



Shaping Tomorrow's  
Built Environment Today

## ASHRAE Task Force for Building Decarbonization

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### Using Building Performance Standards to Address Carbon Emissions

Building Performance Standards (BPS) are an increasingly important policy tool for cities and states looking to reduce the carbon impact of their built environment to meet their climate commitments.<sup>1,2</sup> The inherent flexibility of a newer policy tool allows jurisdictions to tailor its requirements to the needs of that locality, focusing on either energy or carbon according to their priorities. Unlike codes, which only affect buildings at distinct events like new construction or major renovation, BPS address the ongoing energy and carbon impact of buildings over their lifespan and aim to improve existing buildings' performance through use of measured data and the establishment of increasingly stringent performance requirements over time.

Jurisdictions looking to adopt a BPS need to set goals, determine how soon they are looking to achieve them, and understand how they relate to their current existing building stock performance and infrastructure, particularly as it relates to the consumption of fossil fuels. To understand the status and carbon reduction potential of buildings in a jurisdiction, policy makers should engage members of the real estate, design, and construction industries, as well as utilities, nongovernmental organizations (NGOs), and local government officials representing sustainability and regulatory departments. Community-based organizations also possess an important voice in the development of building performance standards because of how carbon regulations may impact their members.

This document provides an overview of the following key areas for consideration when developing a BPS:

1. Target Setting
2. Implementation and Enforcement
3. Equitable Application and Compliance Support

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<sup>1</sup> <https://zeroenergyproject.org/all-cities-with-climate-action-plans/>

<sup>2</sup> <https://www.aceee.org/white-paper/2020/06/mandatory-building-performance-standards-key-policy-achieving-climate-goals>

## Target Setting

The most technically difficult aspect of a BPS is determining the performance target for each building type. To do so requires consideration of both a building's intrinsic and extrinsic characteristics. Targets must also be progressive yet attainable if they are to achieve measurable impact. Understanding the energy and carbon intensity of a jurisdiction's current portfolio is a critical first step to setting the right targets.

One method for understanding a jurisdiction's current portfolio is through benchmarking. Benchmarking programs require properties to collect, report, and disclose their energy use and are currently in place in more than 30 cities in the US. Tools such as ENERGY STAR® Portfolio Manager<sup>3</sup> exist to facilitate the benchmarking process. Benchmarking provides vital data, including the average, high, and low energy use of buildings by property type,<sup>4</sup> as well as the quantity and type of fuel used. Designers, efficiency experts, and other members of the building community can help interpret the data gained from benchmarking and to inform the appropriate BPS goals and timeframes for multiple building types.

Important questions for target setting include:

- Which performance metric (site energy, source energy and/or carbon) aligns most closely with the jurisdiction's current and future needs?
  - Consider: Site energy is more familiar to designers, owners, and operators, but is less aligned with long-term decarbonization goals. Greenhouse gas (GHG) emissions are not as familiar to owners and operators, and are harder to measure; however, GHG represents a direct path to decarbonization and may represent the only option where state-level regulations do not allow jurisdictions to set their own energy standards.<sup>5</sup>
- Will the initial performance targets be updated in the future or will long-term targets be established at the onset?
  - Consider: The latter provides more market certainty and encourages long-term investment but offers less flexibility than a periodically updated value. With a carbon-based target the impact of the electric grid is critical; detailed analysis may not be available to set long term targets initially.

One often-overlooked aspect of BPS target setting is the relationship between the BPS target and the expected performance of a new building in that jurisdiction (constructed per the current energy code). Existing resources<sup>6,7,8</sup> and assistance from the design community can help to ensure that the

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<sup>3</sup> U.S. Environmental Protection Agency (EPA), Benchmark Your Building Using ENERGY STAR® Portfolio Manager®, available at <https://www.energystar.gov/buildings/benchmark>

<sup>4</sup> U.S. Department of Energy (DOE), 2019, Benchmarking and Transparency: Resources for State and Local Leaders, DOE Better Buildings, available at [www.energy.gov/sites/prod/files/2019/02/f59/Benchmarking\\_Transparency\\_Resource\\_PDF\\_Final\\_2.14.pdf](http://www.energy.gov/sites/prod/files/2019/02/f59/Benchmarking_Transparency_Resource_PDF_Final_2.14.pdf)

<sup>5</sup> For more information on the implications of different metrics, see the EPA white paper titled "Understanding and Choosing Metrics for Building Performance Standards and Zero-Carbon Recognition." (forthcoming)

<sup>6</sup> NIBS, NBI. 2017. Implementing an Outcome-Based Compliance Path in Energy Codes: Guidance for Cities. National Institute of Building Sciences, New Buildings Institute. <https://www.nibs.org/reports/implementing-outcome-based-compliance-path-energy-codes-guidance-cities>

<sup>7</sup> City of Seattle, Department of Construction, and Inspections. 2018. Energy Compliance Through the Target Performance or Total Building Performance Paths. Seattle Department of Construction and Inspections. [www.seattle.gov/DPD/Publications/CAM/Tip423.pdf](http://www.seattle.gov/DPD/Publications/CAM/Tip423.pdf)

<sup>8</sup> Mark Frankel, Jim Edelson. 2015. Getting to Outcome-Based Building Performance Event Report. In Getting to Outcome-Based Building Performance Event Report from a Seattle Summit on Performance Outcomes. [https://newbuildings.org/wp-content/uploads/2015/11/Performance\\_Outcomes\\_Summit\\_Report\\_5-151.pdf](https://newbuildings.org/wp-content/uploads/2015/11/Performance_Outcomes_Summit_Report_5-151.pdf)

performance expectations at occupancy are aligned with the expectations for that same property when the BPS is first applied. Structural changes in energy codes and standards may be required to allow buildings to comply with both new construction energy codes and carbon-based performance standards.

## Implementation and Enforcement

It is important for jurisdictions not to underestimate the support needed to roll out, maintain, and enforce a BPS. Jurisdictions need to track building performance requirements each cycle including how, and possibly to what extent, each building did or did not comply with the standard. Additionally, it should be anticipated that not every building will be able to meet the BPS due to either financial, technical, or physical constraints. Deciding ahead of time how to address these buildings allows for a more equitable administration of the policy. Consulting with stakeholders like those mentioned above or reaching out to other jurisdictions may help preempt future issues. Items to consider include:

- Will the BPS be administered by an existing group, or will a new department need to be created? If the BPS program is run by a newly established group, how will that group communicate with the existing building officials, particularly on matters related to the energy code?
  - Consider: If a BPS will use a carbon metric, implementation will require not only enforcement staff but also education to building stakeholders?
- Does the selected department have the staff and technical support to administer the BPS? The collection and tracking of building performance data requires specialized software and infrastructure that may not currently exist.
  - Consider: Where existing databases exist, what information do they capture that can be useful in BPS enforcement to prevent duplication?
- How will non-compliance be addressed? In cases where compliance is technically unfeasible, how will the policy continue to be enforced? Will alternative compliance paths be considered?
  - Consider: For BPS using carbon metrics, phase out plans for onsite combustion will need to be coordinated by technology availability alongside capital planning schedules.
- How will partial compliance, or good faith efforts be tracked and credited? If an owner demonstrates good-faith spending towards compliance, without reaching it, will penalties (fees) be waived?
  - Consider: For carbon-based metrics, the decarbonization of the electric grid may also slow progress for buildings where renewable portfolio standards or other clean energy goals are missed, at no fault of building owners.

## Equitable Application and Compliance Support

The size, type, occupants, and ownership of a building affects the ease with which it is able to make the necessary improvements to meet a BPS. The transaction costs and burdens on smaller buildings are significant relative to their capacity, and historically underserved communities who have not been actively engaged in energy efficiency and environmental policymaking need even more support.<sup>9</sup>

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<sup>9</sup> Hart, Zachary, et al. "Understanding the Housing Affordability Risk Posed by Building Performance Policies." [https://www.imt.org/wp-content/uploads/2020/08/IMT\\_BPS\\_AffordabilityRisk\\_SummerStudy\\_2020.pdf](https://www.imt.org/wp-content/uploads/2020/08/IMT_BPS_AffordabilityRisk_SummerStudy_2020.pdf)

Identifying or establishing funding options, such as a Green Bank, like the one in Washington, DC, can increase compliance and reduce the need for punitive measures. Setting up local building performance support hubs, such as those in New York City, Washington, DC, and St. Louis, MO, to provide technical support and aid in policy interpretation can help those without dedicated building staff to understand what they need to do to comply. As part of the BPS development, it is important to consider the following:

- Should buildings that may have difficulties meeting the standard be granted an exemption?
  - Consider: Exemptions may be based on building use or category, size, age of buildings, magnitude of investment anticipated, ownership access to capital, or other factors.
- If a carbon metric is used, what supportive mechanisms will be put in place to ensure underserved communities are not left paying a disproportionately high gas rate as fewer customers are consuming fossil fuels?
  - Consider: As fewer properties are relying on natural gas as a fuel source, fewer customers will be left to pay for the cost of gas infrastructure. This burden is likely to fall on those communities with fewer resources available for major infrastructure changes.

## Additional Resources

The elements described above are critical to a BPS, but do not address all aspects of BPS development, implementation, and enforcement. Several cities and states that have passed BPS legislation provide examples from which additional jurisdictions can learn. New York City was the first to enact such a policy in the United States, using a carbon-based metric, but the details of each new policy, including metrics, targets, and timelines varies by jurisdiction.<sup>10</sup>

Beyond the references included in the text above, the EPA Benchmarking and Building Performance Standards Policy Toolkit<sup>11</sup> provides a summary of several policy aspects and the American Cities Climate Challenge's *Building Performance Standards—A Framework for Equitable Policies to Address Existing Buildings*<sup>12</sup> provides a comprehensive guide for jurisdictions considering a BPS.

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<sup>10</sup> <https://www.imt.org/resources/comparison-of-u-s-building-performance-standards/>

<sup>11</sup> <https://www.epa.gov/statelocalenergy/benchmarking-and-building-performance-standards-policy-toolkit>

<sup>12</sup> <https://www.usdn.org/projects/building-performance-standards.html>