

Complying with BERDO Emissions Standards

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City Of Boston Staff



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Agenda

Today's Meeting

- **BERDO Overview**
- **Calculating Building Emissions**
- **BERDO Emissions Compliance**
 - a. Compliance Mechanisms*
 - b. Flexibility Measures*
- **Next Steps and Resources**
- **Q&A**

BERDO is important for climate action



The Building Emissions Reduction and Disclosure Ordinance (BERDO) addresses Boston's largest source of emissions.

- BERDO requires medium and large buildings in Boston to reduce emissions over time and achieve net-zero emissions by 2050.
- By meeting the requirements of BERDO, the approximately **6,000 covered buildings** (5% of buildings in Boston) could **collectively reduce city-wide emissions by nearly 40%**.
- There are several ways a building can directly or indirectly reduce its emissions and come into compliance with its BERDO emissions standard.

What buildings are covered by BERDO?

BERDO covers large buildings:

- **Non-residential buildings** that are **20,000 ft²** or larger excluding parking (e.g., office spaces, churches, universities)
- **Residential buildings** that have **15 or more units** (e.g., apartments and multi-family buildings)
- Any parcel of land with multiple buildings that sum to **20,000 ft²** or **15 units** or more.



When will buildings need to meet an emissions standard?

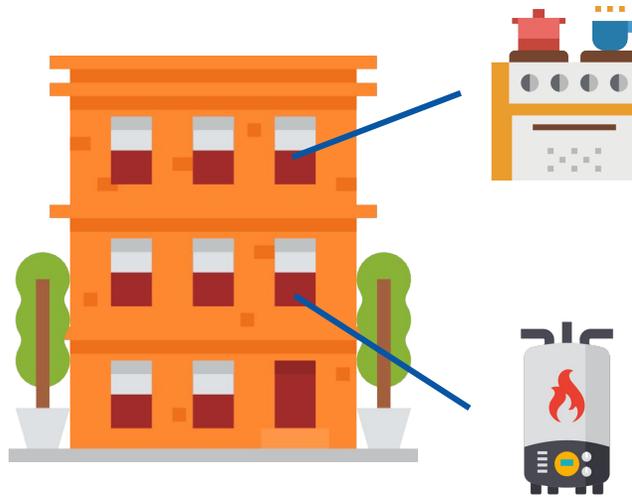
First year with an emissions standard	Non-Residential buildings	Residential buildings
2025	35,000 ft ² or larger	35 or more units
2030	20,000 - 34,999 ft ²	15 - 34 units

Building Emissions

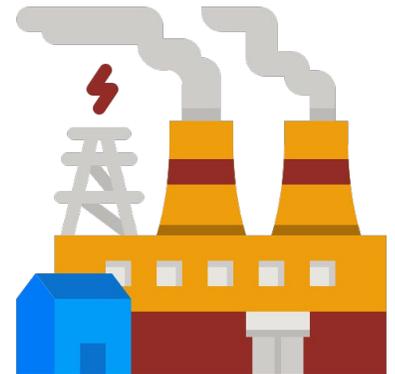
What are building emissions?

Building emissions refer to the polluting gases that come from heating, cooling, cooking, and generating electricity used in buildings.

Some fuels are burned **inside** your building, like your boiler and gas stove



Some fuels are burned **outside your building** to generate electricity (often from far away) or to generate district steam or chilled water.



Calculating Emissions

$$\text{Emissions} = \text{Fuel Consumed} \times \text{Emissions Factor}$$

What is an Emissions Factor?

- *An emissions factor represents the amount of emissions released by each unit of fuel or energy consumed*
- *Represents how “dirty” or “clean” a fuel is*

Fuel Type	United States
	(kg/MBtu)
Natural Gas	53.11
Propane	64.25
Fuel Oil (No. 1)	73.50
Fuel Oil (No. 2)	74.21
Fuel Oil (No. 4)	75.29
Fuel Oil (No. 5,6)	75.35
Diesel Oil	74.21
Kerosene	77.69

BERDO Emissions Factors



Energy Star Portfolio Manager Emissions Factors apply to the following fuels:

- Natural Gas
- Propane
- Fuel Oil
- Diesel
- Kerosene



Electricity Emissions

- Environment Department will publish an annual emissions factor for grid electricity based on ISO NE data.
- Projected emissions factors will be used if the calculated emissions factors are higher than the projection.



District Energy Systems

- Each system operator can submit verified emissions factors for each of their products annually.
- Energy Star Portfolio Manager emissions factors will be applied if no custom factors are provided.



Other emissions factors may be adopted by the Air Pollution Control Commission.

More details are in the [adopted regulations](#).

BERDO Emissions Requirements



Emissions standards set annual emissions limits based on different types of building uses.

Emissions Standard by Building Use Type:

Building use	Emissions standard (kgCO ₂ e/ft ² /year)					
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-
Assembly	7.8	4.6	3.3	2.1	1.1	0
College/ University	10.2	5.3	3.8	2.5	1.2	0
Education	3.9	2.4	1.8	1.2	0.6	0
Food Sales & Service	17.4	10.9	8.0	5.4	2.7	0
Healthcare	15.4	10.0	7.4	4.9	2.4	0
Lodging	5.8	3.7	2.7	1.8	0.9	0
Manufacturing/ Industrial	23.9	15.3	10.9	6.7	3.2	0
Multifamily housing	4.1	2.4	1.8	1.1	0.6	0
Office	5.3	3.2	2.4	1.6	0.8	0
Retail	7.1	3.4	2.4	1.5	0.7	0
Services	7.5	4.5	3.3	2.2	1.1	0
Storage	5.4	2.8	1.8	1.0	0.4	0
Technology/Science	19.2	11.1	7.8	5.1	2.5	0

Emissions Standards (Limits)

- Emissions standards are based on emissions intensity and are reported in kilograms of carbon dioxide equivalent per square foot per year.
- Based on the building use type and reduce every five years.
- Building types with higher average energy use have higher emissions standards to start.
- All buildings covered by BERDO are expected to achieve net-zero emissions by 2050.



Compliance Mechanisms

Emissions may be mitigated with one or more of the following mechanisms

Complying with BERDO's Emissions Standards

Options to keep your building's emissions under its limit:

- **Directly reducing the emissions produced by your building:**
 - *Energy efficient appliance upgrades, electrification, improved building insulation and controls, etc.*
- **Purchase eligible renewable energy**
 - *Boston Community Choice Electricity, local solar generation, Renewable Energy Certificates, Power Purchase Agreements*
 - *Renewable energy may be used to reduce emissions only from electricity usage.*
- **Make an Alternative Compliance Payment (ACP)**
 - *\$234 per metric ton of CO₂e*
 - *ACPs go into the Equitable Emissions Investment Fund*



Eligible Renewable Energy in BERDO

Specific requirements detailed in the [adopted regulations](#).

Renewable Energy Option	Key Requirements	Geographical Requirements
Boston Community Choice Electricity (BCCE)	Mass Class I RECs purchased on behalf of residents and businesses enrolled in either the standard or Green 100 options the BCCE program.	New England
MA Class I Renewable Energy Certificates (RECS)	Unbundled RECs bought and retired independently OR bundled MA Class I RECs bought and retired as part of a PPA inside ISO-NE.	New England
Power Purchase Agreement (PPA)	Requires the purchase of both electricity and its associated RECs. PPAs need to be signed prior to the commercial operation of the renewable energy project. RECs.	Must be in U.S. or Canada and connected to grid
Local Renewable Generation	REC retirement is not required if: (a) purchasing of solar generated eastern MA began before 2024 or, (b) the system is any type of non-emitting renewable energy and is located inside the City of Boston.	Boston (after 2024) or REC retirement is required.



Renewable Energy Option Highlight: BCCE

Boston Community Choice Electricity (BCCE)

Enrolling in BCCE

- Available for **both** Residential and Commercial* electricity customers to join
- Opt in [form](#) (no sign-up or termination fee)
- Use the [BCCE Calculator](#) to compare BCCE plan rates to basic Eversource, or other Third Party rates, and more

BCCE rates December 2023 through December 2025:

OPTIONAL BASIC	STANDARD (default)	OPTIONAL GREEN 100
\$0.14205 / kWh December 2023- December 2025	\$0.14805 / kWh December 2023- December 2025	\$0.17195 / kWh December 2023- December 2025
24% Renewable Energy	39% Renewable Energy	100% Renewable Energy

* To be **eligible for BCCE**, each individual electric meter **cannot use more than 1.5 million kwh/yr**

Alternative Compliance Payments (ACPs)

ACPs fund emissions reduction projects in Boston buildings

- **\$234** for every metric ton of CO₂e (from **both** electricity and fossil fuels) **over the emissions limit**.
- ACPs go into the Equitable Emissions Investment Fund used for building emissions reduction projects that advance environmental justice.



BERDO buildings with emissions over their limits pay ACPs to comply with BERDO

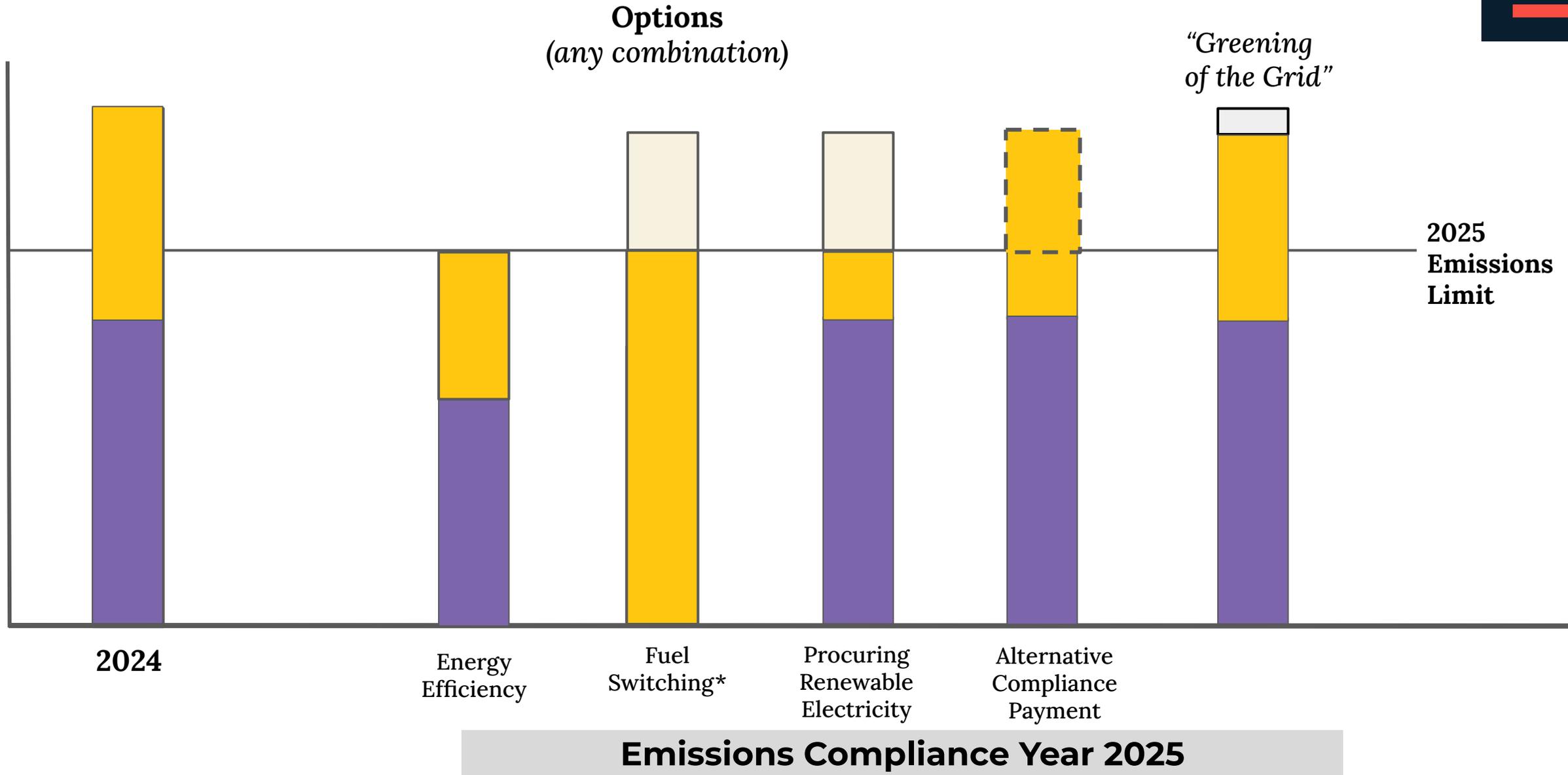


Equitable Emissions Investment Fund collects money



Funds are invested in local building carbon reduction projects approved by the Review Board

Example: Single Building Compliance



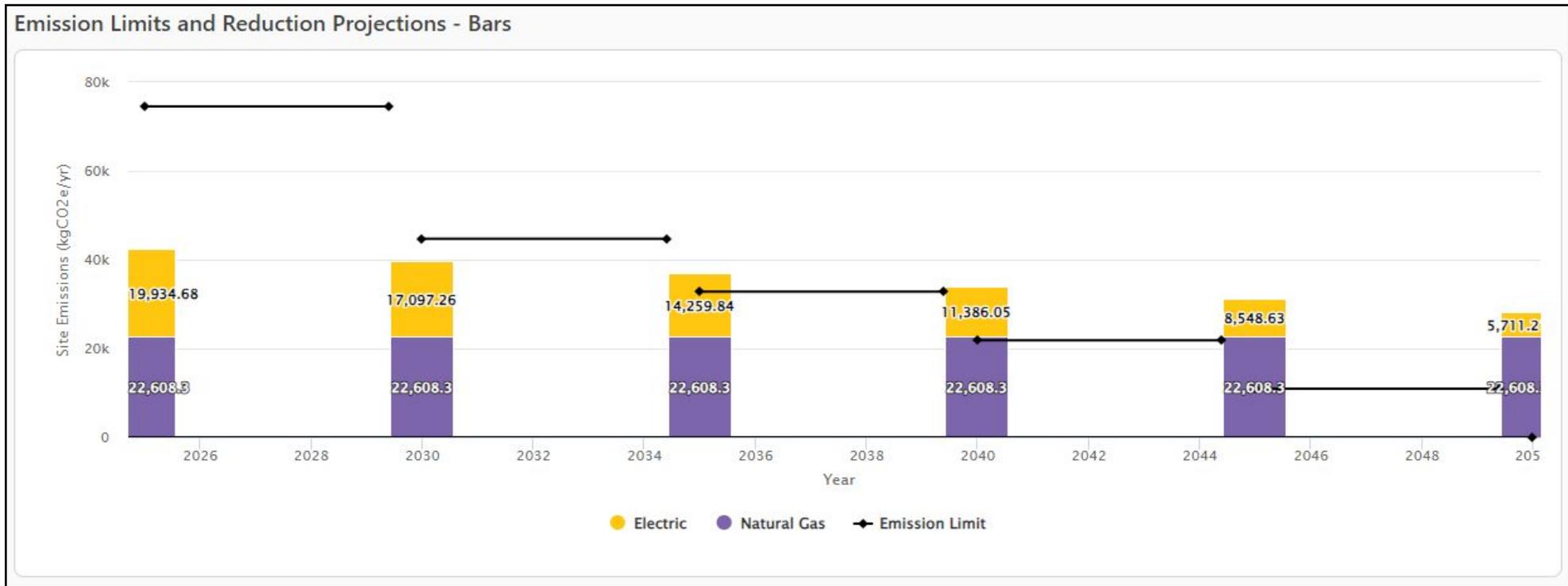
* Fuel switching often best when combined with efficiency **For illustrative purposes only

Electricity Natural Gas

BERDO Emissions Calculator



[BERDO Emissions Calculator](#) - Designed to assist building owners in evaluating and understanding their projected emissions and emissions standard.



berdocalculator.touchstoneiq.com

Flexibility Measures

A building may be eligible for flexibility measures that adjust its emissions limits and pathway to net-zero emissions*

**Subject to meeting eligibility criteria and application approval.*





BERDO Flexibility Measures

Flexibility measures can change a building's emissions standard (limit)

	BLENDING EMISSIONS STANDARD	BUILDING PORTFOLIOS	INDIVIDUAL COMPLIANCE SCHEDULE	HARDSHIP COMPLIANCE PLAN
DESCRIPTION	Allows Owners of a building or building portfolio with more than one primary use to calculate a blended emissions standard based on the mix of primary uses in the building(s).	Allows Owners of multiple Buildings to comply with a single portfolio-level emissions standard according to the mix of Building Uses in the portfolio.	Allows Owners to comply with an alternative emissions reduction schedule based on a baseline year.	Allows Owners to comply with alternative emissions reduction limits and/or schedules.
EMISSIONS REDUCTION REQUIREMENT	Requires calculating and complying with a blended emissions standard.	Requires use of a blended emissions standard in most cases.	Requires a 50% emissions reduction from the baseline year by 2030 and a 100% reduction by 2050.	May allow alternative emissions reduction timeline or less stringent emissions reduction limits.
ELIGIBILITY	More than one Primary Use in a building.	Any Owner with multiple buildings , that demonstrates eligible shared ownership or a shared Institutional Master Plans for all Buildings in the Building Portfolio.	Third-party verified data for the baseline year and no changes to the Primary Use from the baseline year.	Owner must demonstrate one of the eligible hardships .
REVIEW BOARD APPROVAL		✓	✓	✓

* Owners of Building Portfolios may also apply for an Individual Compliance Schedule or a Hardship Compliance Plan.

Blended Emissions Standard





Blended Emissions Standard

As opposed to complying with the single-use Emissions Standards provided in the [Ordinance](#), you may opt to use a Blended Emissions Standard based on your building's mix of primary uses.

A **Primary Use Type** in BERDO means that **at least one** of the following is true:

- Occupies at least 10% of a Building's or Building Portfolio's square footage
- Accounts for more than 10% of a Building's or Building Portfolio's total annual Energy use
- Accounts for more than 10% of a Building's or Building Portfolio's total annual CO₂e Emissions

Blended Emissions Standard Example 1

Primary Use	Gross Floor Area (sf)	Gross Floor Area % by Use	Emissions Standard in 2025 [kgCO ₂ e/SF/Year]	Step 1: Multiply each primary use sf by its emissions standard	Step 2: Divide the total in step 1 by total square footage to get the Blended Standard
Multifamily Housing	60,000	60%	4.1	60,000 x 4.1 = 246,000	487,500 ÷ 100,000 sf = 4.875
Parking Garage	25,000	25%	5.4	250,000 x 5.4 = 135,000	
Retail	15,000	15%	7.1	15,000 x 7.1 = 106,500	
Total	100,000	100%		Blended Emissions Limit = 487,500 [kgCO₂e/yr]	Blended Emissions Standard = 4.9 [kgCO₂e/sf/yr]



Blended Emissions Standard (cont.)

What if one of your use types is less than 10% of the building’s total square footage?

Blended Emissions Standard Example 2

Primary Use	Gross Floor Area (sf)	Gross Floor Area % by Use	BERDO Emissions Standard in 2025 [kgCO2e/SF/Year]	Step 1: Add any use types that are <10% to the largest sf use type	Step 2: Multiply each use sf by its emissions standard	Step 3: Divide the Total in Step 2 by total square footage to get the Blended Standard
Lodging	75,000	75%	5.8	$75,000 + 5,000 = 80,000$	$80,000 \times 5.8 = 464,000$	$606,000 \div 100,000 \text{ sf} = 6.057$
Retail	20,000	20%	7.1	20,000	$20,000 \times 7.1 = 142,000$	
Restaurant	5,000	5%	17.4	0	0	
Total	100,000	100%			Blended Emissions Limit = 606,000 [kgCO2e/yr]	Blended Emissions Standard = 6.1 [kgCO2e/sf/yr]

How to comply with a Blended Emissions Standard?

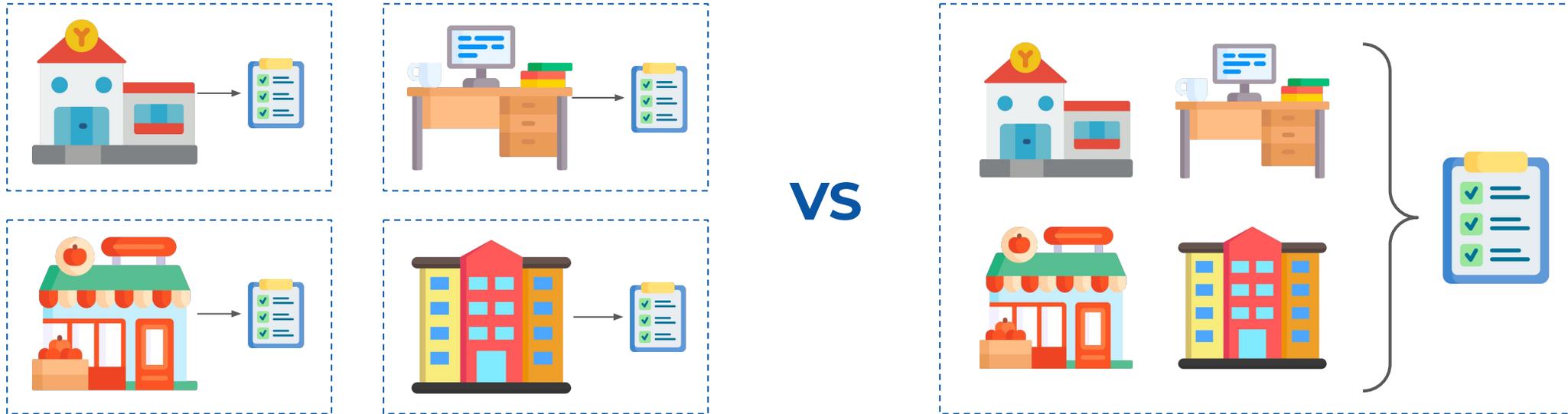
- A Blended Emissions calculator will be provided in the BERDO Reporting Platform.
- And when completing your BERDO reporting form in your first emissions compliance year (starting 2025 or 2030 and onwards), provide your building’s Blended Emissions Standard.
- Third-party verification of Primary Uses and Blended Emissions Standard is required.

The background of the slide is a dark blue wireframe illustration of a city skyline, viewed from an elevated perspective. The buildings are represented by white and light blue lines, creating a complex, geometric pattern of rectangular and curved shapes. The overall aesthetic is modern and architectural.

Building Portfolios

Building Portfolios

Building owners with **more than one building** can apply to comply with emissions limits **as a Building Portfolio versus a building-by-building approach.**



Requirements:

- All buildings in a portfolio must have the **same owner**.
- There are **no vacant buildings** in the portfolio.
- Building Use(s), Energy Use(s), Gross Floor Area, Emissions data for all buildings in the proposed portfolio **must be third party verified** during the last verification year.



A Building Portfolio's Emissions Calculations

Portfolio Blended Emissions Standard Template

In most cases, a blended emissions standard is required for Portfolios:



* Emissions limit for 2025 -2029

Who is eligible to apply for Building Portfolios

To be eligible for a Portfolio, one of the following must be true:

- The **same Owner** listed in the records of the **Boston Assessing Department**.
- The same Sponsor of **two or more Deed-Restricted Residential Buildings**.
- The same majority owner, beneficial owner, or managing partner of two or more **special purpose entities or charitable organizations**.
- **Charitable organizations under common ownership** and control of an entity that is legally responsible for BERDO.

Please refer to the [adopted regulations](#) for fully detailed requirements.

The background of the slide is a dark blue wireframe illustration of a city skyline, viewed from an elevated perspective. The buildings are represented by white and light blue lines, creating a complex geometric pattern. A semi-transparent dark blue horizontal band runs across the middle of the image, serving as a backdrop for the title text.

Individual Compliance Schedules

Individual Compliance Schedule (ICS)

Buildings or Building Portfolios with **historic emissions data** can apply to use an **alternative timeline** to reduce emissions based on a **baseline year** of their choosing (baseline year cannot be before 2005 or after 2021).

Requirements:

- **Absolute emissions** must be **reduced by 50% by 2030** and by **100% by 2050** on a **linear or better basis**.
- Building Use(s), Energy Use(s), Gross Floor Area, Emissions Factors **must be third party verified** during the last verification year.
- Total Gross Floor Area **cannot have been reduced by more than 10%** and the building's primary use **must be the same** from baseline year to now. *This applies to each building in a portfolio.*
- Building(s) must **be in compliance at time of application**.

Note: An ICS can be combined with a portfolio, but **cannot** be combined with a Hardship Compliance Plan.

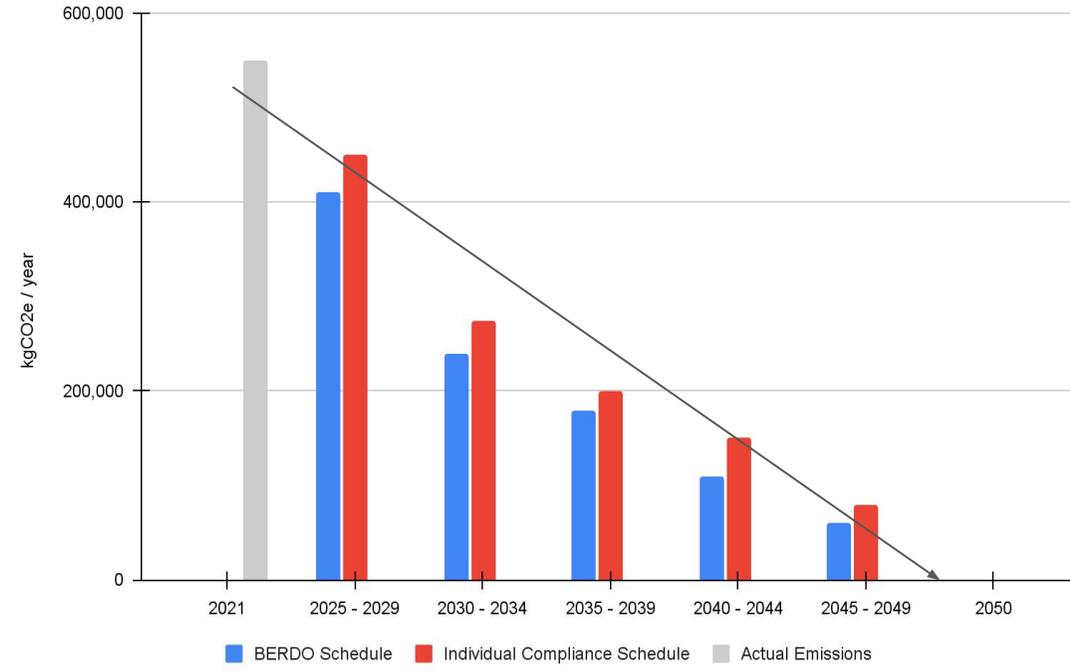


Example of Individual Compliance Schedule (ICS)

Example: Multifamily building that's 100,000 square feet and has 100 units, with 2021 as baseline year*.

Year	Emissions Standard for Multifamily (kgCO2e/sf/yr)	Absolute Emissions (kgCO2e/yr)	BERDO Emissions Limit (kgCO2e/yr)	Individual Compliance Schedule Limit (kgCO2e/yr)	
2021	-	550,000	-	-	← ICS emissions limits set by Building Owner
2025 - 2029	4.1	-	4.1 x 100,000 = 410,000	450,000	← Baseline year
2030 - 2034	2.4	-	2.4 x 100,000 = 240,000	275,000	← 50% reduction from baseline by 2030
2035 - 2039	1.8	-	1.8 x 100,000 = 180,000	200,000	
2040 - 2044	1.1	-	1.1 x 100,000 = 110,000	150,000	
2045 - 2049	0.6	-	0.6 x 100,000 = 60,000	80,000	
2050 -	0	-	0	0	← Net zero emissions by 2050

Reduction must be on a linear or better basis.



* These are example numbers used to simplify analysis.

Hardship Compliance Plans

Hardship Compliance Plans (HCPs)

Building owners that have specific **circumstances or characteristics** that create an eligible hardship in complying with the emissions limits can apply for a HCP.

Circumstances and characteristics

- Financial
- Regulatory or contractual
- Technical or operational
- Other



CREATE

Eligible hardships

- Compliance-related work that requires space, equipment, or electric service that is not available;
- Compliance significantly interferes with, or significantly increases the cost, to provide services that are critical to community health and safety; and/or
- Compliance creates an undue burden on a building owner in terms of costs.

Please refer to the [adopted regulations](#) for fully detailed requirements.

Hardship Compliance Plans

Types of Hardship Compliance Plans:

- **Short-term Hardship: 1-3 years**
- **Long-term Hardship: 4+ years, must be reviewed every 5 years for any material changes.**

Possible Relief Measures:

- **Alternative timeline** for complying with emission limits.
- **Alternative emissions limits.**
- **Exemption of specified energy use(s)**, in whole or in part.
- **Adjusted compliance obligations** due to obstacles or delays from third parties for significant energy efficiency or electrification projects.
- **Additional** compliance mechanisms.
- **Other relief** the Review Board may deem appropriate on a case-by-case basis.

POLL:

What flexibility measure are you considering using (if any)?



BERDO Flexibility Measures

Flexibility measures can change a building's emissions standard (limit)

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REVIEW BOARD APPROVAL		✓	✓	✓

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Application Deadlines for Flexibility Measures

Building Portfolios, Individual Compliance Schedules, and Hardship Compliance Plans

Deadlines for Flexibility Measure Applications	
July 1, 2024*	Long-term Hardship Compliance Plan application deadline.
September 1	Building Portfolio application deadline (to be in effect the following year).
	Individual Compliance Schedule application deadline (to be in effect the following year).
October 1**	Short-term Hardship Compliance Plan application deadline.
<p>*After July 1, 2024, long-term Hardship Compliance Plan applications are due 9 months before the first year the HCP would be used.</p> <p>**Short-term Hardship Compliance Plan applications are due 3 months before the first year the HCP would be used.</p>	

Slide updated on January 23, 2024

Applications for Flexibility Measures

- Sample application materials are available on boston.gov/berdo and directly linked [here](#).
 - *Online application forms for Portfolios and ICS will be released soon.*
 - *Draft Hardship Compliance Plan application is available for review.*
- Applications for Building Portfolios, Individual Compliance Schedules, and Hardship Compliance Plans must be approved by the BERDO Review Board at a public hearing.
- Learn more about the Review Board at boston.gov/berdo-review-board.

An aerial wireframe map of a city, rendered in a light blue color against a darker blue background. The map shows a dense grid of buildings and streets, with a prominent curved road or highway cutting through the center. The overall style is technical and architectural.

Next Steps

2024 BERDO Reporting

Annual BERDO reporting will open in February

- Energy Star Portfolio Manager (can begin now)
- Updated BERDO Reporting Form will open in February

Reporting of 2023 data will be due May 15, 2024

Next Steps

Sign up for the BERDO Newsletter on boston.gov/berdo

Stay tuned for upcoming webinars on:

- *Building Portfolios*
- *Individual Compliance Schedules*
- *Hardship Compliances Plans*

BERDO emissions consultations and office hours with a BERDO Team member

- Building Consultations: https://calendly.com/dima_cityofboston/45min
- Office Hours Fridays at 10am on [Zoom](#).

POLL:

Which other topics do you think we should host webinars on?

Resources



- BERDO website: boston.gov/berdo
- [Ordinance](#)
- [Adopted Regulations](#)
- [Adopted Policies](#)
- Retrofit Resource Hub: boston.gov/retrofithub
- No-cost Mass Save energy audits, engineering studies, rebates and incentives:
 - Non-residential: MassSave.com/business
 - Residential: MassSave.com/Multi-Family
 - Rebates: MassSave.com/Rebates

Q & A

Thank You!



Please visit boston.gov/berdo and boston.gov/berdo-regulations for more information and updates.

