

Existing Building Policy Review for Burlington

Completed July 2022

Table of Contents

- Existing Building Policies Overview
- Case Studies
 - Boston Case Study
 - Denver Case Study
 - New York Case Study

Recommendations for Burlington



Existing Building Policies Overview



Existing Building Policies | Background

Background and Summary of Project

Since 2018, BEI has worked closely with Burlington, VT's municipal utility, the Burlington Electric Department (BED), to accelerate equitable building electrification across the city, which is a key element of Burlington's commitment to become a "net zero energy" city by 2030.

BEI developed this overview of existing building policies in other cities to help Burlington identify opportunities and considerations for large buildings within their local context. This overview includes case studies of three cities with ambitious policies in place—Boston, Denver, and New York City. The case studies include an overview of each policy, the stakeholder engagement process used to develop them, a description of supportive programs and resources created to ensure equitable implementation, and lessons learned. This review also includes a set of recommendations for Burlington to consider when developing a policy for its large existing buildings.





Existing Building Policies | Benefits & Challenges

There are both benefits and challenges to developing policies to reduce greenhouse gas (GHG) emissions from existing buildings that will also ensure equitable outcomes:

Benefits

- Potential to lower utility costs for owners and tenants
- Opportunity to build an inclusive, organized workforce and provide high-road jobs
- Guarantee deep GHG emission reductions from buildings to reach climate goals

Challenges

- Risk of increased housing and energy costs, which could lead to gentrification and displacement
- Significant financial and technical support often needed for building compliance
- Different policy approaches likely needed for different building types, with potentially significant
 administrative and enforcement burdens given the complexities of existing buildings
- Significant stakeholder engagement needed to plan and implement effective policies



Potential Requirements for Building Owners

There are several potential policy requirements to consider to address existing buildings:

Policy Type	Description	Pros	Cons	Examples
Building Performance Standards (BPS)	Establishes targets for buildings to reduce energy use, GHG emissions, and/or other metrics over time	 Can guarantee GHG savings on a specific timeline Addresses whole-building energy usage Provides owners with flexibility for reaching targets 	 May require early equipment replacement Potential for tenant disruption May be unnecessarily complicated for smaller buildings 	Implemented in: • Boston, MA • Denver, CA • New York City, NY • St. Louis, MO • Washington, DC
Replacement on Burnout Requirement*	Requires certain appliances and/or efficiency standards at the time of equipment replacement	 Reduces costs by aligning with natural equipment replacement cycles Provides lead time for capital planning Limited tenant disruption 	 Does not reach unpermitted work Does not address whole- building energy usage Timeline may not align with climate goals 	Implemented in: • Denver, CO • Piedmont, CA Under consideration: • San José, CA
Date-certain Equipment Phase-out	Mandates phase-out of certain types of systems (such as certain heating systems) by a specific date	 Guarantees GHG savings on a specific timeline Provides lead time for capital planning 	 May require early equipment replacement Does not address whole- building energy usage 	Implemented in: • New York City, NY (to phase out heavy heating oil)

*Also referred to as an "existing building code"

Potential Requirements for Building Owners (Cont.)

Policy Type	Description	Pros	Cons	Examples
Appliance Emissions Standards*	Bans the sale of high- emission appliances regionally or statewide based on air pollutants, such as nitrogen oxide (NOx)	 Broad reach that promotes market transformation Reduces costs by aligning with natural equipment replacement cycles 	 Implementation authority may be at the state level Does not address whole- building energy usage Timeline may not align with climate goals 	Under consideration: • California • Colorado • New York
Rental Efficiency Standards	Requires property owners to meet minimum efficiency standards for a building or unit before they can receive or renew rental licenses	 Limited tenant disruption Ease of administrative implementation if aligned with existing processes Opportunity to augment existing standards 	 Only applies to rental properties 	Implemented in: • Ann Arbor, MI • Boulder, CO • Burlington, VT
Point of Sale Requirements	Requires property sellers to assess energy usage and/or implement certain measures prior to listing their building for sale	 Many building owners make upgrades at the time of sale 	 Reaches relatively few buildings annually May require early equipment replacement Increases costs/complexity for new homeowners 	Implemented (assessments only) in: • Berkeley, CA • Portland, OR

*Technically appliance emissions requirements would be placed on retailers, although enforcement for building owners may also be needed.

Potential Utility-Scale Approaches

There are also policy options to consider that could be applied at the utility level:

Policy Type	Description	Pros	Cons	Examples
Strategic Gas Decom- missioning	Utilities could be required to target segments of the gas network to electrify buildings and decommission or down- grade associated gas infrastructure	 Creates a coordinated approach to building electrification Minimizes the potential for gas price spikes and stranded assets Could avoid unnecessary gas investments Unlocks utility capital for the transition to electrification 	 Has not yet been attempted outside of a pilot level Would require significant changes to the existing utility regulatory structure 	Current exploration of pilots in the San Francisco Bay Area (PG&E territory)
Utility Scale Geothermal	Utilities could be required to target segments of the gas network to convert to district-scale geothermal energy networks	 All of the above, plus: Enables hyper-efficient district-level electrification Provides a potential transition for gas utility workers 	 Has not yet been attempted outside of a pilot level Would require significant changes to the existing utility regulatory structure Significantly more expensive and disruptive than air source heat pumps (ASHPs) 	Current exploration of pilots in Philadelphia, New York, and Massachusetts

Boston Case Study

Building Performance Standard



Boston | Policy Overview

Type of Policy: Building Performance Standard Year Enacted: 2021

Covered Buildings:

- Non-residential buildings greater than 20,000 sq. ft.
- Residential buildings with 15 or more units
- Any parcel with multiple buildings that sum to at least 20,000 sq. ft. or 15 units

Total Buildings Covered: Approximately 6,200 Metric Used: GHG emissions Intensity (CO2e/sq. ft.) Policy Development Timeline: Winter 2019 – Fall 2021 Implementation Timeline: Targets every 5 years beginning 2025 through 2050

Background and Summary of Approach

The Building Emissions Reduction and Disclosure Ordinance (known as "BERDO 2.0") requires large buildings to meet decreasing GHG emissions standards over time and achieve net zero emissions by 2050. Boston staff and local climate advocates were motivated by the City's 2050 carbon neutrality goal and were inspired by other cities, such as New York City and Washington, DC, that recently passed similar laws. Boston spent nearly two years on intensive stakeholder engagement to work through key elements of the law. In September 2021, Boston's City Council passed the law unanimously as an update to the City's existing benchmarking and energy action and assessment requirements.



Boston | Policy Details

Policy Structure

- Achieves zero emissions in 2050 with decreasing GHG emissions intensity targets every 5 years
- Separate targets are set for 13 building typologies
- Option to pay an "Alternative Compliance Payment" of \$234 / ton CO2e / year over compliance target
- Compliance is determined by verified benchmarking data

Determining Compliance Pathways

- Modeled pathways based on existing BERDO benchmarking data
- Policy includes built-in flexibility, including:
 - An "Individual Compliance Schedule" for buildings based on percentage reduction (50% by 2030 and 100% by 2050)
 - Individually proposed "Hardship Compliance Plans" that must be approved by an Emissions Review Board



Image: BERDO 2.0 TAG Slides prepared by Synapse Consulting



Boston | Stakeholder Engagement

Boston invested in stakeholder engagement for both the technical and equitable aspects of the BPS, ensuring broader support and a robust policy structure.

Technical Advisory Group Topics

- Targets, typologies, and compliance pathways
- Economic analysis of costs and penalty options
- Other areas of concern, such as campuses, district systems, renewable energy credits (RECs), and offsets

Residential Advisory Group Topics

- Benefits of electrification and building upgrades
- Community and tenant priorities and concerns
- Governance of Equitable Emissions Investment Fund, including types of projects and criteria for funding
- Establishment of an Emissions Review Board that will be twothirds community-appointed representatives



Engagement image: <u>BERDO 2.0 TAG Slides</u> Timeline: <u>BERDO development webpage</u>



Boston | Supportive Programs & Resources

Retrofit Resource Hub

- A one-stop website and help desk staffed by city officials for any building owner interested in a retrofit
- Includes policy compliance support such as office hours, webinars, and detailed guides
- Additional staff will be needed, with more onboarding this year

Funding

- Some retrofits will be funded by Alternative Compliance Payments
- City funding will support the Emissions Review Board
- Funding gap for under-resourced buildings remains, particularly for support during first reporting cycle (2021 - 2026); Boston is exploring options now



Boston Retrofit Resource Hub website



Boston | Lessons Learned

Successes

- Guaranteed carbon reductions through GHGbased metric
- Deep technical analysis created support and confidence among sophisticated building owners for ambitious policy requirements
- Investment in deep community and stakeholder engagement helped embed equitable policy elements and helped secure support from environmental justice advocates and residents for the final policy

Challenges & Lessons Learned

- The stakeholder engagement strategy required significant staffing and iterative coordination between technical and community partners
- A changing political landscape required an evolving political strategy
- Boston staff will need to continue community engagement and prioritization of their housing affordability and anti-displacement efforts
- Significantly more staffing and funding will be needed for policy & program implementation



Denver Case Study

Building Performance Standard + Replacement Requirement on Burnout



Denver | Energize Denver Ordinance

Type of Policy: Building performance standard (BPS) + replacement requirement on burnout

Year Enacted: 2021

Covered Buildings: Commercial and Multifamily

- **BPS:** 25,000+ sq. ft.*
- Electrification Requirement: All commercial and multifamily buildings at system replacement, when cost effective

Total Buildings Covered: BPS: 3,100, Electrification Requirement: 14,000

BPS Metric Used: Site Energy Use Intensity (EUI)

Policy Development Timeline: Jan - Sept 2021

Implementation Timeline:

- **BPS:** 2030 end date with interim 2024 + 2027 targets
- Electrification Requirements: 3-phased approach
 between 2022-2027

Background and Summary of Approach

In November 2020, 60% of Denver voters approved a measure to create a new sales tax to fund a Climate Protection Fund (CPF), which now collects ~\$40 million annually for climate action in Denver. In 2021, a stakeholder group called the "Energize Denver Task Force" examined existing buildings and developed a set of recommendations that resulted in the "Energize" Denver Ordinance" and supporting technical assistance and incentive programs for commercial and multifamily buildings. Incentives for electrification upgrades will be funded by the CPF, and the City is prioritizing investments to under-resourced buildings to improve health, create jobs, and ensure an equitable approach.



Denver | Policy Details of the BPS

Goal: 30% improvement in energy performance across all covered buildings (25,000+ sq. ft.) by 2030

Task Force Approach

- The Task Force used a "Policy Design Tool" to set the overarching 30% goal.
- The Task Force analyzed Denver's benchmarked buildings and set an EUI target at the 15th percentile by building type to achieve the 30% goal.

Policy Structure

- Separate site EUI targets are set for 80 building typologies.
- Unique building types received general 30% reduction targets (e.g., museums, fitness centers, etc.).
- On-site solar is credited towards energy use, lowering a building's net EUI.
- Alternate compliance options will be available, including target or timeline adjustments, prescriptive options for buildings 25,000-100,000 sq. ft., and options for under-resourced buildings.



Example Site EUIs by Building Type

ESPM Building Type	Target EUI
Office	48.3
Hotel	61.1
Multifamily Housing	44.2
Performing Arts Center	53.2
Distribution Center	25.4
Restaurant	194.1
Medical Office	69.0



Denver | Energize Denver Policy Tool

Policy Inputs

Energy Efficiency and Renewable Policy Parameters Carbon Impact Cumulative Carbon Reduction by 2040 (tons eCO2) Task Force Goal 13,744,214 Large building = 25,000 SF or greater Benefit of EE & RE policies 8.236.619 Benefit of electrification policies 3.574.408 Large Building Parameters Benefit of all policies 11.811.027 EUI Reduction Target: 30% CARBON REDUCTION GOAL NOT MET Interim Target #1 Interim Target #2 Final Compliance Cumulative avoided social cost by 2040 2024 2027 2030 Date: Annual Policy Benefit to Denver \$892,858,752 Average EUI Reduction Target: 10% 20% 30% Implementability Small Building Parameters **Buildings Impacted** Large Buildings Small Buildings Policy Path: Prescriptive # of buildings impacted 3,400 14,158 % total building area 82% 18% Number of Phases: 1 % of total energy use 76% 24% Phase 3 Phase 1 Programmable Thermostats Programmable Thermostats Programmable Thermostats LED Lighting Upgrade LED Lighting Upgrade LED Lighting Upgrade Cost Effectiveness Onsite Solar Onsite Solar Onsite Solar Low Simple Payback High Simple Payback Solar 5% Roof Area Solar 15% Roof Area Solar 30% Roof Area (years) (years) Large Buildings 3.0 Total Expected Energy Savings: 15.0 15% N/A N/A Small Buildings Compliance Date: 2025

Image: CASR Community Briefing Presentation, updated as of April 2022

Policy Outputs



Denver | Policy Details of Electrification Requirements

Policy Structure

- Phase 1 (2022-2023): Incentives available for electrification schematic design and costs.
- Phase 2 (2023-2025): Incentives available for heat pump installations for all buildings. The City also ensures that permitting ease for electric appliances is equal to process for gas appliances.
- Phase 3 (2025-2027): The City requires heat pumps at time of replacement and when cost effective, with "Easy-to-Electrify" systems required in 2025 and "Hardthe-Electrify" systems in 2027 (see right). Heat pump incentives are available for under-resourced buildings only.

Phase 3 Electrification Requirements

Amending Denver Building and Fire Code	2025	2027
Heat Pump Required upon Replacement of Easy-to-Electrify Equipment (furnaces, roof top units, individual water heaters) when cost-effective.	Х	
Heat Pump Required upon Replacement of Hard-to-Electrify Equipment (PTACs, boilers, central hot water) when cost-effective.		х



Denver | Stakeholder Engagement

Energize Denver Task Force Recommendations

- Eight meetings from Jan-Aug 2021 to provide recommendations on the Energize Denver ordinance and supportive programs.
- Three Workgroups: Workforce, Equity, and Climate Solutions
- Conducted two public briefings for public comment and a community engagement survey for input.

Ongoing Engagement for Under-Resourced Buildings

- Goals are to identify under-resourced buildings and work with their tenants and owners to design supportive programs.
- Meetings with tenants and owners are identifying key concerns and barriers to compliance.
- The City is launching a \$41 million building electrification incentive program that will be designed with ongoing input from community and workforce groups.

Energize Denver Task Force Membership

Building Owners / Mangers	Colorado Hotel & Lodging Association LBA Realty Urban Villages NAIOP Colorado Denver Metro Association of Realtors Apartment Association of Metro Denver Denver Metro BOMA
Utility / Oil + Gas	Xcel Energy BPX Energy Colorado Oil and Gas Association
Residents / Tenants / Non-Profits	Urban Land Conservancy Denver Housing Authority Energy Outreach Colorado Neighborhood Development Collaborative
Labor / Workforce Training	IBEW 68 Pipefitters Local Union No. 208 LiUNA Local 720
Environment / Clean Energy	Group 14 Engineering Southwest Energy Efficiency Project Colorado Sierra Club NRDC Colorado Solar and Storage Association Ensight Energy Consulting Rocky Mountain Assoc. of Energy Engineers
City Council	City Council District 7

Image: CASR Community Briefing Presentation, updated as of April 2022



Denver | Supportive Programs & Resources

Energize Denver Hub 2.0

- A one-stop help desk staffed by a contracted firm
- Includes how-to guides, checklists, and resources specifically for underresourced buildings

Building Electrification Pilots

- Up to 70 pilot projects, beginning in July 2022, covering most potential building types and systems
- Lessons will inform building electrification incentive design and provide case studies for other building owners considering retrofits

Building Electrification Incentives

- \$41 million program will cover incremental costs of electrification at time of replacement and technical assistance from start to finish
- Currently in design, with focus on support for under-resourced buildings





Denver | Implementation Timeline





Image: Energize Denver Ordinance, CASR Overview Presentation, March 2022

Denver | Lessons Learned

Successes

- Denver's Climate Protection Fund provides significant resources that are critical to fund supportive programs for equitable policy implementation
- A "Policy Design Tool" allowed Energize Denver Task Force members to examine multiple options and build consensus on best course for GHG and equity goals
- Denver has hired 7+ staff to complete ongoing community engagement, incentive program design, and policy implementation

Challenges & Lessons Learned

- A rapid policy implementation timeline is necessary to meet Denver's ambitious goals, but the City underestimated the time required to design equitable supportive programs
- The final Energize Denver Ordinance is a compromise for the Task Force on their climate ambition, which is a result of technical and economic challenges to rapid electrification
- New policies will likely be needed to protect tenants from cost increases and displacement



New York City Case Study

Building Performance Standard



New York City | Policy Overview

Type of Policy: Building Performance Standard Year Enacted: 2019

Covered Buildings:

- All buildings over 25,000 sq. ft. and parcels and condos with more than 50,000 sq. ft. of built space*
- Affordable housing** that meets size threshold is carved out, but must complete low-cost prescriptive measures

Total Buildings Covered: 50,000 (60% of citywide built sq. ft.)

Metric Used: GHG emissions Intensity (CO2e/sq. ft.) Policy Development Timeline: Fall 2016 - Spring 2019 Implementation Timeline: Targets every 5 years beginning in 2024 through 2050

Background and Summary of Approach

New York City's Building Emissions Law (Local Law 97) requires large buildings over 25,000 sq. ft. to meet decreasing GHG emissions targets over time, eventually mandating an 80% reduction by 2050. The law will deliver the largest carbon reductions in New York City's history. New York City and its partners conducted more than two years of stakeholder engagement, including a yearlong process called the 80x50 Buildings Partnership run by the local nonprofit Urban Green Council. To help implement the policy, New York City launched the NYC Accelerator, which offers free technical assistance to building owners to support compliance, along with a range of other supportive resources and financing.



*Municipal buildings are subject to an accelerated portfolio-wide reduction requirement.

ion **Originally defined as any building with at least 1 rent-regulated unit. A recent amendment now defines affordable housing as buildings with more than 35% rent-regulated units.

New York City | Policy Details

Policy Structure

- Requires decreasing GHG emissions intensity targets over time, with separate targets set for 15 building use types.
- Initial target period in 2024 will impact the top 20% of worst performers, with future targets impacting more buildings over time.
- Electricity GHG coefficients will be updated in future years to reflect a changing grid, creating some challenges for long-term planning.
- Penalty fee for non-compliance is set at \$268/year/metric ton of GHG emissions over the target and goes to NYC's general fund.
- A new Office of Building Energy Performance at the NYC Department of Buildings will implement the law.

Approach to Affordable Housing

Affordable housing* is carved out from the standard Buildings Emissions Law requirements as a result of concerns from housing advocates about compliance costs and a lack of solutions to prevent costs from being passed through to renters.

Instead, affordable housing buildings over 25,000 sq. ft. must complete a list of prescriptive, non-capital-intensive measures.

Building Emission Limits for 2024-2029 & 2030-2034

Occupacy Classification	2024-2029 Limit (tCO2e/sf)	2030-2034 Limit (tCO2e/sf)
Group A (Assembly)	0.01074	0.00420
Group B (Business)	0.00846	0.00453
Group B (Healthcare)	0.02381	0.01193
Group E (Education)	0.00758	0.00344
Group F (Factory / Industrial)	0.00574	0.00167
Group H (High Hazard)	0.02381	0.01193
Group I-1 (Institutional)	0.01138	0.00598
Group I-2 (Institutional)	0.02381	0.01193
Group I-3 (Institutional)	0.02381	0.01193
Group I-4 (Institutional)	0.00758	0.00344
Group M (Mercantile)	0.01181	0.00403
Group R-1 (Residential)	0.00987	0.00526
Group R-2 (Residential)	0.00675	0.00407
Group S (Storage)	0.00426	0.00110
Group U (Utility)	0.00426	0.00110



New York City | Stakeholder Engagement

Stakeholder Engagement

Late 2016-April 2019

• The NYC Mayor's Office engaged stakeholders, focusing on the real estate industry and affordable housing advocates, who initially expressed resistance to the proposed approach.

November 2017-August 2018

- The local nonprofit Urban Green Council launched the **80x50 Buildings Partnership**.
- This engagement effort included 85 meetings with 70 experts from 40 different local groups, who proposed 21 recommendations that helped shape the final legislation.

December 2019-Ongoing

- To refine the law and inform its implementation, the NYC Mayor and City Council speaker appointed a 16-member **Climate Advisory Board** in December 2019.
- The Climate Advisory Board consists of architects, engineers, property owners, business and utility representatives, environmental justice advocates, and tenant advocates.

April 2020-Ongoing:

 The Climate Advisory Board created 8 Climate Working Groups to provide advice and recommendations to the Department of Buildings and Mayor's Office of Sustainability related to the Building Emissions Law.

Climate Advisory Board Working Groups

- Multifamily Building Technologies & Pathways
- Commercial Building Technologies & Pathways
- Carbon Accounting
- Energy Grid
- Economic Impact
- Hospitals
- Communications
- Implementation



New York City | Supportive Programs & Resources

NYC Accelerator

The NYC Accelerator is a one-stopshop funded by the City that offers free technical assistance for compliance with the Buildings Emissions Law and connects building owners to funding and financing options. The program is funded \$10M per year for the first three years. This complementary program is critical for equitable and successful implementation of the law.



Funding & Financing

- Low-interest loans available through a new Property Assessed Clean Energy (PACE) program can finance energy efficiency upgrades through a building's property tax bill.
- Incentives are also available from local utilities and NYSERDA.
- Additional funding sources will be needed to help cover upgrade costs.

Buildings Emissions Law Carbon Emissions Calculator*

 Allows for automatic or manual uploading of building data to generate carbon thresholds and potential fees for upcoming compliance periods.

Carbon Trading Study

- The Buildings Emissions Law requires that the City perform a carbon trading feasibility study as a potential compliance mechanism. This mechanism will:
 - Provide flexibility for building owners to comply at a lower cost
 - Reward building owners who act sooner
 - Ensure benefits go to environmental justice communities.

New York City | Implementation Timeline





New York City | Lessons Learned

Successes

- Guaranteed carbon reductions will be achieved through a GHG-based metric.
- The NYC Accelerator will provide free technical assistance to building owners to support compliance with the law.
- Continuous working groups made up of building professionals and other stakeholders will assist in successful and equitable implementation.
- Future targets are subject to updates that will encourage electrification as other efforts progress, such as time-of-use rates, electric vehicle use, greening of the grid, and more.

Challenges & Lessons Learned

- Concerns about the ordinance remain from building owners and the real estate industry, and a recent lawsuit has been filed against the law.
- Electricity coefficients will be updated regularly to account for a changing grid, which can create implementation challenges and confusion.
- Additional funding is needed for retrofit costs, and NYC's budgeting structure does not allow for the use of fines to pay for energy upgrades.
- Affordable housing carve-out misses an opportunity to improve affordable housing quality and resolve health and energy disparities.



Recommendations for Burlington



Recommendations for Burlington

Considerations to develop an effective and equitable policy for existing buildings:

- Conduct extensive stakeholder engagement to achieve alignment and support on policy design and implementation, with groups including architects, engineers, property owners, environmental justice advocates, tenant advocates, and representatives from historically marginalized communities.
- Work with stakeholders to design flexible compliance pathways to help avoid unintended burdens, particularly for buildings with more complicated uses* or those that serve vulnerable populations.
 - Provide clear guidance around these compliance mechanisms, such as a help desk or online calculator, to avoid confusion from building owners and service providers and to enable proactive decision-making.
- Choose policy and program metrics that are aligned with citywide goals, such as electrification, improved public health, and increased housing affordability.
- Offer complementary program support and funding to provide financial and technical assistance specifically for affordable housing and other under-resourced buildings. This helps ensure the residents of these buildings benefit from the policy while also preventing housing cost increases or other inequities.



Building Electrification Institute