type when setting standards. Most BPS policies passed to date have differentiated performance levels by property type. Certain property types tend to operate at a higher Site EUI than others (e.g., a supermarket is expected to consume more energy per square foot than a warehouse). Jurisdictions may want to take these differences into account by differentiating performance levels by property type, depending on which metrics or compliance paths they adopt.

Setting a timeframe for compliance and interim milestones. To date, state and local governments have adopted BPS policies with interim standards defined by compliance cycles (e.g., every five years) until the ultimate, long-term performance standard is reached. Depending on how they are established, these interim standards can drive predictable improvements in building performance and corresponding GHG emissions reductions, while allowing for flexibility by enabling building owners to defer improvements so that upgrades can be aligned with capital planning within a longer timeframe. Establishing long-term standards using set metrics can provide building owners a clear sense of the reductions they must achieve over time.

Ensuring that performance is measured and standards are set based on high-quality data. An important consideration in BPS design is including measures to ensure that compliance data are high quality, such as requiring building owners to verify the data they submit. Such measures may increase confidence in the standards and the assessment of a building's performance relative to them.

Changing standards based on local considerations. If a BPS has more than a single standard and compliance period, state and local governments could consider changing how standards are set over time. This would depend on several factors, such as changes in the performance of buildings, the carbon intensity of the electricity grid, technology developments, stakeholder needs, and shifting priorities. In setting and updating standards over time, it is helpful for policy makers to recognize that the GHG impact of a given energy use reduction today (at present grid emissions levels) may be markedly different than the impact of the same energy use reduction in the future (when grid emissions have been lowered). Similarly, the GHG impacts of electricity use increasingly vary by the time of day and season as more intermittent renewable energy is added to the grid and emissions from fossil fuel-fired power plants are displaced at certain times of the day.

Determine Covered Properties

Property Types

State and local governments can apply a BPS metric to a variety of building types, though most BPS policies to date have covered existing commercial and multifamily

buildings.[xiii] The process for determining specific covered properties can be informed by several factors, including the amount of energy savings and GHG reductions that can be achieved, the degree of program outreach and support that will be needed for building owners, and stakeholder input.

Large commercial and multifamily energy users have potential for significant energy savings and emissions reductions and—due to resources in-house—may require less support than other, under-resourced building owners. When considering buildings to be covered, decision makers may want to plan for additional support needs for smaller building owners. Conducting stakeholder outreach will provide state and local governments with a better understanding of property owners' needs and inform equitable access to available resources for compliance.

Jurisdictions with existing benchmarking policies can align their covered property types with their covered properties under a BPS, relying on the effort, outreach, and data collection already established through a benchmarking policy. For example, New York City; St. Louis, MO; and Washington, D.C. relied on properties covered under their respective benchmarking policies to determine their covered properties under a BPS.[xiv]

Exemptions and Accommodations

Exemptions and accommodations for certain property types are important to ensure that the design of a BPS considers equity. Existing BPS policies consider factors such as financial hardship, capacity constraints, building usage, occupancy rates, major renovations, the condition of a property, and change of ownership for determining exemptions and accommodations. Jurisdictions with a benchmarking policy in place can also consider aligning property type exemptions with their BPS. Impacts from the COVID-19 pandemic have amplified the need to pay close attention to exemptions and accommodations.

State and local decision makers, in consultation with stakeholders, can identify accommodations for additional support and compliance flexibility that enable building owners and tenants to realize the benefits from compliance strategies and support policy goals. This is particularly relevant for under-resourced buildings, such as affordable housing. For example, in St. Louis, MO, the BPS extends compliance for affordable housing and houses of worship from four to six years. This helps balance the benefits of BPS for affordable housing and other under-resourced market segments with the strain on their budgets and staff required to comply with the standard.[xv]

Consider Compliance Approaches

Compliance Approaches

Determining allowable compliance approaches offers an opportunity for state and local governments to build in flexibility, while aligning stakeholder needs with BPS objectives.

Washington, D.C.'s Compliance Pathways

Washington, D.C.'s Building Energy Performance standard provides building owners with a variety of paths to choose from to bring their buildings into compliance. More details about these compliance paths will be available once the rules and guidance documents are finalized. Compliance pathways as of February 2021 include:

- Performance: reduce site energy usage by 20%
- Prescriptive: implement cost-effective efficiency measures
- Standard: reach the standard for the property type; only available for property types that are above the national median
- Alternative compliance: special circumstances such as portfolios, deep retrofits, etc.[1]

[1] "BEPS [Building Energy Performance Standard] Frequently Asked Questions," Department of Energy & Environment, Washington, D.C., accessed February 2021, https://doee.dc.gov/service/beps-frequently-asked-questions.

Compliance can be based on achieving a standard for performance, implementing a set of prescriptive measures, or completing alternative measures for special circumstances. State and local decision makers may want to primarily direct building owners to a performance pathway because it ensures a set level of savings; however, considering additional pathways can allow for

compliance flexibility. For example, developing a set of cost-effective prescriptive measures may help building owners with resource constraints meet the standard and provide certainty concerning compliance. In addition, incorporating flexibility by extending compliance timeframes can enable building owners align building upgrades with their capital planning, granted the long-term standards are met.

State and local leaders can consider various compliance approaches when selecting performance metrics(s) for their standards. Due to factors such as grid emissions and technology availability, some combinations of compliance approaches will be more effective at meeting standards than others during a given timeframe (e.g., short- or long-term). State and local leaders can consider which technology investments will align with the performance metric(s) used to set the standard and whether they are viable investments for building owners. State and local governments and utilities can encourage investment in building performance improvements by providing incentives via early adoption programs (see *Washington State's Early Adopter Incentive Program*), or supporting voluntary recognition programs such as ENERGY STAR certification.[xvi] Regardless of the compliance approach taken, a BPS will likely require some mechanism to allow for alternative compliance paths for some buildings, such as those with highly energy-intensive space uses or characteristics that make them fundamentally different from most buildings and building types.

Washington State's Early Adopter Incentive Program

Washington State's BPS includes a program to incentivize early compliance. The program is set to launch in summer 2021 and will be administered by the utility and the Washington State Department of Commerce. Early adopters who bring their buildings into full compliance with the standard can receive a performance-based incentive totaling 85 cents per square foot.[1]

[1]"Clean Buildings," Washington State Department of Commerce, Olympia, WA, accessed February 2021, https://www.commerce.wa.gov/growing-the-economy/energy/buildings/.

Enforcement for Noncompliance

While state and local governments can focus on educating building owners and providing support to boost compliance through performance improvements, an enforcement mechanism can help discourage noncompliance. When determining fines for noncompliance, state and local governments have considered a level that would encourage compliance by setting an amount higher than the estimated building improvement cost. Fines—or "alternative compliance payments" as some have suggested they be called—can be structured to adjust for building size (e.g., dollars per square foot) and tapered depending on the level of improvement a building achieves by the end of a performance period. State and local governments can consider the role that tenants play in a building's performance by enabling building owners to pass incentives and fines to their tenants. This may create an opportunity for tenants to support building performance improvements; however, it is important to consider the effects this could have on under-resourced buildings and tenants. State and local governments may also consider providing additional support and considerations for owners of certain building types, including affordable housing or other under-resourced buildings.

Fines can be triggered after a building owner is out of compliance or does not report a performance period after other support measures have been explored. In addition, state and local governments can consider distributing the fines collected to support those building owners in need of financial support. As BPS policy implementation gets under way in the coming years, there will be opportunities to assess the effectiveness of different enforcement approaches that can inform future policy development.

Provide Support to Building Owners

Technical Support

State and local governments are well-positioned to offer technical support and education to building owners. This can include providing education materials on planning and implementing cost-effective performance improvements, helping to answer questions on reporting

or compliance requirements, and establishing a support mechanism to assist underserved and under-resourced buildings (see *St. Louis' Building Energy Improvement Board*).

St. Louis' Building Energy Improvement Board

St. Louis viewed equity as one of the most important design decisions when constructing their BPS. Equity is also a driving force behind the Building Energy Improvement Board, a nine-member board appointed by the Mayor to provide support to underserved and under-resourced buildings. The Board is responsible for the following:

- Democratically approves equitable accommodations;
- Oversees establishing and approving standards by property types in each compliance cycle;
- Reviews and recommends amendments to proposed regulations;
- Meets on a quarterly basis to approve alternative compliance plans (available for building owners who need it on case-by-case basis to help with providing necessary expertise);
- Helps with creating suggested template compliance plans, recommending complementary programs, providing technical expertise, and connecting building owners to utility incentives for affordable housing.[1]

[1]"Next-Generation Building Performance Policies: Maximizing Energy Savings and Environmental Impacts," Better Buildings®, U.S. Department of Energy, Washington, D.C., accessed February 2021, https://betterbuildingssolutioncenter.energy.gov/webinars/next-generation-building-performance-policies-maximizing-energy-savings-and-environmental.

Technical support needs will likely vary by building type (e.g., large commercial buildings tend to have more resources and technical expertise in-house, whereas other building types such as small commercial and affordable housing may need more support). State and local governments can consider convening building owners and technical experts to plan services similar to Washington, D.C.'s Building Innovation Hub.[xvii] This type of platform can offer coordinated technical assistance, oversight, and outreach to help building owners with compliance. In addition, state and local governments might explore partnering with colleges and universities to provide technical support with students serving as support staff.

EPA is available to support state and local governments throughout BPS development, including direct support for ENERGY STAR Portfolio Manager, access to helpful resources on renewable energy procurement, GHG emissions estimation and accounting, and related topics; as well as technical assistance.

Funding Support

It is necessary to ensure that funding is in place for a state or local government to design and administer the BPS. Decision makers can also develop new or feature existing sources of funding to assist building owners with compliance. For many building owners, compliance with a BPS could require significant investment and financial assistance.[xviii] Depending on a jurisdiction's current energy polices, some examples of possible funding sources include incentive program offerings from local utilities targeted to covered building types[xix]; and Property-Assessed Clean Energy (PACE) financing, a low (or no) upfront cost loan that can be used to fund energy efficiency and renewable energy projects and is repaid through a building's property tax bill. Green banks, financial instruments that leverage public funding to attract private capital for investments in clean energy projects, can also be a source of financing for building owners (see *Washington, D.C.'s Green Bank*).[xx]

Washington, D.C.'s Green Bank

Washington, D.C.'s building energy performance standard sets aside dedicated funding for the District's new Green Bank. The District is partnering with the Montgomery County Green Bank to run the Commercial Loan for Energy Efficiency and Renewables (CLEER) program for commercial buildings, and is planning to offer a pre-development loan by early 2021. The District's Green Bank is also matching their financing offerings to rebates from the D.C. Sustainable Energy Utility and supporting work with diverse contractors.[1]

[1]"DC Green Bank," DC Green Bank Finance Authority, Washington, D.C., accessed February 2021, https://dcgreenbank.org/.

Establish Reporting Requirements

Regardless of the specific implementation details of a state or local BPS, it is likely that EPA's ENERGY STAR Portfolio Manager tool will play a role in the performance reporting process. This is especially likely if the jurisdiction has already required the use of Portfolio Manager through a benchmarking and disclosure ordinance. (See Section 1 of this toolkit for more information on benchmarking policies.) State and local decision makers may want to consider the following:

Reporting Mechanism

The most common reporting approach under existing benchmarking requirements is for the state or local government to set up a custom reporting template in Portfolio Manager, and to publish this as a **Data Request**. Building owners access the Data Request by clicking on a dedicated URL. After clicking the link, respondents select the properties for which they are reporting data and release their report to the requesting state or local government. The reported properties from all respondents are combined in the reporting template, and the requesting government downloads the data from Portfolio Manager as one data set. The other reporting approach available in Portfolio Manager is called **Property Sharing**. Through this method, covered building owners share read-only access with an account set up by the state or local government for reporting. This approach allows the state or local government to directly view the respondent's property record in real time, and extract the necessary metrics for compliance and reporting. Some local governments have used these methods in tandem, helping them resolve data quality issues with respondents more easily. These reporting approaches are described in more detail in the *Summary of Benchmarking Reporting Approaches* table on pg. 10.

Access to Historical Data

Because BPS policies may assess performance against a historical baseline, it is critical to make data available going back an appropriate number of years. Addressing this will require the establishment of clear expectations for the historical data that utilities should provide when supporting requests for access to building owner data. A BPS can also establish requirements for providing historical property data to the new owner of a property upon sale. This ensures that the new owner will have access to any baseline data that may be required as a part of BPS reporting and compliance, and will not need to start the data-gathering process anew.[xxi]

EPA's ENERGY STAR Portfolio Manager

The go-to tool for collecting energy and water use data from commercial and/or multifamily housing buildings is **EPA's ENERGY STAR Portfolio Manager**. EPA offers robust, off-the-shelf training materials; regularly hosts webinars; and has a help desk to support users. Some fast facts on the tool include:

- The tool is completely cost-free to use.
- Users enter data into their own secure, password-protected account.
- Any building can be benchmarked in Portfolio Manager.
- At least 25% of building square footage nationwide is benchmarked in Portfolio Manager.
- Buildings can use the tool to track GHG emissions and energy, water, and waste costs.
- 1-100 ENERGY STAR scores indicate a building's energy performance compared to similar buildings nationwide, and are available for approximately 21 building types and 60% of commercial floorspace.
- Portfolio Manager can also be used to:
  - Check for possible errors using the data quality checker,
  - Set goals and track progress toward them,
  - Share or transfer properties,
  - Run custom and pre-populated reports, and
  - Apply for ENERGY STAR certification-EPA recognition for top performance relative to similar buildings nationwide-where eligible.

ENERGY STAR® Portfolio Manager®

Summary of Benchmarking Reporting Approaches

Reporting Method	Characteristics	Pros and Cons
Data Request	Creates a "snapshot of performance" based on requested metrics and time period	• Requires action from the building owner each reporting cycle that may improve data quality and completeness. • Defined metrics and time period ensure greater data privacy. • Offers fewer insights into historical data and into building owner inputs that could have errors.
Property Sharing	Provides "real-time" and full view into all building owner inputs and corresponding metrics	• Allows state or local government to see rolling view of current and historical inputs and metrics as building owner makes changes and when EPA refreshes metrics such as 1-100 ENERGY STAR scores. • Could create issues from not prompting the building owner to review data quality and completeness, and may raise data privacy concerns among building owners, requiring transparent communication around what data points will be retrieved, when, and for what purpose(s).

Changes to Metrics in Portfolio Manager

Generally speaking, the building-specific models underlying EPA's ENERGY STAR 1-100 scores available in Portfolio Manager are updated every four to five years as new national data sets become available. At these times it is common for a property's ENERGY STAR score to change to reflect changes in the efficiency of the building population. For all types of buildings, including those not eligible for an ENERGY STAR score, EPA's regular updates to site-to-source energy conversion factors and GHG emissions factors—necessary as the mix of fuels and renewable energy used to generate electricity changes—may result in changes to metrics. When Portfolio Manager models or conversion factors change, updated models and/or factors are applied both moving forward and retroactively. This means that the relative percentage performance improvement over the baseline for a property should remain intact (since both the baseline and the current period will be evaluated using the same, updated scoring model). BPS administrators may want to consider whether to ask building owners to capture pre-update metrics for comparison. Administrators may also want to consider whether or how any significant impacts to performance due to these changes would be addressed in assessing compliance against a BPS, given that the impact of these changes are outside of the building owners' control.

Contact EPA

Katy Hatcher, ENERGY STAR Commercial & Industrial, hatcher.caterina@epa.gov

Brendan Hall, ENERGY STAR Commercial & Industrial, hall.brendan@epa.gov

Cassandra Kubes, State and Local Energy & Environment Program, kubes.cassandra@epa.gov

EPA Resources

EPA offers robust training materials and support to help state and local decision makers understand how to benchmark in Portfolio Manager, implement and finance energy efficiency improvements, and quantify the multiple benefits of clean energy:

ENERGY STAR Buildings Support for State and Local Governments—Fact sheet providing an overview of how EPA's ENERGY STAR® Commercial and Industrial Branch serves as a partnership among private and public sector organizations to channel marketplace ingenuity, promote energy efficiency, and prevent pollution.

ENERGY STAR: An Overview of Portfolio Manager—Guide describing some of ENERGY STAR Portfolio Manager's basic functions, such as how to navigate through the tool, enter building data, and connect and share data with others.

ENERGY STAR for Existing Buildings—Explore a set of EPA tools and resources to help commercial and institutional building owners or managers save energy. Resources include getting started, finding financing, earning recognition, and communicating success.

Future Offerings: Online GHG Calculator Tool

EPA's ENERGY STAR Portfolio Manager calculates a building's GHG emissions (including carbon dioxide, methane, and nitrogen oxide) from on-site fuel combustion and purchased electricity and district heating and cooling, and enables tracking of avoided emissions from any green power purchases. This is done using emissions factors for the 26 eGRID subregions. EPA is building a web-based tool that will allow users to import energy use data from Portfolio Manager and apply local or custom emissions factors to see additional estimates of GHG emissions. The results from this tool will be downloadable.

State, Local, and Tribal GHG Inventory Tools—Interactive spreadsheet models designed to help state, local, and tribal governments develop GHG emissions inventories, and provide a streamlined way to update an existing inventory or complete a new inventory.

Tools for State, Local, and Tribal Governments—Overview of the State and Local Energy and Environment Program's tools to help state, local, and tribal governments quantify and achieve their environmental, energy, and economic objectives.

Local Action Framework: A Guide to Help Communities Achieve Energy and Environmental Goals—State and Local Energy and Environment Program's step-by-step guide to help local and tribal governments plan, implement, and evaluate new or existing energy or environmental projects.

ENERGY STAR Portfolio Manager Technical Reference: Greenhouse Gas Emissions—Overview of the GHG emissions metrics used in Portfolio Manager and how to calculate the emissions footprint associated with a building's energy consumption.

Clean Energy Finance: Green Banking Strategies for Local Governments—This primer provides a basic explanation of green banks, the benefits they offer, issues local governments might consider when deciding whether to create a green bank, and several case studies. It also provides information on other green banking opportunities for local governments.

Did Your Energy Efficiency Project Get Lost in Translation? Financial Speak for Facility Managers—Highlights alternative financing solutions specific to energy efficiency that may offer a solution for facility managers in getting approval for a project.

Additional Resources

American Council for an Energy-Efficient Economy—Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals—Summarizes current trends and profiles 17 jurisdictions where BPS are being successfully implemented, implementation is just beginning, or adoption is being considered.

American Council for an Energy-Efficient Economy—How Energy Efficiency Programs Can Support Building Performance Standards—Discusses the role of energy efficiency programs before and after BPS take effect, including approaches to crediting energy savings achieved.

Institute for Market Transformation (IMT)—Exploring Building Performance Standards—Set of resources focused on BPS for local governments, building owners, and tenants.

Institute for Market Transformation—Summary of IMT's Model Ordinance for a Building Performance Standard—Overview of model ordinance for a building performance standard that incorporates lessons from four jurisdictions that have adopted BPS policies.

National Housing Trust—Recommendations for Implementing the District's Building Energy Performance Standard in Affordable Multifamily Housing—Overview of recommendations to Washington, D.C.'s Department of Energy and Environment for the Building Energy Performance Standard as it relates to multifamily affordable housing developers and owners in the District.

Urban Green—All About Local Law 97—Set of resources focused on New York City's BPS, enacted under Local Law 97.

Urban Sustainability Directors Network and Cadmus—A Guidebook on Equitable Clean Energy Program Design for Local Governments and Partners—Guidebook supporting local governments and their partners to intentionally design clean energy programs that enable current and emerging technologies to be accessed equitably.

[i] Other jurisdictions have adopted forms of performance requirements for buildings, including San José and Brisbane, CA; Boulder, CO; and Reno, NV. For the purposes of this document, we will refer to the types of BPS policies adopted in Washington, D.C.; New York City; St. Louis, MO; and Washington State.

[ii] From this point forward, the term "building owner" will be used to indicate "building owner and/or operator," with the understanding that many property owners rely on third-party management companies to operate the building on their behalf.

[iii] U.S. Energy Information Administration (EIA), *Annual Energy Outlook 2020 with Projections to 2050* (Washington, D.C.: EIA, January 2020), accessed February 2021, www.eia.gov/aeo; U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018,* EPA 430-R-20-002 (Washington, D.C.: U.S. EPA, 2020), accessed February 2021, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2018.

[iv] "Greenhouse Gas Inventories," Department of Energy & Environment, Washington, D.C., accessed February 2021, https://doee.dc.gov/service/greenhouse-gas-inventories.

[v] American Council for an Energy-Efficient Economy (ACEEE), *Halfway There: Energy Efficiency Can Cut Energy Use and Greenhouse Gas Emissions in Half by 2050* (Washington, D.C.: ACEEE, September 18, 2019), accessed February 2021, http://www.aceee.org/research-report/u1907; ACEEE, *Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals* (Washington, D.C.: ACEEE, June 22, 2020), accessed February 2021, https://www.aceee.org/white-paper/2020/06/mandatory-building-performance-standards-key-policy-achieving-climate-goals.

[vi] "The Climate Mobilization Act, 2019," NYC Mayor's Office of Sustainability, City of New York, NY, accessed February 2021, https://www1.nyc.gov/site/sustainability/legislation/climate-mobilization-act-2019.page; "Clean Energy DC Act," Department of Energy & Environment, Washington, D.C., accessed February 2021, https://doee.dc.gov/service/clean-energy-dc-act.

[vii] "Retrofit Market Analysis," Urban Green, City of New York, NY, June 18, 2019, accessed February 2021, https://www.urbangreencouncil.org/sites/default/files/urban_green_retrofit_market_analysis.pdf.

[viii] Energy metrics and GHG metrics include, but are not limited to, Site Energy Use Intensity—the total amount of energy a property consumes on-site, regardless of the source (electricity, natural gas, or another fuel), divided by the property's gross floor area; ENERGY STAR Score—the measure of how well a property is performing relative to similar properties nationwide, while normalizing for weather and business activity; Source Energy Use Intensity—the total site energy required to operate a property, adjusted to factor in the amount of energy required to generate, transmit, and distribute the energy consumed by the property, divided by the gross floor area; and GHG Emissions Intensity—the amount of carbon dioxide equivalent (CO_2e) that is emitted as a result of the total energy used to operate a property (either directly via on-site fossil fuels, indirectly from grid-based generation, or a combination thereof), divided by the gross floor area.

[ix] D.C. Law Library, D.C. Law 22-257, CleanEnergy DC Omnibus Amendment Act of 2018 (Washington, DC: D.C. Law Library), accessed February 2021, https://code.dccouncil.us/dc/council/laws/22-257.html.

[x] State of Washington, Certification of Enrollment, Engrossed Third Substitute House Bill 1257, Chapter 285, Laws of 2019, 66th Legislature, 2019 Regular Session, Energy Efficiency, Effective Date: July 28, 2019 (State of Washington, Secretary of State), accessed February 2021, http://www.commerce.wa.gov/wp-content/uploads/2019/06/HB1257.pdf.

[xi] New York City, Local Laws of the City of New York for the Year 2019, No. 97 (New York City, NY), accessed February 2021, https://www1.nyc.gov/assets/buildings/local_laws/ll97of2019.pdf.

[xii] City of St. Louis, Ordinance 71132, Building Energy Performance Standard (BEPS) (City of St. Louis, MO), accessed February 2021, https://www.stlouis-mo.gov/government/city-laws/ordinances/ordinance.cfm?ord=71132.

[xiii] Additional facility types can include public buildings and manufacturing facilities, with special attention to performance metrics considerations.

[xiv] "Urban Green: NYC Building Emissions Law: Frequently Asked Questions," Urban Green, New York City, NY, November 2020, accessed February 2021, https://www.urbangreencouncil.org/content/nyc-building-emissions-law-frequently-asked-questions; "BEPS [Building Energy Performance Standard] Frequently Asked Questions," Department of Energy & Environment, Washington, D.C., accessed February 2021, https://doee.dc.gov/service/beps-frequently-asked-questions; "Building Energy Performance Standards," City of St. Louis, MO, accessed February 2021, https://www.stlbenchmarking.com/Building-Energy-Performance-Standards.

[xv] "Building Energy Performance Standards," City of St. Louis, MO, accessed February 2021, https://www.stlbenchmarking.com/Building-Energy-Performance-Standards.

[xvi] "ENERGY STAR Certification for Your Building," ENERGY STAR, accessed February 2021,

https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification; "Host a Competition to Save Energy," ENERGY STAR, accessed February 2021, https://www.energystar.gov/buildings/program-administrators/state-and-local-governments/host-competition-save-energy.

[xvii] "Connecting Ambition and Action in DC," Building Innovation Hub, Washington, D.C., 2021, accessed February 2021, https://buildinginnovationhub.org/.

[xviii] "Cash Flow Opportunity Calculator," ENERGY STAR, last updated March 7, 2018, accessed February 2021, https://www.energystar.gov/cfocalculator; "Finding Money for Your Energy Efficiency Projects," ENERGY STAR, last updated August 12, 2019, accessed February 2021, https://www.energystar.gov/buildings/tools-and-resources/finding-money-your-energy-efficiency-projects.

[xix] "How Energy Efficiency Programs Can Support Building Performance Standards," ACEEE, Washington, D.C., October 22, 2020, accessed February 2021, https://www.aceee.org/topic-brief/2020/10/how-energy-efficiency-programs-can-support-building-performance-standards.

[xx] *Clean Energy Finance: Green Banking Strategies for Local Governments,* EPA-430F-18-004 (Washington, D.C.: U.S. EPA, October 2018), accessed February 2021, https://www.epa.gov/statelocalenergy/clean-energy-finance-green-banking-strategies-local-governments.

[xxi] Consider avoiding a reliance on baseline or performance measurement in years with highly atypical business activity or operations, including 2020 and 2021, due to impacts from the COVID-19 pandemic.