Building Performance Standards - Adoption, Implementation, and Lessons Learned

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ENERGY TECHNOLOGIES AREA

Our Panel



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Session Learning Objectives

- Learn about what Building Performance Standards are and how they're being defined across the country
- Understand the variety of performance metrics, target setting approaches, and compliance pathways found in Building Performance Standards
- Identify adoption and implementation best practices from jurisdictions embarking on BPS, with an eye toward equity and ease of implementation
- Discover the supportive federal tools, resources, and analysis available to jurisdictions and other stakeholders interested in Building Performance Standards



Building Performance Standards: Adoption, Implementation, and Lessons Learned

Agenda

- □ BPS Overview + Landscape (10 Minutes)
- Technical Assistance (10 Minutes)
- BPS Policy Life-Cycle
 - Prerequisites, Fact-finding, Passing Legislation (15 Minutes + Discussion)
 - Rule Making + Target Setting (15 Minutes + Discussion)
 - Post-Adoption + Implementation (15 Minutes + Discussion)

Discussion, Q+A



Buildings critical to US Climate Goals



>70% of electricity used in buildings

Here in 2050

Building Energy Codes - Crucial, but not enough

Commercial and residential building energy codes have raised floor of energy performance over time, but do not affect majority of existing buildings



Average annual building retrofit rates of 2% alone will not meet US energy and climate goals

Building Performance Standards connect gap between energy codes and rate of voluntary retrofits over lifecycle of existing building

Background: Reducing emissions with BPS

Several jurisdictions are planning and implementing policies to help reduce GHG emissions from existing buildings (e.g., benchmarking, audits, tune-ups, BPS)

Building Performance Standards (BPS) require ongoing performance improvement + reporting to meet specified targets

BPS policy design and impacts depend on many factors

- Building stock (type, size, age, energy use, fuels, equipment)
- Data availability (tax assessor, benchmarking, audit)
- BPS targets (EUI, GHGI, electrification)
- Policy goals (energy and/or emissions reductions, electrification)
- Resources available (technical expertise, time, effort)



BPS 101

Building (E) Performance Standard

- E: Energy or Emissions
- First policy that **requires significant** intervention at the building
- Long-term policy with increasing stringency over time
- Aligns with ambitious energy and climate goals through long-term strategic planning



Source: St. Louis Building Energy Performance Standard (BEPS): <u>BEPS Compliance</u> <u>Pathways Fact Sheet</u>

How a BPS Gets Started

Establish Overall Policy Goals					
Sector-level goals, e.g. reduce emissions by 90% by 2050	Select a BPS Metric				
	Select a performance metric that is best-suited for the BPS goal	Select Covered Buildings			
		Divide the covered buildings into categories (e.g. by building type)	Develop Targets		
			Compute the distribution of building performance for each category		

Metric Selection

- Range of metrics
 - Site EUI, Energy Star score, GHG intensity, etc.
- Range of complexity, building-level control
- Connected to jurisdiction goals and abilities
 - Energy/climate/building policy goals
 - Regulatory authority
- One metric or multiple
 - Dependent on policy design, building stock diversity, etc.



Source: DOE & ASHRAE BPS Technical Resource Guide

Covered Buildings Selection

Policy 1:

All buildings above 35,000 sqft, exempting houses of worship and historic properties Policy 2: Buildings above 50,000 sqft, exempting commercial kitchens



campus-style buildings, warehouses, offices

Examples of covered buildings lists

Jurisdictions select which buildings are **in or out** of BPS policies:

- Building typology (offices, warehouses, agriculture, multifamily, etc.)
- Building size threshold (10,000-50,000+ sqft starting thresholds)
- Building ownership (municipal/public, private, cooperative, leased vs owned, etc)

Target-setting Approaches

Sector-Level Goals	 Requires understanding existing building stock performance Top-down approach may not account for the feasibility of retrofits needed to meet targets 	
Benchmarking Data	 Targets can be set based on the top performers in the stock Targets by type depend on how buildings are represented in the data 	
Published Sources	 ASHRAE Standard 100 and ENERGY STAR National Median EUIs can be used directly for target-setting 	
Modeled Performance	 Multiple approaches are being explored, including prototype building and urban-level modeling Yet to be used in existing policies 	

DOE and **EPA BPS** Technical Assistance Network



The BPS TA Network is open to all members of the National BPS Coalition and any other cities, states, and jurisdictions working on or interested in a BPS or similar policy prompting improvements in a building.

DOE, EPA, and the National Labs with support from contractors offer direct technical assistance, tools, technical and program design guidance, and resources

- DOE and EPA Technical Assistance Network support includes:
 - Building stock analyses, including analysis of energy and emission impacts associated with BPS adoption
 - Benchmarking, prescriptive, performance, and other data-driven compliance pathway tools and resources
 - Performance target-setting and savings trajectories
 - Measure and technology prioritization
 - Program impact and cost-effectiveness analyses
 - Program design and administrative structure support

BPS Program – Building off BTO Core Strengths





Software and Tools – Leveraging existing technology for new applications



Stakeholder Engagement– Convening stakeholders for widespread influence and feedback



Technical Analysis – Delivering analytical power and research capabilities for greater impact

Laying the data foundation for BPS

Energy Benchmarking			
- Energy Data	Tune-Ups / Retro-cor	mmissioning Energy Audits	
- Building Characteristics - Existing Building Performance	 Basic System Data Low-hanging Fruit Energy Savings Opportunities 	 Building Systems Conservation Measures (ECMs) 	
		- Decarbonization Potential	

Building Performance Standards



Data-driven BPS Policy Analysis



Building Type, Size, Age *Tax database*



Energy/Emissions *Bx data, utility bills Est. via EIA,BPD,...*

Asset characteristics *Audits, permit data Est. via EIA,BPD,...* BPS targets

scenarios

Current Stock

Energy/Emiss.



Future Stock Energy/Emiss.



DOE Building Stock Impact Analysis

- Building Stock Analysis / Energy + Carbon Baselining
 - Fill the gap of unknown energy+carbon data for existing buildings
 - Support jurisdictions at any phase of policy development
 - Leverage all existing data, regardless of format or quality
- Impact Analysis/Target Setting Support
 - Model policy-driven scenarios for energy/carbon reduction for any jurisdiction, tailored to their policy framework
 - Support policy standardization without sacrificing accuracy of scenario simulation





BPS Technical Guidance

DOE & ASHRAE Building Performance Standards Technical Guidance

- BPS Metrics
- Performance Target Setting
- Policy Decision Support
- Overarching BPS Analysis Methodology

 Key Considerations, variants, high-level methodological approaches



BPS Technical Guidance Report



Major Learnings – Providing effective TA

Importance of leveraging available data

- The power of cohort cooperation
- ◆ Balancing sophistication with administration

Let the data talk!









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BPS Life-Cycle Stages





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Context + Goal: City of Madison

• Climate & energy goals adopted in 2019

• 100% renewable energy and net zero carbon emissions for city operations by 2030 and community-wide by 2050

• Building Energy Savings Code adopted in 2023

- Annual benchmarking for commercial buildings +25,000 ft2
- Tune-ups for commercial buildings +50,000 ft2 every four years

• Policy design questions

- Which buildings should we include?
- What is the estimated impact on GHG emissions?
- What should be required for tune-ups and tune-up specialists?
- How can we prevent or mitigate adverse impacts for communities of color & low income communities?









Correcting misinformation & repairing trust

- Definitions
- Data security
- Engagement process

• Limited data availability

- Tax assessor data (floor area & few building use)
- Local energy use information
- Regional information on benefits and costs of tune-ups
- Demographics of building owners and tenants
- Simultaneous Policy Adoption and Implementation – Benchmarking and Tune-ups





Technical Assistance Needed



- Estimating program benefits & costs complete
 - Building stock analysis
 - GHG reduction estimates
 - Air quality benefits
 - Summarizing data on costs and impacts of similar programs
- Defining tune-up requirements and specialist qualifications ongoing
- Implementing the program ongoing
 - Developing the covered buildings list UBID
 - Benchmarking tools and trainings ENERGY STAR Portfolio Manager
 - Software solutions to manage compliance SEED and Audit Template



Innovative Solutions



- Workshops to engage community in program's design
- Racial Equity and Social Justice Analysis
- Harness the power of partner voices





Lessons Learned



- Community engagement is critical and ongoing
- Engage utilities early
- Monitoring needs go beyond energy and emissions
- Carefully consider content of policy vs program guidance
- Build in flexibility





Context + Goal: City of Chicago

- Context
 - **Programs:** Benchmarking ordinance (2013); Retrofit Chicago (2014)
 - Plans: Climate Action Plan (2022); Chicago Building Decarbonization Working Group Recommendations Report (2022)
 - Legislation: Energy Transformation Code (2022); Draft New Construction Fossil Fuel Phaseout (2023)
- Goals and Objectives
 - Reduce GHG emissions 62% by 2040 (CAP)
 - Building retrofit and electrification goals: 13.1% of total GHG reduction strategy
 - 68% of Chicago emissions tied to buildings
 - New construction ordinance passage in 2023
 - Building performance standard passage by Earth Day 2024
- Policy design questions
 - How does Chicago equitably decarbonize both new construction and existing buildings while reducing utility costs, lowering upfront capital expenses, and ensuring that that decarbonization benefits low-income, disenfranchised communities?





Challenges



- Buildings account for 68% of all GHG emissions in Chicago
 - Fossil gas combustion accounts for more 50% of those emissions (CMAP 2019 GHG inventory)
- Cold climate, emerging technologies (for some)
- Diverse stakeholder and City council interests
- Research needs, technical expertise, and staff capacity



Technical Assistance Needed

- Need: Economic impact assessment of both new construction and building performance standards
 - Received: new construction economic impact assessment from national experts
- Need: Market segmentation study of existing buildings for BPS
 - Received: TA from DOE, EPA, and national labs staff to develop preliminary market segmentation study to inform future performance standards. Received as part of White House BPS Coalition!



Innovative Solutions

Challenge: Large share of emissions associated with buildings

- Solution: Comprehensive accounting of Climate Action Plan building decarb goals.
- **Solution:** Robust decarbonization scenario planning with Chicago Building Decarbonization Working Group.

Challenge: Cold climate and building decarb

- **Solution:** Leverage local decarbonization leaders who have implemented at-scale cold climate electrification projects.
- **Solution:** Leverage national experts like IMT, RMI, NRDC, DOE, and labs staff, to share resources for public dissemination.

Challenge: Diverse stakeholder positions

• **Solution:** Continuous engagement with business, labor, frontline, and environmental justice groups. Over 300 sessions of engagement in 2023 alone.

Challenge: Research, TA, and capacity building

- **Solution**: Actively searched out partnerships with local and national experts, including those with lived experience, to strategically co-develop policy, conduct research, and build political momentum.
- **Solution**: Supporting the concepts like a regional building decarbonization hub. Seeking federal funding for both capacity building and implementation support.





Lessons Learned



- Clear accounting of total emissions and potential impact of building decarbonization is critical for messaging
- Active and constant policy and planning engagement with diverse stakeholders is crucial for success
- Building coalitions of both local and national experts and advocates leads to detailed and contextually appropriate plans and policies
- Highlight the economic, public health, and climate benefits of building decarbonization it works in our favor!
- To ensure equitable co-benefits, empower EJ and frontline leaders throughout the planning, policy development, and implementation process.



CONTEXT + GOAL: NYC

- 2019 Climate Mobilization Act and Local Law 97 (LL97)
 - Legislation established the goal to reduce emissions by 40% by 2030, and 80% by 2050 (current goal is carbon neutrality by 2050)
 - Caps GHG emissions of **buildings over 25,000 Sq. Ft.** beginning in 2024
 - Emission limits (GHGI) reduce every five years
 - 2024 2029 is a warm up period that is not on the overall trajectory (roughly 80% of bldgs. comply)
 - 2030 is when limits become challenging for most buildings (roughly 75% of bldgs. don't comply)
 - City-owned buildings are subject to more aggressive reduction targets, NY City Housing Authority subject to same targets as the private sector

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build safe live safe

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CONTEXT + GOAL: NYC

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By 2030, the Climate Mobilization Act is expected to achieve:

- 6 million tons of CO₂e reduced
- 26,700+ jobs created
- 150 hospitalizations avoided per year
- 50 to 130 deaths prevented per year



CHALLENGES: NYC

Outliers

- As with any policy, "one-size fits all" won't work

Considering alternatives

- Renewable Energy Certificates vs. keeping co-benefits in NYC

Changing policy landscape

 NY State's Climate Leadership & Community Protection Act passed shortly after LL97

Universal hurdles to BPS implementation

- Workforce deficiencies and ensuring access to funding
- Increased operational costs of electrification
 - NYC and NYS working with the PSC to consider reduced rates for electrified buildings

CHALLENGES: NYC

Affordability

- LL97 carves out rent-regulated housing (over 35% of dwelling units), leaving carbon from ~7,000 properties on the table

Changing energy grid

- May motivate owners to delay investments

Support needed for full implementation

- Increased staffing needs, challenges in hiring qualified technical staff and attorneys
- Challenges in financing options (C-PACE)
- Technical challenges unique to NYC?
 - Islanded cogeneration properties

- Large district steam system

TECHNICAL ASSISTANCE: NYC

Better data

- Data yielded by our audits/retro-commissioning law is filled with junk, no requirement to implement measures (Local Law 87)
- ESPM was set up for benchmarking not BPS, there are gaps/hurdles

Real-time carbon data for the grid

 Owners want real-time data to make informed decisions day-today

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- NY ISO is working on a solution

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INNOVATIVE SOLUTIONS: NYC

NYC Accelerator

- Takes the data we have on a building already and provides free technical assistance

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- Connects owners to service providers, incentive programs, financing programs
- Has assisted owners with 12,000 buildings to date

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LESSONS LEARNED

Sort the sticky issues out later!

- LL97 passed with many details not fully worked out
- An Advisory Board worked with the City to sort out some of these details, which uncovered others
- It was more important that the framework of the law was passed
- You will *never* please everyone.

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- Prioritize how to have the biggest bang for the buck
 - Sometimes you have to support tens of thousands of owners first while still being responsive to squeaky wheels

LESSONS LEARNED

- Cooperation needed from all entities (City and State) and multiple agencies
- Flexibility is key!
 - We're still studying the metric

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- Manufacturing and industrial facilities don't fit the mold
- Occupant density matters but isn't in the law
- Our law is still evolving, and will continue to evolve over time

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- Provide ways to authorize flexibility and evolution

Panel Questions

- What advice do you have for other jurisdictions looking to start their BPS journey?
- What were the highest priorities for stakeholder engagement throughout the process?
- What were the most important data-related priorities for you throughout the process?
- What resources and assistance have you sought in preparing to comply with BPS or similar policies?
- How do you see BPS evolving in the next 5-10 years?



Panel Questions

- What sort of equity / social justice considerations are at play with your policy?
- How has regional utility engagement shaped your process?
- Questions from the audience?



THANK YOU!



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