



City of Boston
Planning Department

Net Zero Carbon Zoning

Boston Zoning Commission

August 14, 2024

Net Zero Carbon Zoning

Planning Department and Environment Department



Planning Department

CITY of **BOSTON**

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TYPES OF EMISSIONS FROM BUILDINGS



Embodied Carbon

Building Emissions

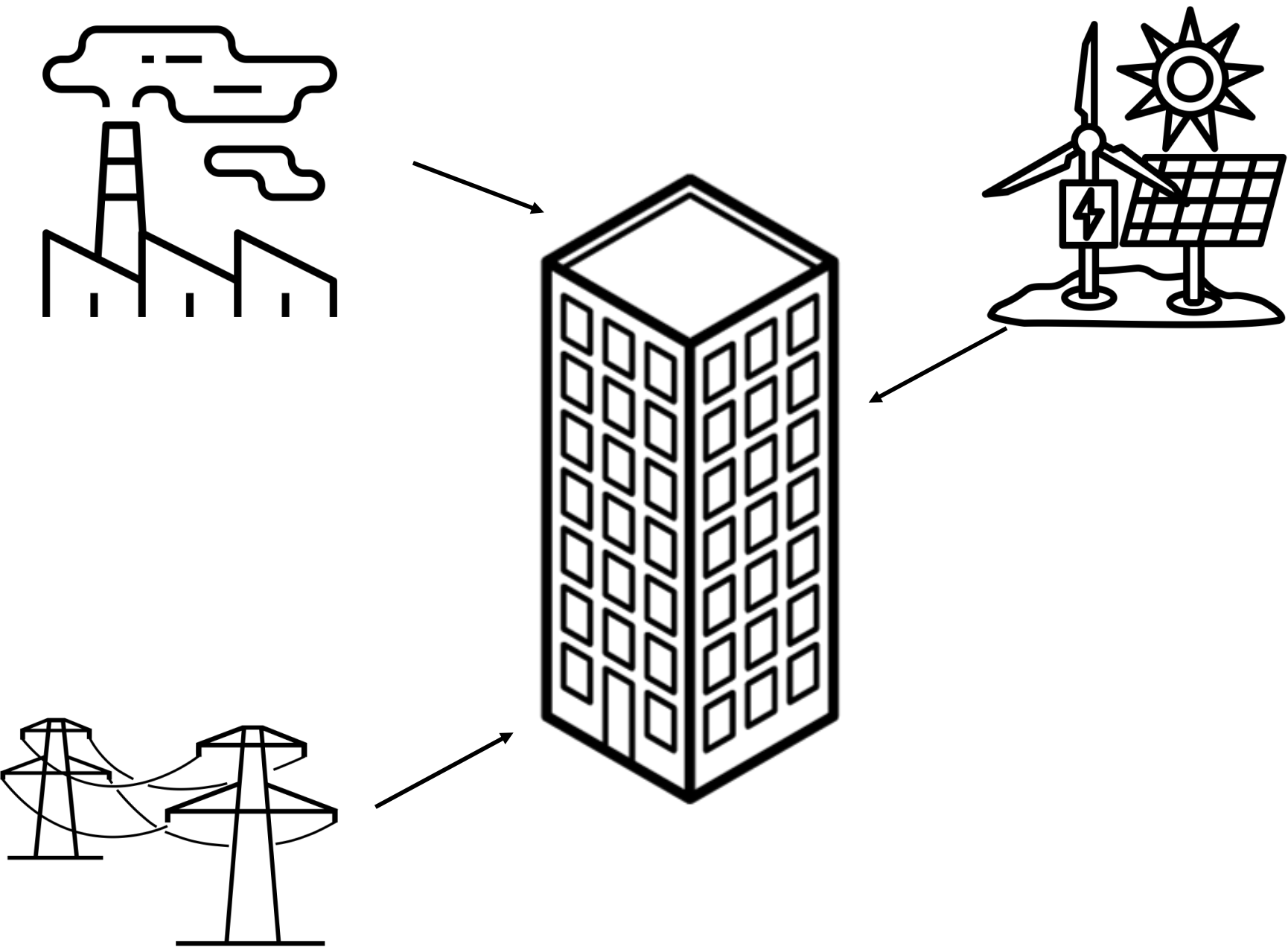
Embodied Carbon: Greenhouse Gas Emissions associated with stages of products' lifespan —extraction, production, transport, and manufacturing. Embodied Carbon accounts for almost half of a building's total GHG emissions over its lifetime.

Building Emissions: Greenhouse Gas Emissions associated with a building's operations.

BUILDING EMISSIONS

Existing buildings account for nearly **70%** of our community's carbon emissions.

Fossil fuels and electricity power the majority of buildings' operations.

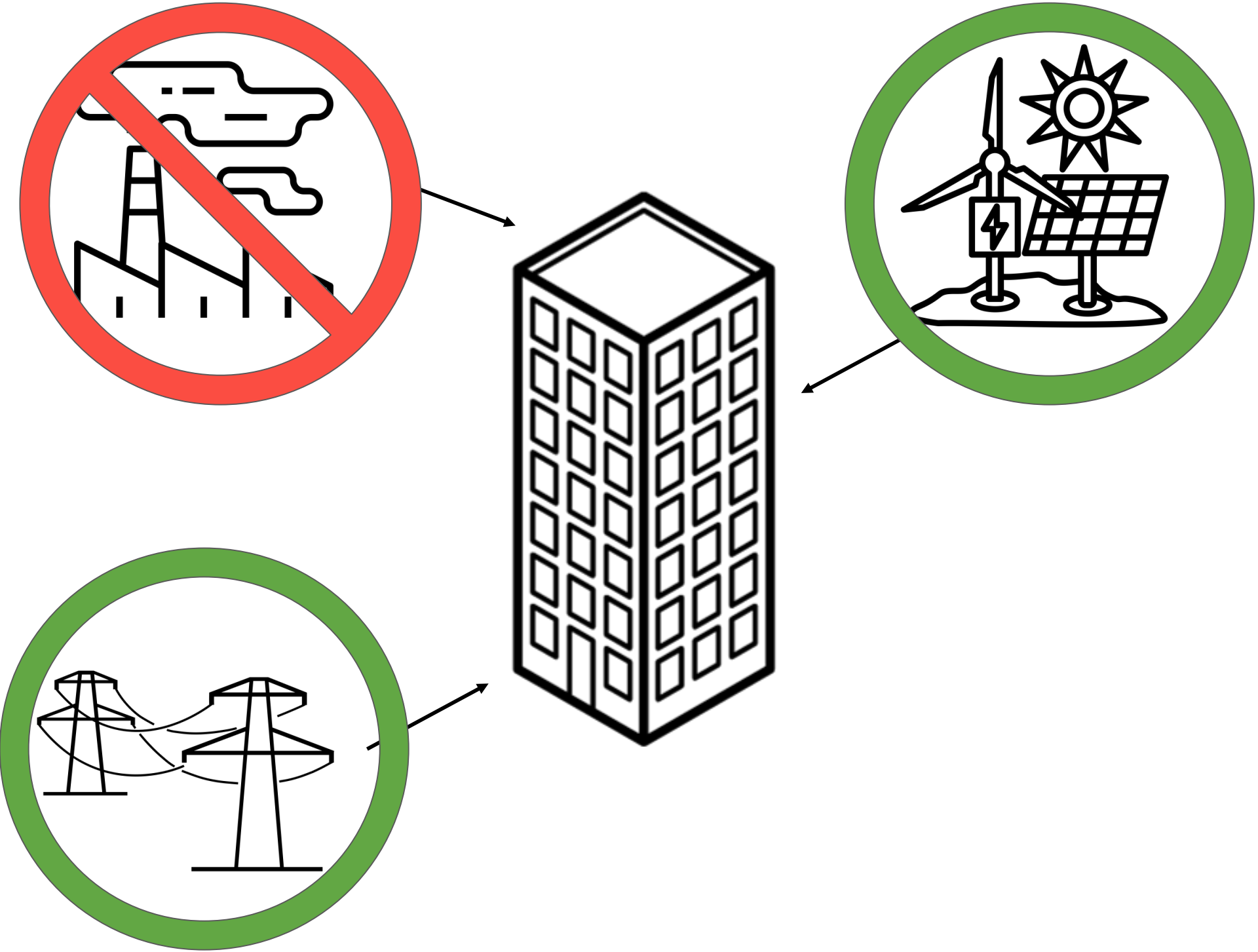


Typical building's power supplies

BUILDING EMISSIONS

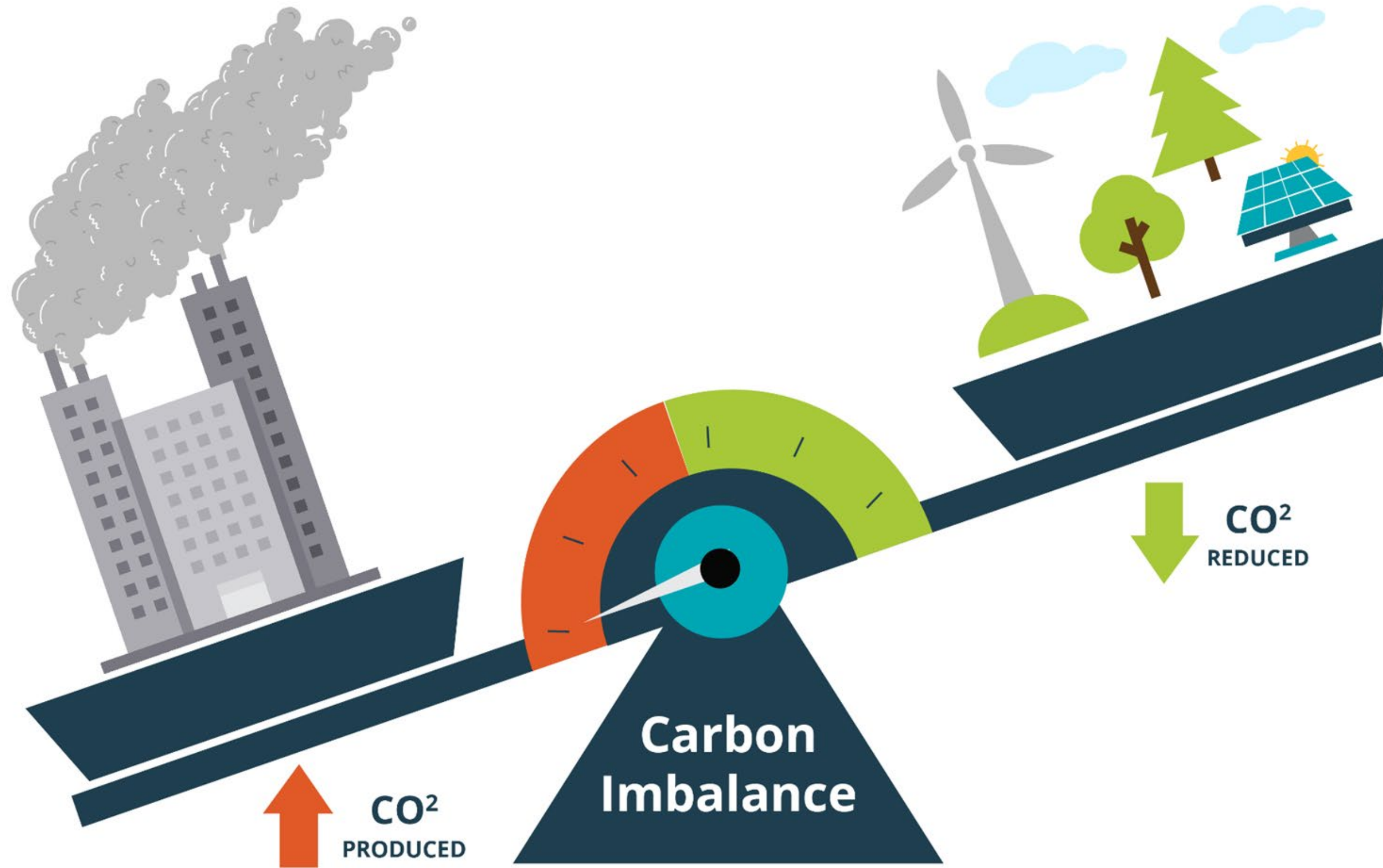
Buildings can be designed to minimize emissions and climate impact by:

1. Increasing efficiency
2. Reducing reliance on fossil fuels (e.g. decarbonize)
3. Using renewable energy



Typical building's power supplies

BOSTON IS PRODUCING MORE EMISSIONS THAN IT IS OFFSETTING

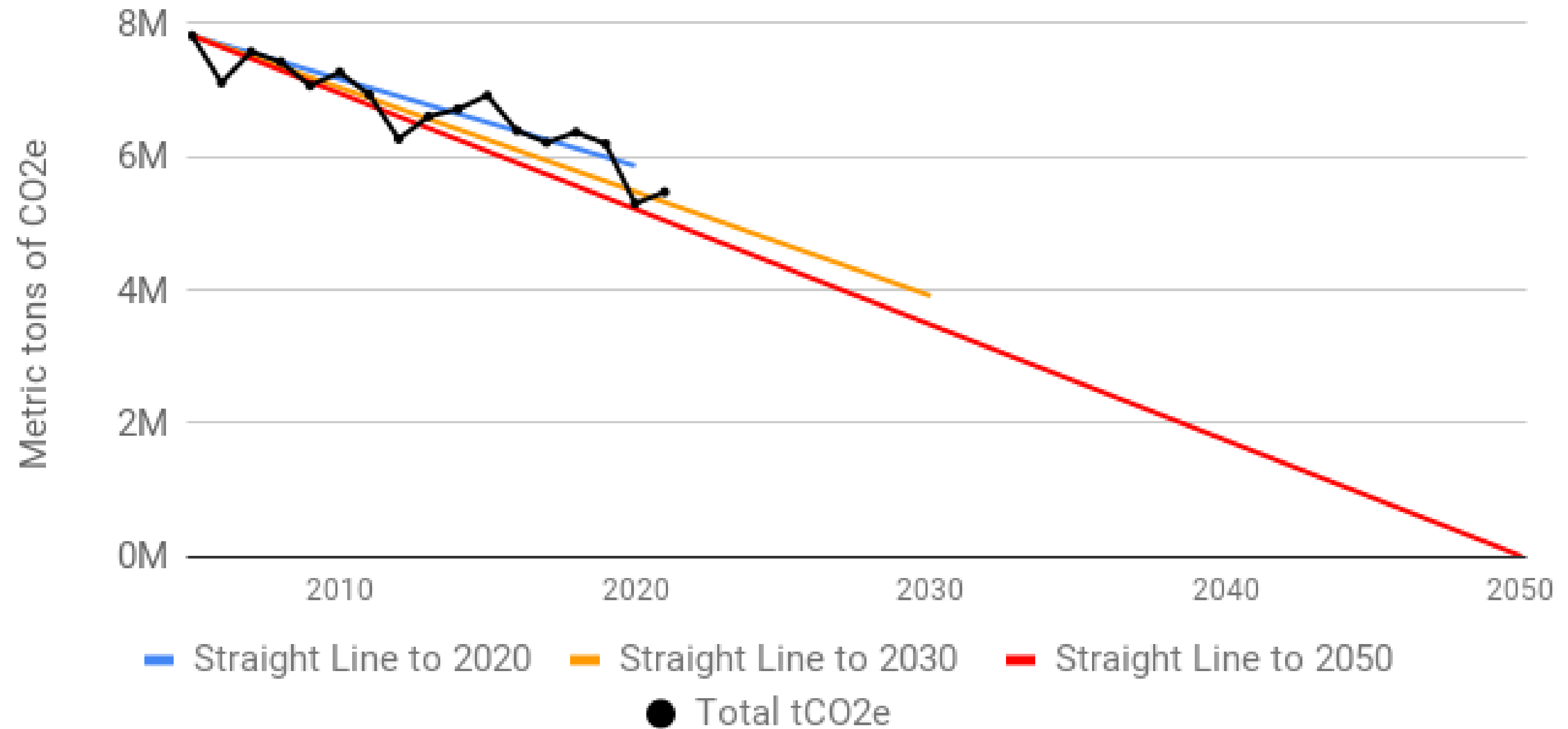


Present

THE CITY OF BOSTON AIMS TO ACHIEVE CARBON NEUTRALITY BY 2050.



BOSTON COMMUNITY-WIDE EMISSIONS





WHAT IS BOSTON ALREADY DOING TO DECARBONIZE NEW BUILDINGS?



1. Requires LEED Certifiable

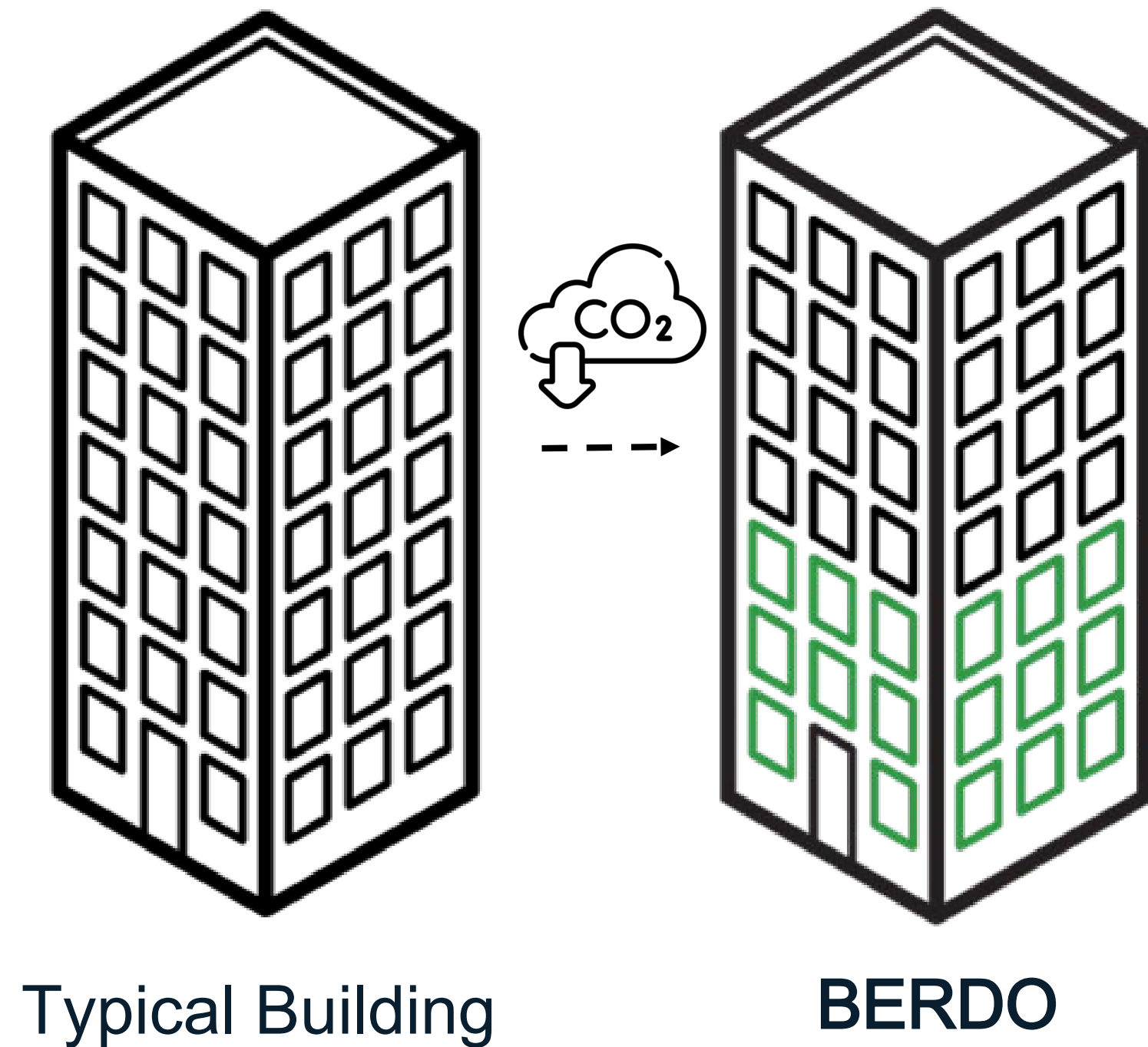
Applicable to Large Projects (i.e. create/ add >50,000 SF)

→ Ensures that major building projects are designed and constructed to minimize adverse environmental impacts

BUILDING EMISSIONS REDUCTION DISCLOSURE ORDINANCE (BERDO)



Boston's BERDO sets annual emissions limits on existing buildings.



→ *Reduces emissions*

BERDO SETS ANNUAL EMISSIONS LIMITS ON EXISTING BUILDINGS



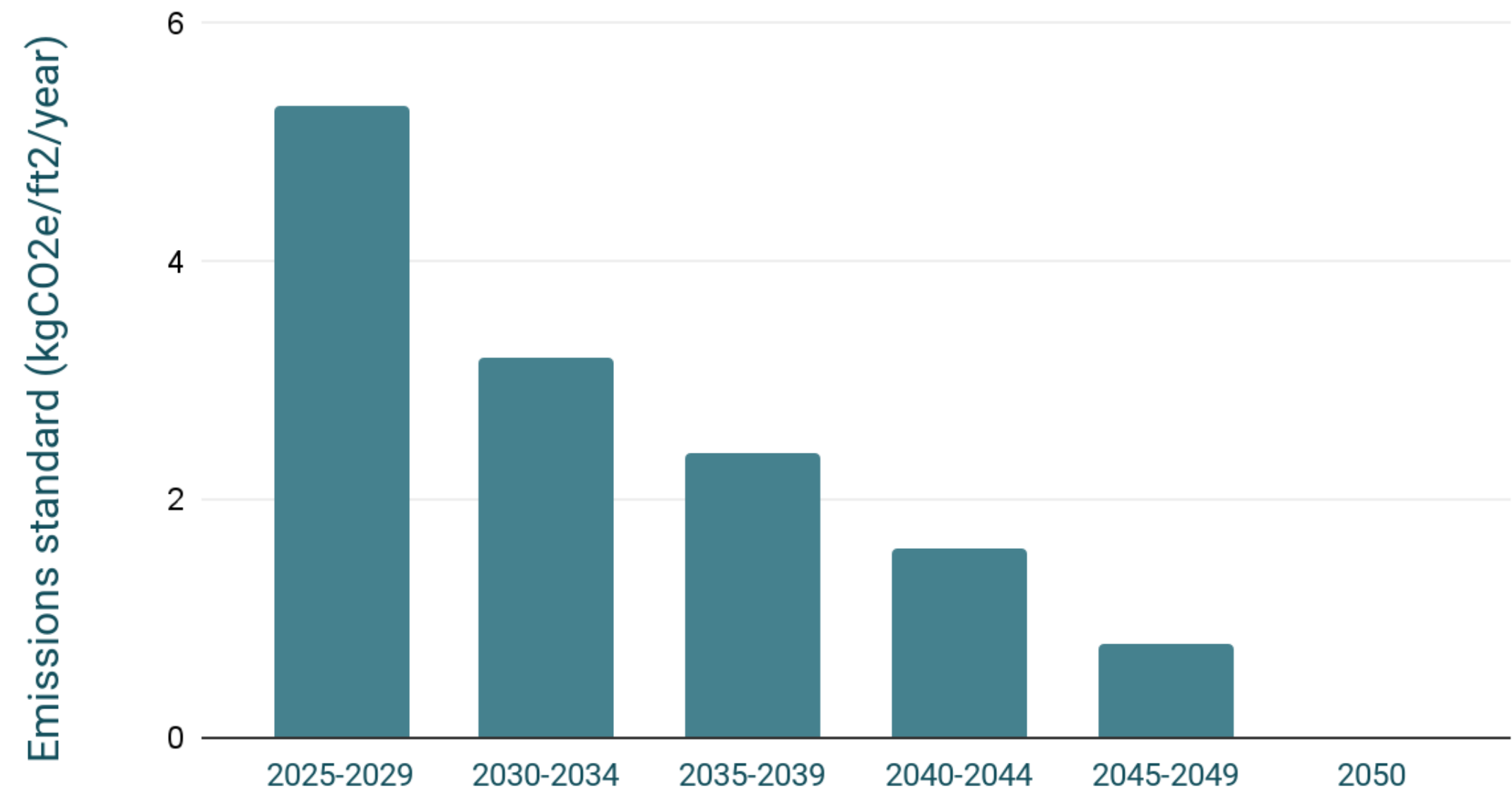
BERDO applies to:

- Residential buildings with 15+ units
- Non-residential buildings >20,000 SF

BERDO tracks and enforces emissions reductions after a building is in operation (i.e. up and running), enforcing net zero emissions by 2050.

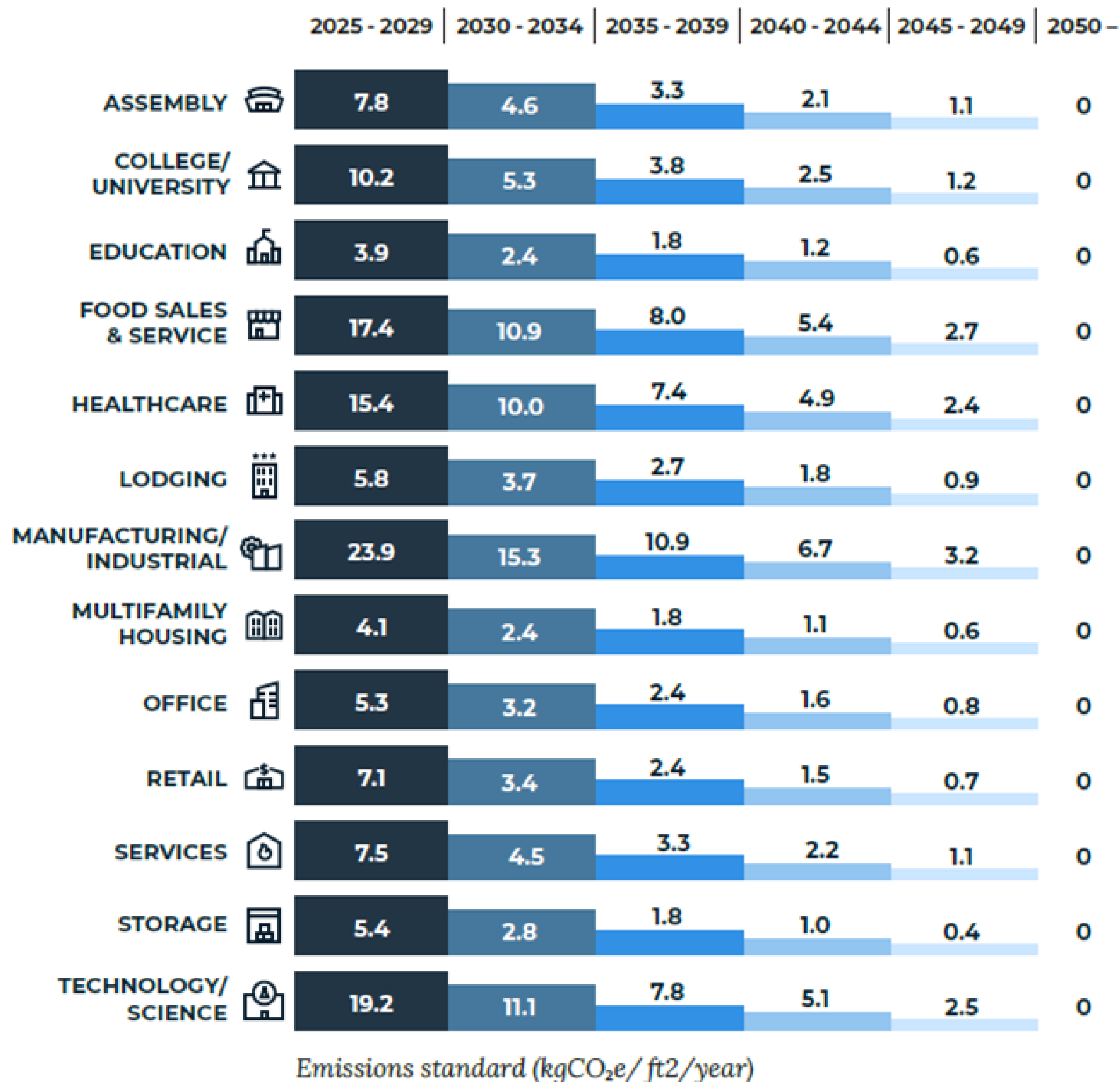
For example 

Office's Emissions Standard by Year

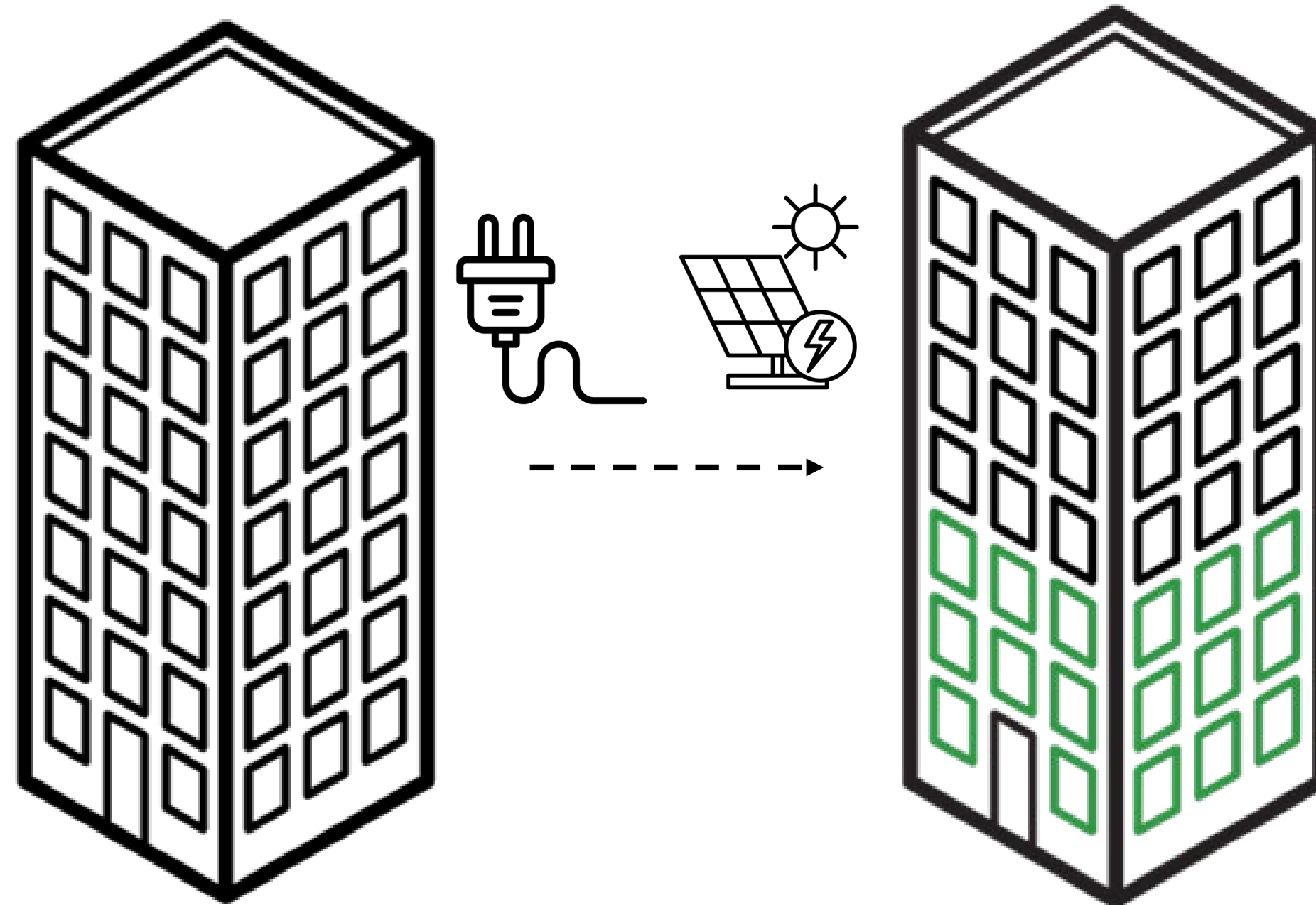


The annual emissions limits are based on different types of building uses, which meet declining emissions standards and achieve net zero emissions by 2050.

All uses' emissions limits 



STATE ENERGY CODE REGULATES ENERGY EFFICIENCY IN NEW CONSTRUCTION



Typical Building

State Energy
Building Code

→ *Improves energy efficiency*

BOSTON ADOPTED THE SPECIALIZED STRETCH ENERGY CODE



Specialized Stretch Code

Current Base
Energy Code



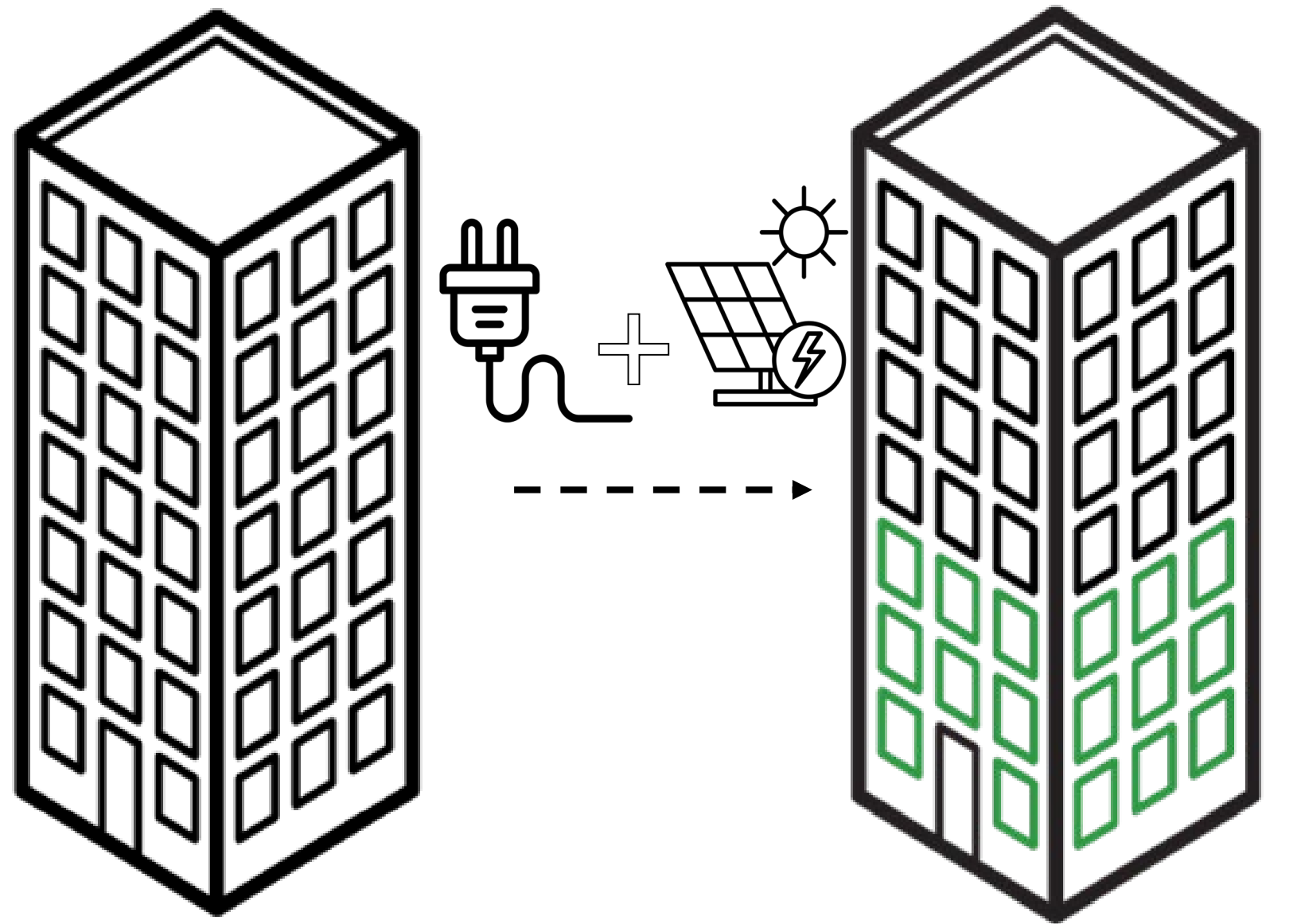
Stretch Code
Amendments



Specialized
Code
Appendices

Boston adopted the *most stringent energy code* (went into effect Jan 1, 2024) allowed in Massachusetts.

SPECIALIZED STRETCH ENERGY CODE



Typical Building

Specialized Stretch
Energy Building Code

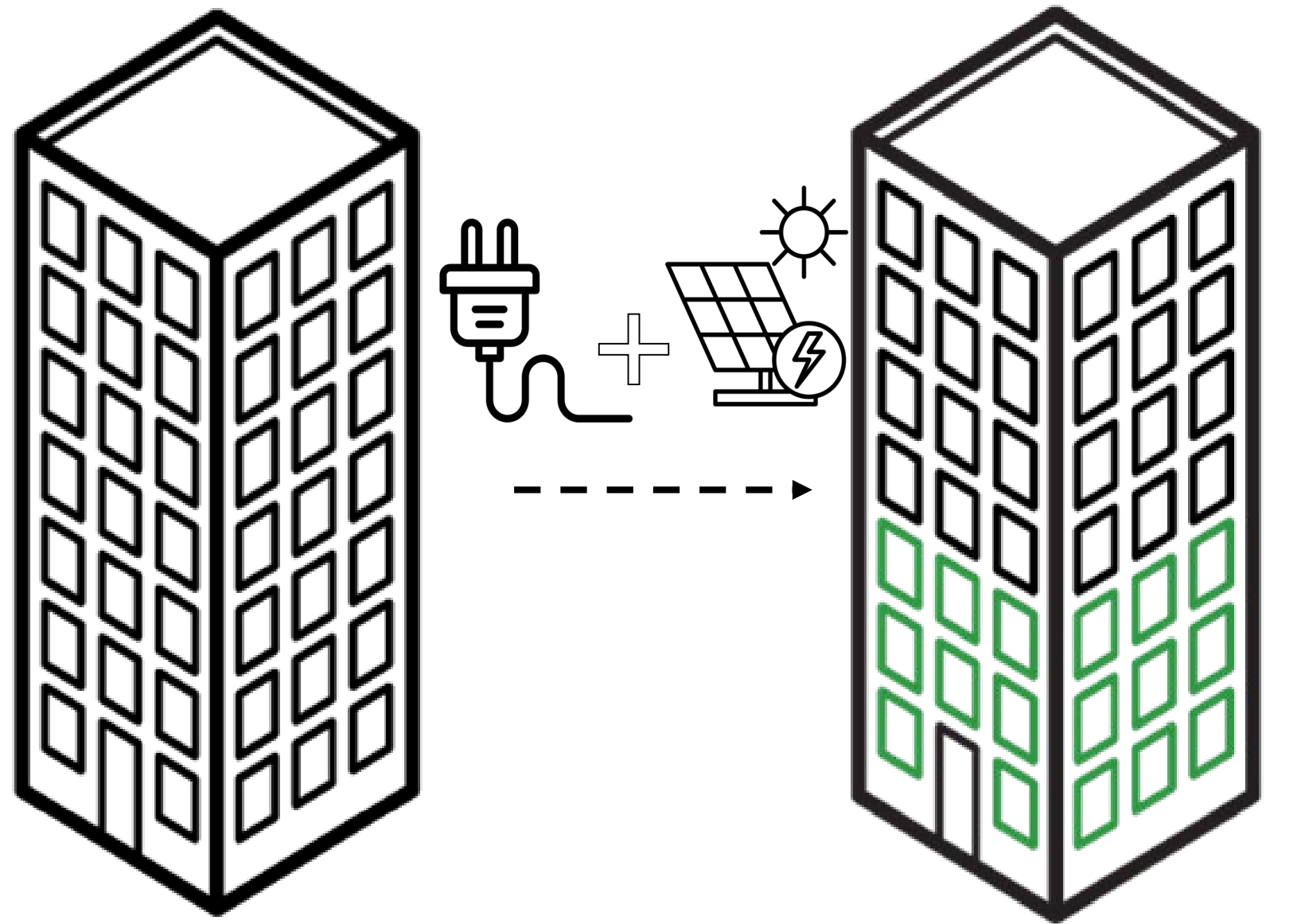
→ *Improves energy efficiency*

Requires very high levels of energy efficiency for all new construction.

1. **Incentivizes electrification:** Mixed fuel buildings must pre-wire* for electrification and install solar where feasible.

*install electrical infrastructure during construction to support future electrical demands

SPECIALIZED STRETCH ENERGY CODE



Typical Building

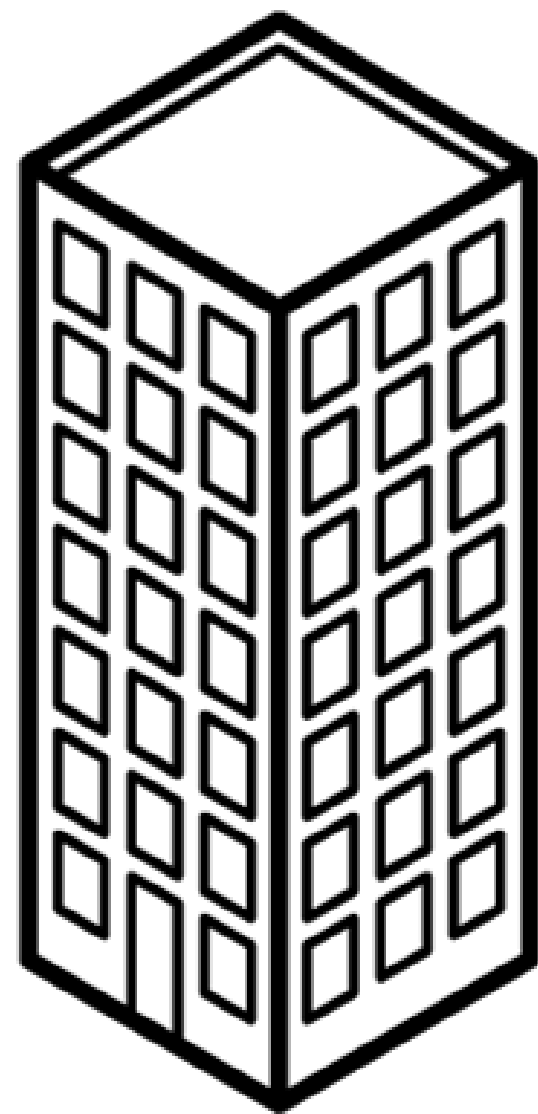
Specialized Stretch
Energy Building Code

Requires very high levels of energy efficiency for all new construction.

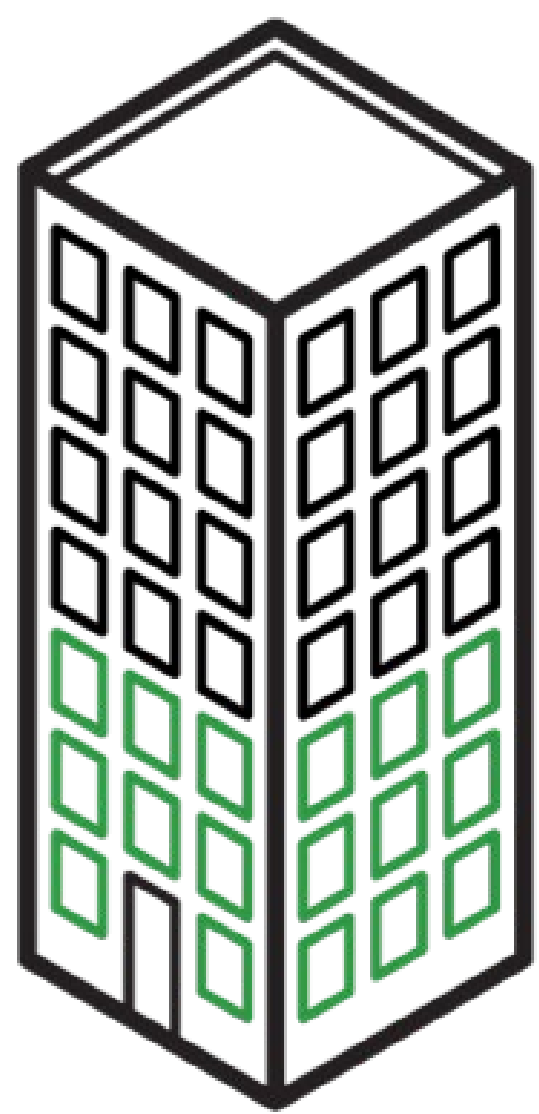
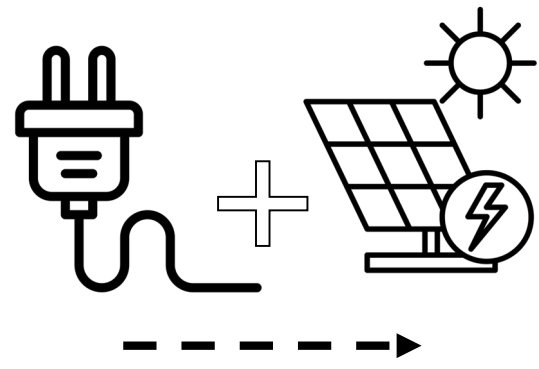
1. **Passive House Certification** required for all new multifamily housing over 12,000 sf. Requires reduction of energy use for space heating and cooling.

→ *Improves energy efficiency*

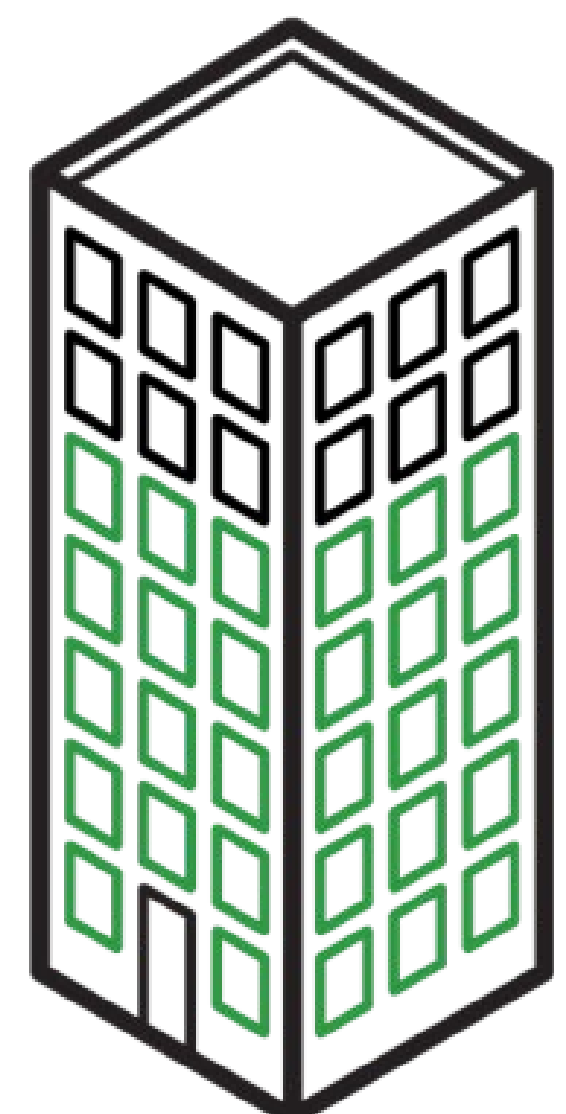
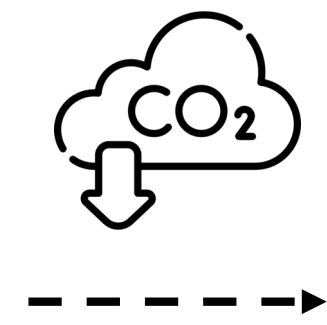
WHAT IS BOSTON ALREADY DOING TO DECARBONIZE NEW BUILDINGS?



Typical Building



Specialized
Stretch Energy
Building Code



Specialized Stretch
Energy Building
Code + BERDO

A high-angle, wide shot of a dense urban neighborhood, likely in New York City, showing rows of multi-story brick buildings with numerous windows and flat roofs. Some rooftops have small structures or equipment. The scene is captured in bright daylight.

**HOW CAN ZONING SUPPORT THE CITY'S
DECARBONIZATION GOALS?**

A solid blue square containing the white number '2' in a large, bold, sans-serif font.

2

1. Continues LEED Certifiable (no change)

+

2. Requires net zero building emissions

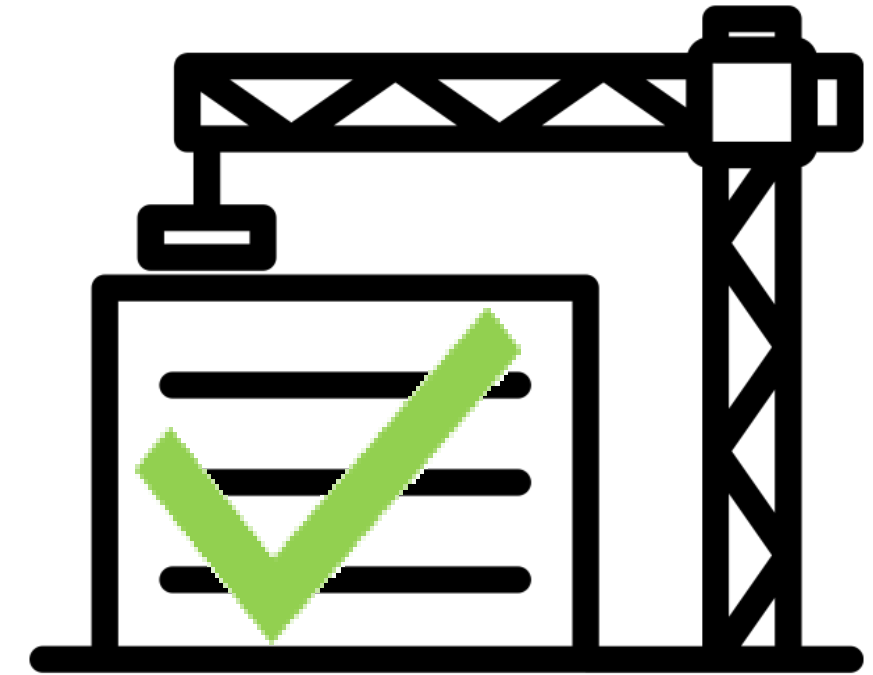
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3. Requires reporting on embodied carbon

NET ZERO CARBON ZONING OVERVIEW

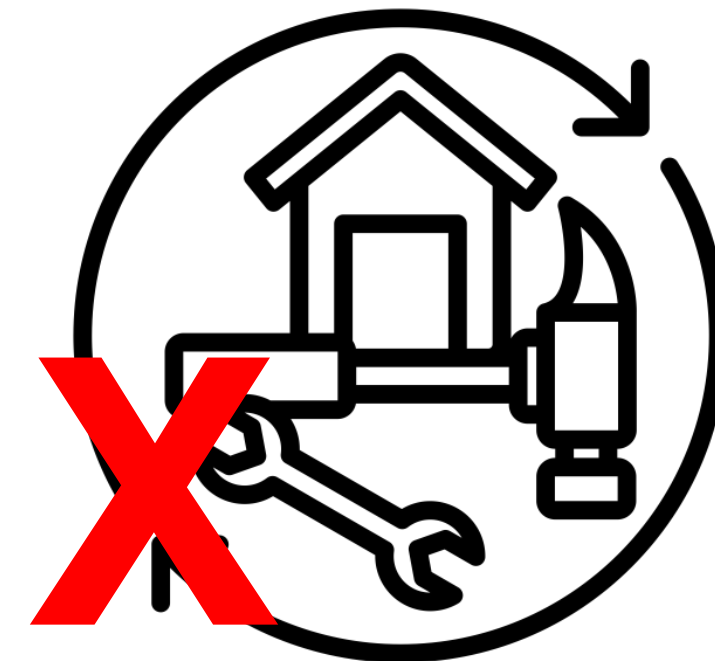
Applies to new construction filing a Project Notification Form on/after July 1, 2025:

- New buildings >20,000 SF; or
- New building with 15 units +; or
- Additions >50,000 SF



Does not apply to:

- Renovations
- Changes of use (e.g. office to residential conversions)
- Additions <50,000 SF



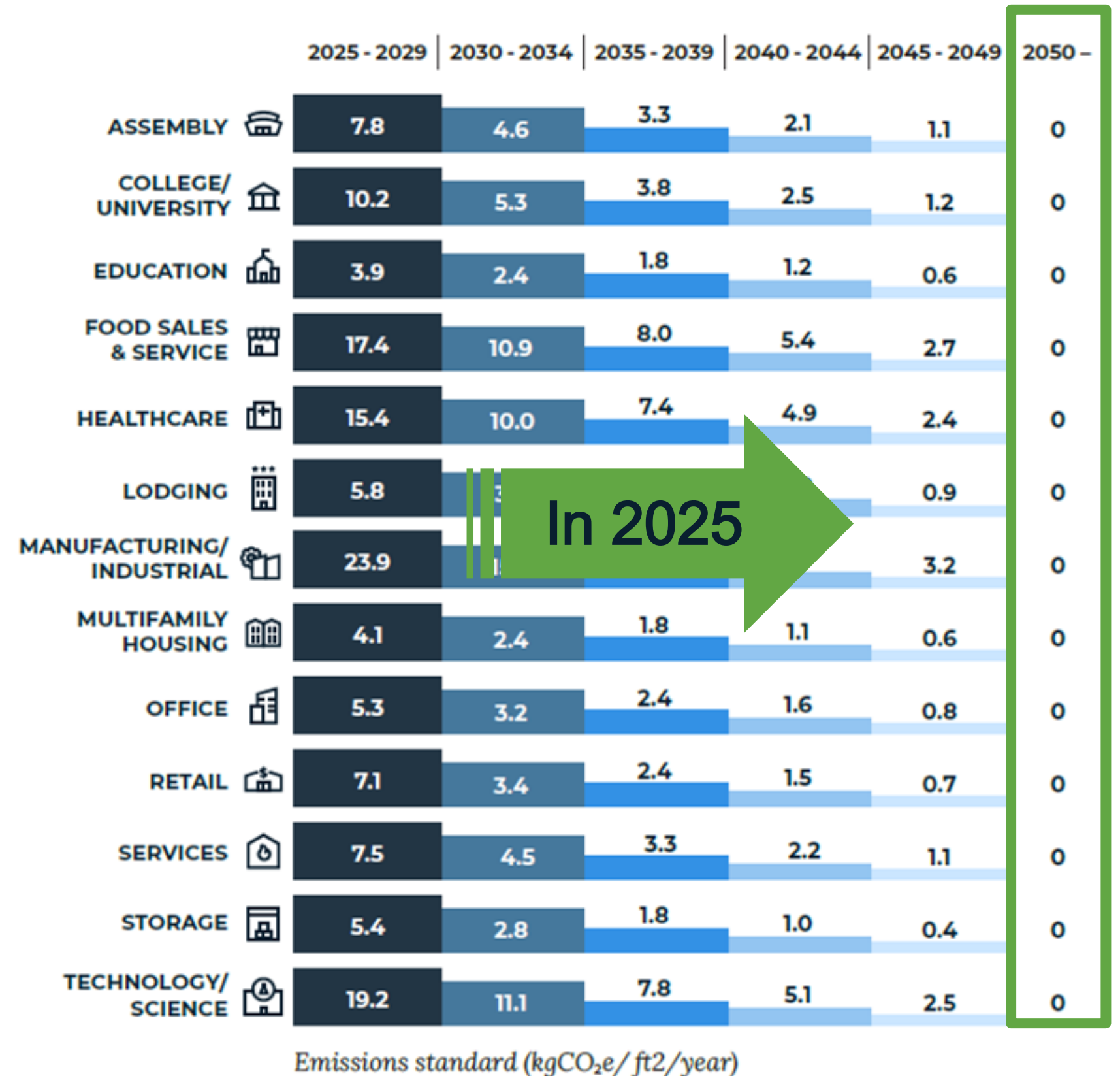
REQUIRE NET ZERO CARBON EMISSIONS



- New project filings will be required to meet **Net Zero Carbon** emissions standard (i.e. BERDO 2050) starting July 1, 2025.

Once a building is in operation:

- Compliance with net-zero emissions will be demonstrated through BERDO compliance mechanisms and annual reporting.



REQUIRE NET ZERO CARBON EMISSIONS



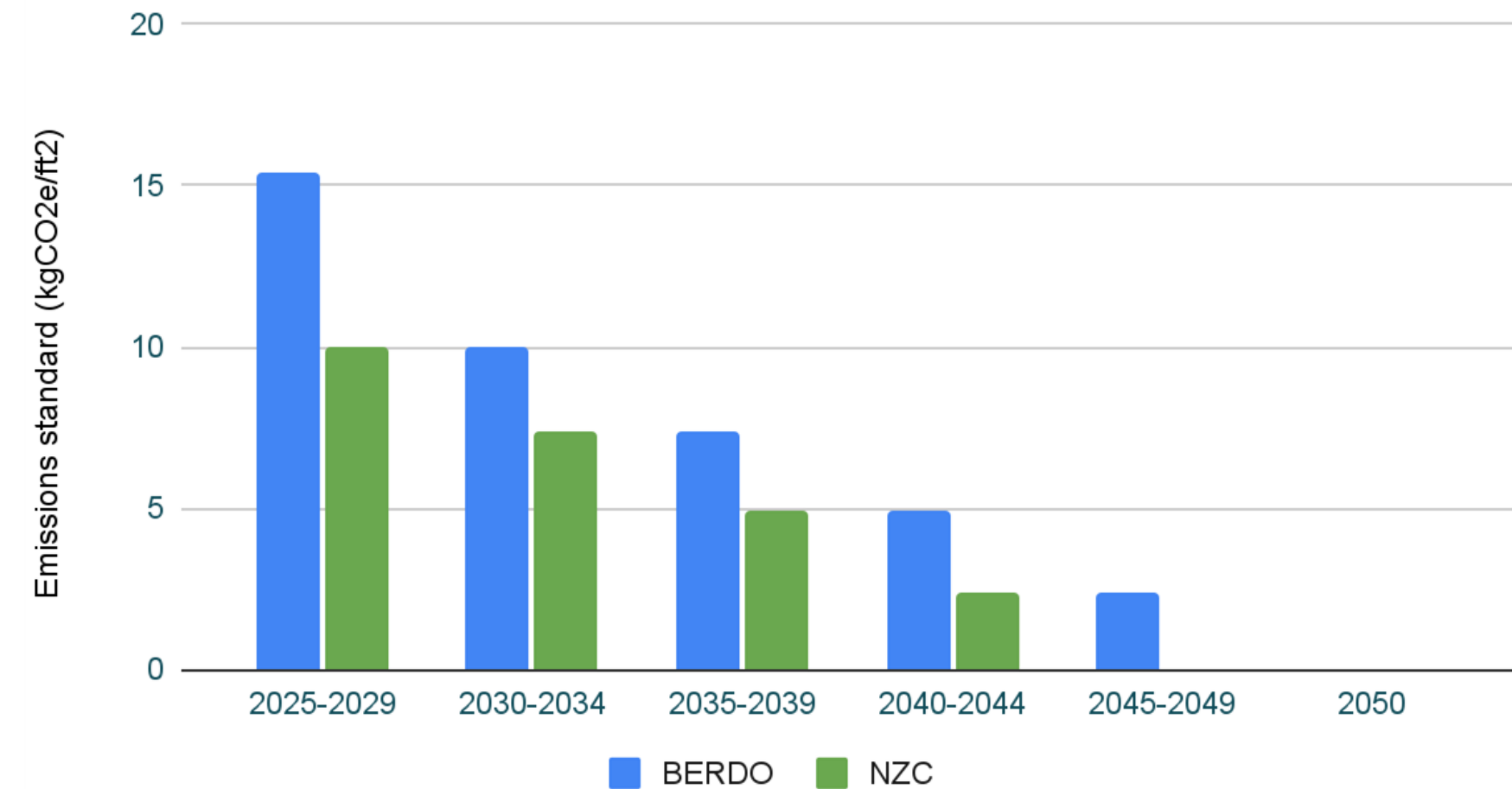
For Hospital and General Manufacturing Uses:

- In 2025 - 2029 require compliance with 2030-2034 building emission standards stepping down to Net Zero emissions by 2045.

Why?

- Complexities related to mechanical systems to achieve zero emissions
- Specialized equipment and unique energy demands

Hospital's Phased-in Emissions Standard



REQUIRE NET ZERO CARBON EMISSIONS



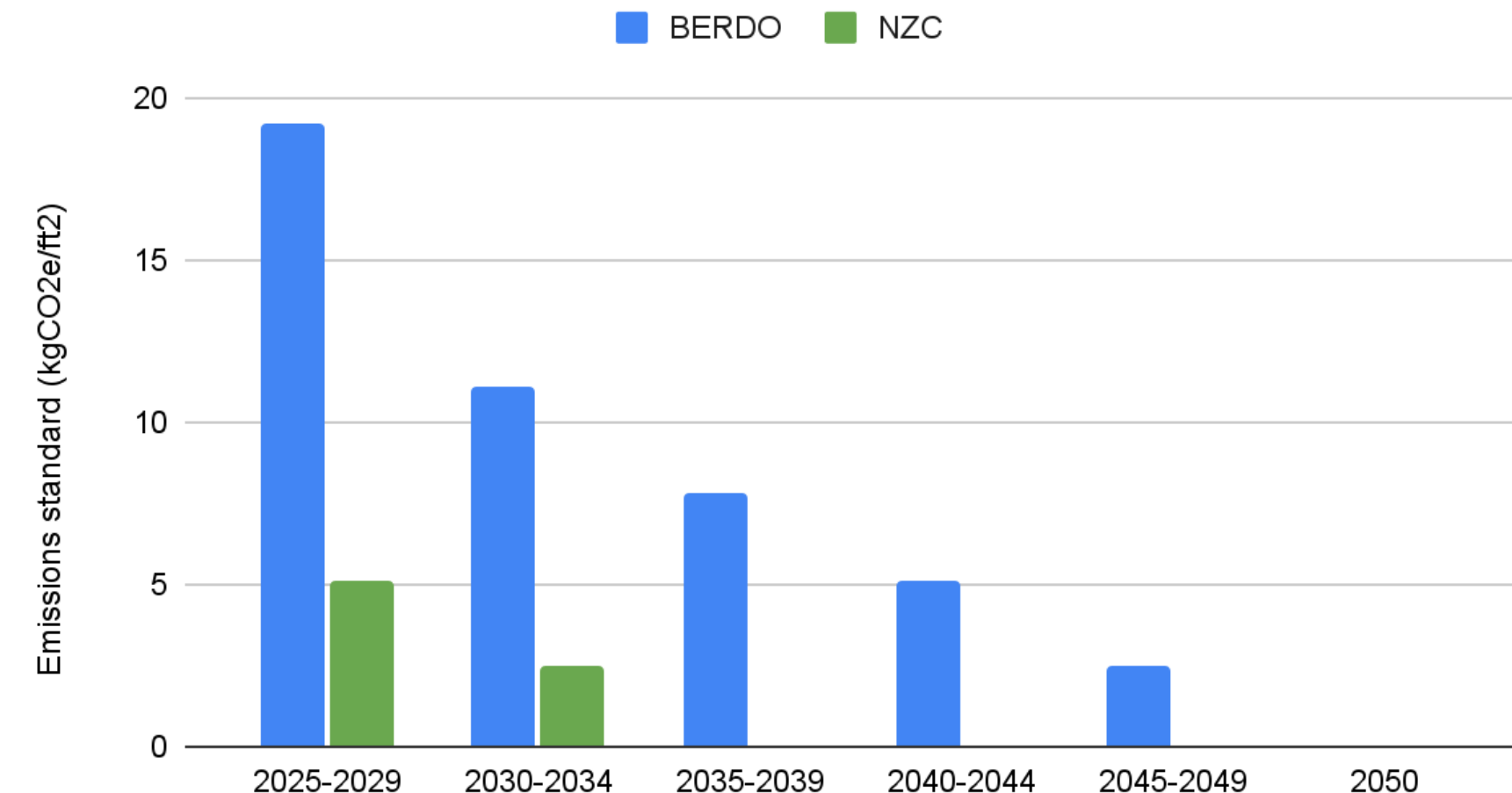
For Labs:

- Require compliance with
- 2040 - 2044 building emissions standards in 2025, stepping down to Net Zero in 2035.

Why?

- Complexities related to unique energy demands
- Technology constraints related to peak energy demands

Lab's Phased-in Emissions Standards



INTRODUCE EMBODIED CARBON REPORTING

1. Large buildings (> 50,000 SF) required to **provide structure and enclosure life cycle assessment.**
2. Smaller buildings (<50,000 SF) required to report on their embodied carbon through a checklist/ sustainability narrative.

EX: What is your low carbon and healthy material strategy?



NZC ENGAGEMENT SUMMARY

Since the draft was released on April 26, 2024 :

- We had a 32 day comment period (closed May 28, 2024):
 - Public Meeting
 - 4 Office Hours

We received:

- 84 comments through feedback form
- 8 comment letters

KEY TOPICS RAISED DURING ENGAGEMENT

1. Feedback on sustainability certifications
2. More clarity on the review process and expectations
3. Feedback on the date the zoning would go into effect & the filing cutoff
4. Concerns about the impact on development
5. Feedback on the embodied carbon reporting

CONTINUE LEED CERTIFIABLE REQUIREMENT

Feedback on maintaining LEED Certifiable:

- Require more stringent standard → LEED Gold
- Support maintaining LEED Certifiable (as proposed)
- Remove LEED standard to allow flexibility to pursue other sustainability certification pathways

Why we are maintaining the existing requirement:

- Recognize importance of additional sustainability review
- Familiarity with review process
- Allow flexibility to pursue other rigorous sustainability certifications

FEEDBACK ON EFFECTIVE DATE

- A. Clear expectations need to be established upon a project's filing.**
 - Requirements should not be introduced mid - review or at the end of the project's review.

- A. Desire for an earlier effective date**
 - Reducing building emissions as soon as possible is important to address climate change.

- A. Desire for a later effective date**
 - Need time to prepare.
 - Align with the timeline of the “greening of the electric grid”.
 - Concern that the proposal will stall desired development in Boston.
 - Supply chain & electric grid capacity disruption concerns.

Feedback A: Clear expectations need to be established upon a project's filing.

Response:

- NZC applies to project's filing a Project Notification Form:
 - Establishes clear expectations upon a project's filing
 - Ensures that the applicability of NZC requirements is not affected by arbitrary events (e.g. Article 80 approval date changing outside of Proponent's control)
 - Aligns with standard legal procedures
 - Does not subject project's mid - review to new requirements

Feedback B: Desire for an earlier effective date

Response:

- Provide time for project teams to prepare ahead of adoption
- Provide NZC review team time to develop compliance pathways with zoning
- New Linkage fees went into effect in January 2024 & IDP requirements will go into effect in October so a NZC July 1, 2025 effective date ensures projects are not subject to new requirements all at once.

Feedback C: Desire for a later effective date

Response:

- The Mayor and the City's Climate Action Plan prioritize achieving carbon neutrality for new buildings
- High Ventilation and General Manufacturing Buildings have phased-in requirements to achieve Net Zero Carbon emissions
- The Building Code primarily dictates mechanical systems requirements
- Project teams have a year to prepare for NZC compliance requirements

INTRODUCE EMBODIED CARBON REPORTING

Feedback:

- Support for embodied carbon reporting & suggestions on how to collect data
- Align with Cambridge and Newton's embodied carbon reporting standard
- Introduce embodied carbon requirements in addition to reporting

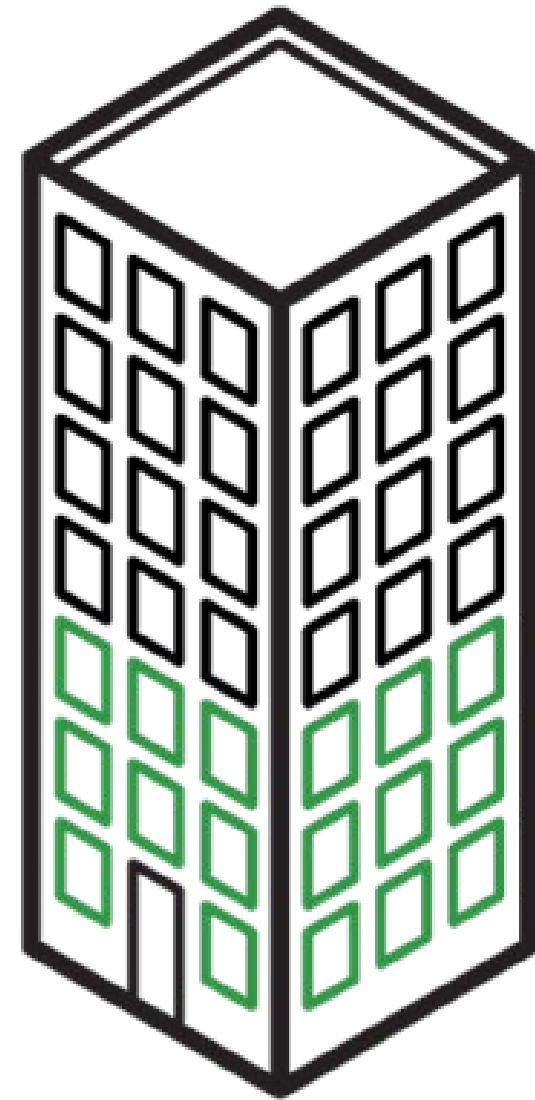
Next Steps:

- Collaborate with industry leaders on methodology to collect embodied carbon data.
- Align with Cambridge and Newton's existing standards
- Obtain embodied carbon data to establish future requirements

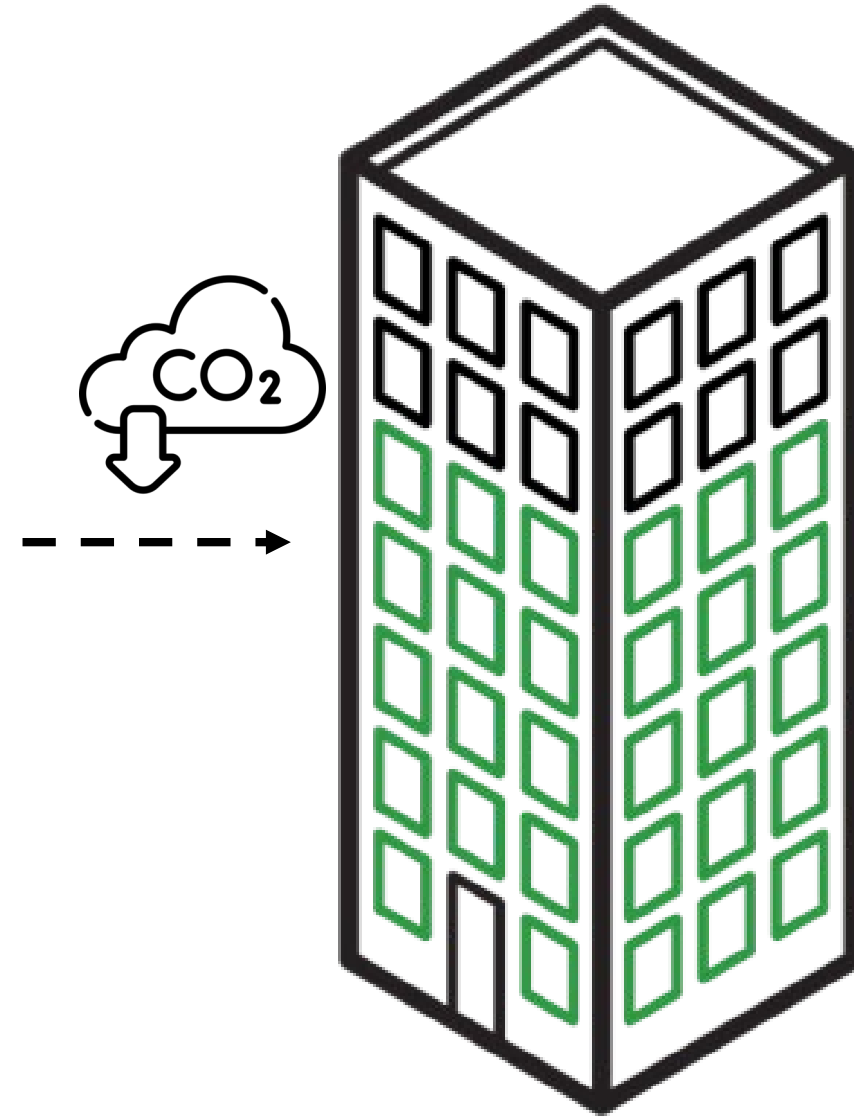


WITHOUT NET ZERO CARBON ZONING →

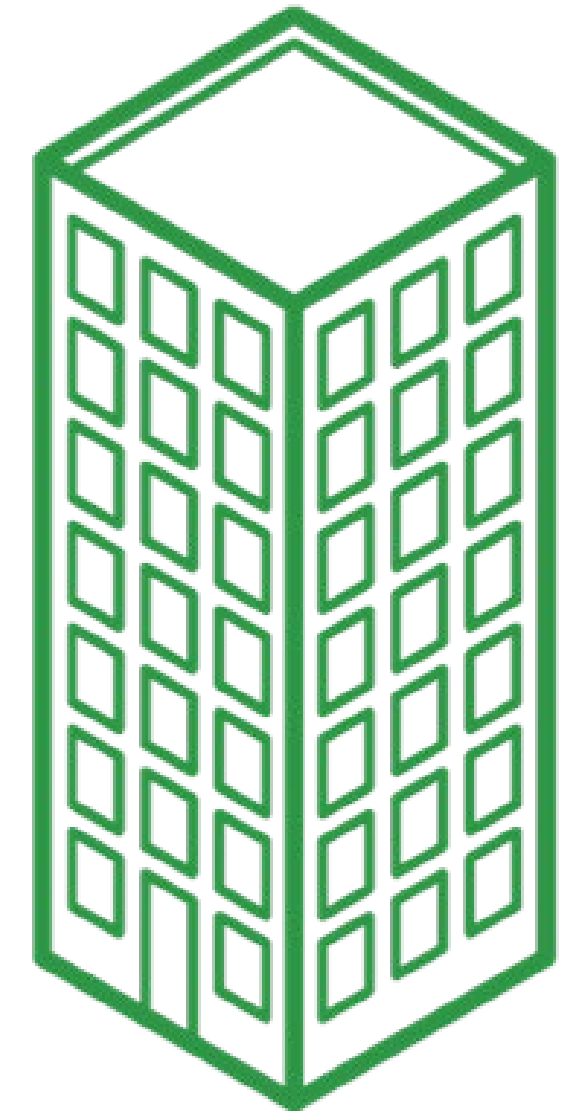
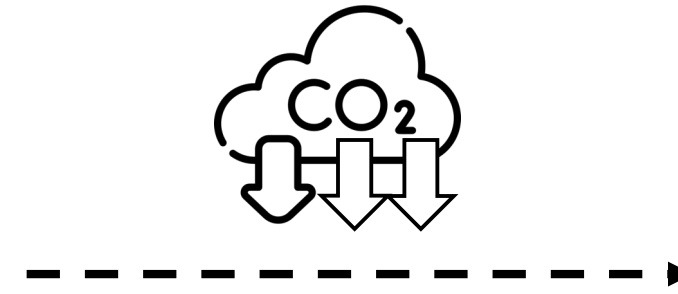
ZERO IN 2050



Specialized
Stretch
Energy
Building Code



Specialized Stretch
Energy Building
Code + BERDO



Specialized Stretch
Energy Building
Code + BERDO

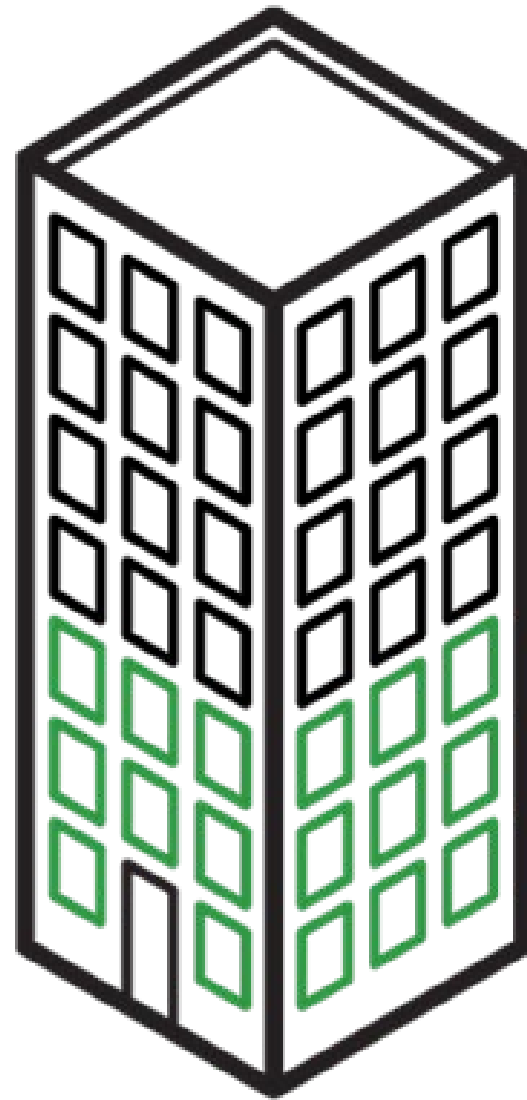
2024

2025

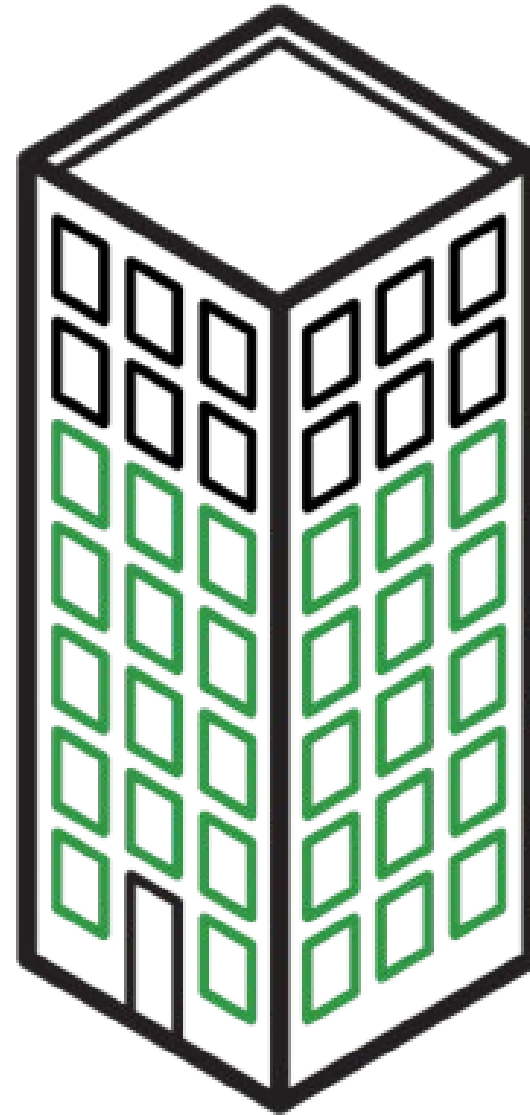
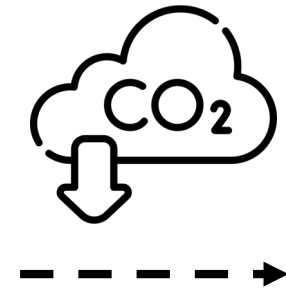
2050

WITH NET ZERO CARBON ZONING →

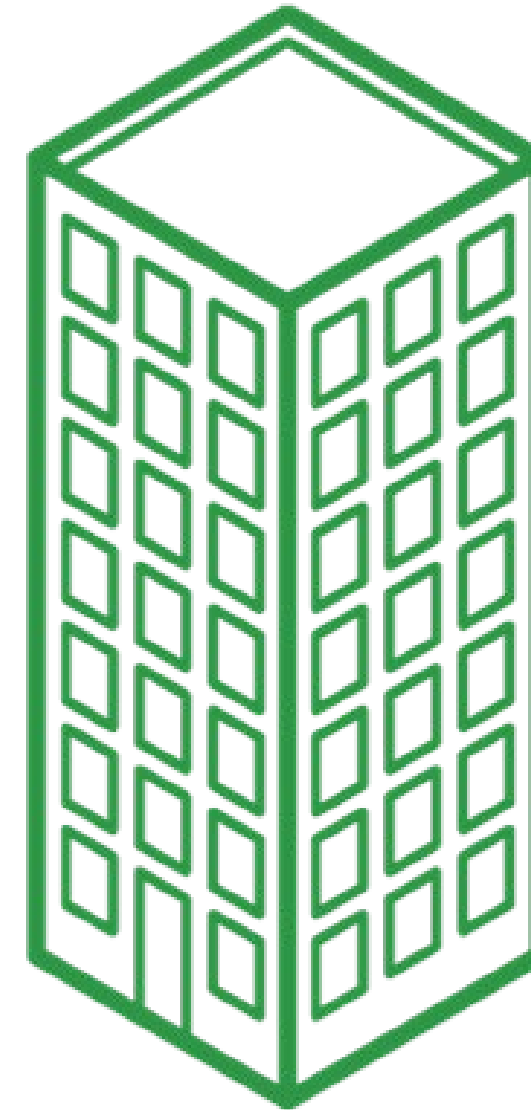
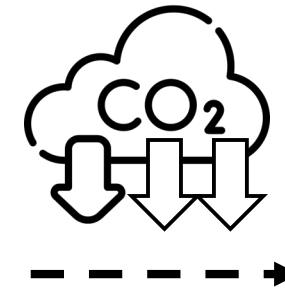
ZERO IN 2025



Specialize
Stretch
Energy
Building Code



Specialized Stretch
Energy Building
Code + BERDO



Specialized Stretch
Energy Building Code
+ BERDO +
Zoning

2024

2025

2025

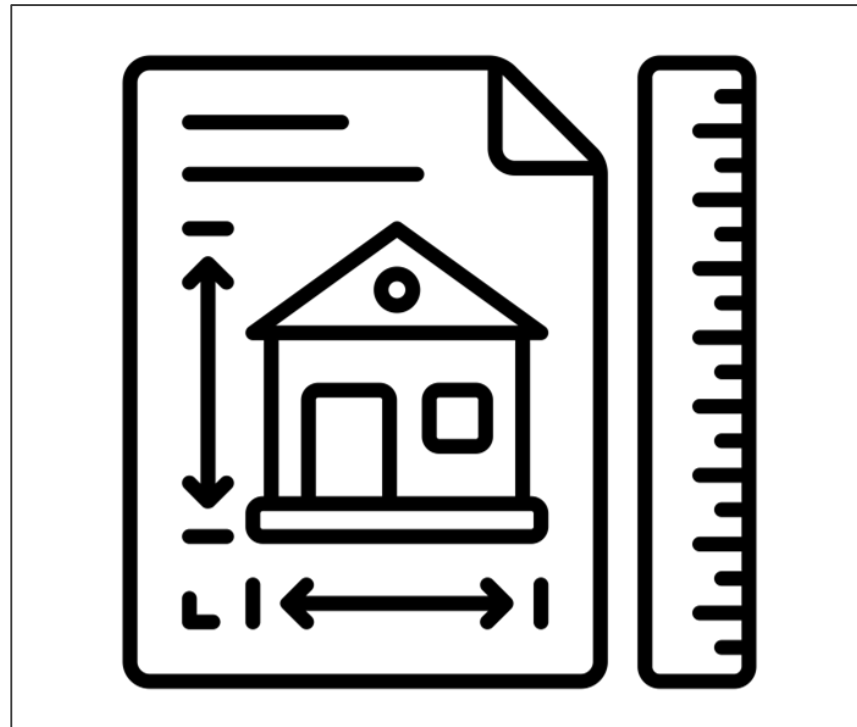


A high-angle, close-up photograph of a dense urban building facade, likely in New York City, showing multiple stories of brick and stone buildings with numerous windows and fire escapes. The image is slightly blurred and serves as the background for the slide.

HOW DO BUILDINGS COMPLY WITH NZC?

3

Planning

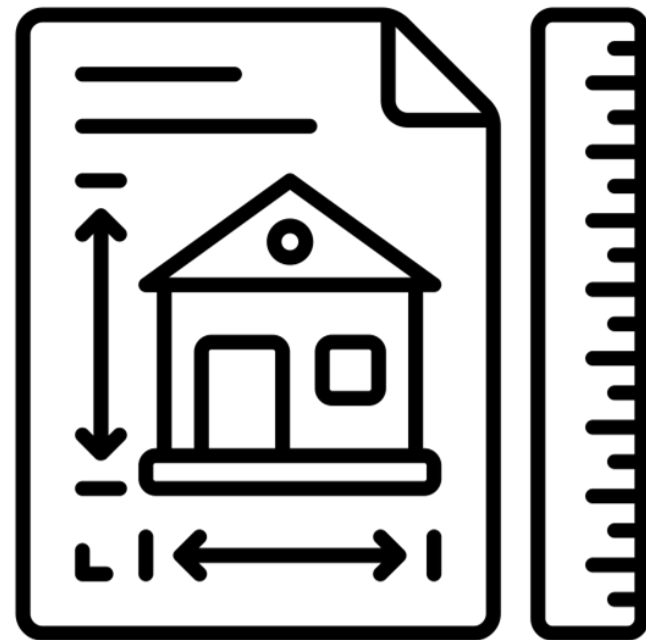


NZC Zoning

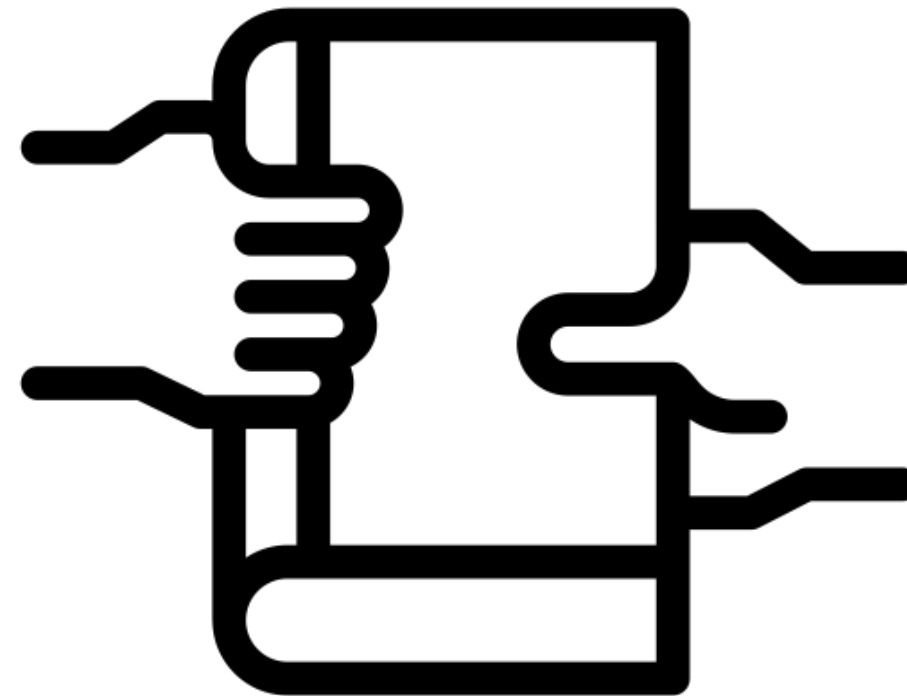
Projects will demonstrate they are *designed* to be Net Zero once they are in operation.

In others words, they will demonstrate that they are *Net Zero Ready*.

Planning



NZC determines if a building is *Net Zero Ready*.



Built



BERDO enforces *annual compliance* with the emissions standard established in NZC.

HOW CAN A BUILDING BE NET ZERO UNDER BERDO?



Direct emissions reduction in the building

(e.g. improving insulation, upgrading heating and cooling systems)



Install renewable energy or purchase eligible renewable energy

(e.g. solar) or purchase eligible renewable energy to reduce emissions from electricity only.



Alternative Compliance Payments (ACPs)

ACPs will be paid into the new Equitable Emissions Investment Fund to support building decarbonization projects that prioritize benefits to Environmental Justice communities in Boston.

RENEWABLE ENERGY OPTIONS UNDER BERDO



In all cases, eligible renewable energy can only be used to reduce emissions from electricity.

Renewable Energy Options	Key Requirements
Boston Community Choice Electricity (BCCE)	MA Class I RECs purchased on behalf of residents and businesses enrolled in either the standard or Green 100 options of the BCCE program.
MA Class I Renewable Energy Certificates (RECs)	MA Class I RECs bought and retired independently or as part of a Power Purchase Agreement.
Power Purchase Agreement (PPA) outside the ISO New England grid	Energy contract requiring the purchase of both electricity and its associated RECs. This includes virtual PPAs. PPAs need to be signed prior to the commercial operation of the renewable energy project (additionality requirement)
Local renewable generation	Rooftop solar, community solar, or other local renewable generation. REC retirement is not required if: (a) purchasing from solar system in Eastern MA that began operation before 2024; or (b) purchasing from any type of non-emitting renewable energy system located inside the City of Boston.

HOW CAN A BUILDING BE NET ZERO UNDER BERDO?

Flexibility Measures: Applied differently to NZC buildings



Portfolios: A NZC building in a Building Portfolio must meet its building - specific emissions standard every year.



Individual Compliance Schedules: Not applicable



Hardship Compliance Plans: A NZC Building must meet its building - specific emissions standard every year regardless of whether it has a Hardship Compliance Plan. The BERDO Review Board may approve other forms of relief in Hardship Compliance Plans for NZC buildings.

1. **SUPPORT** decarbonization of new buildings
2. **REDUCE** future expensive building retrofits
3. **ACCELERATE** adoption of renewable energy
4. **CLIMATE LEADER** – Position Boston at the forefront of building sustainability

Compliance pathways ranked by expected impacts on operational costs

- 1) **Smaller Accounts Boston Community Choice Electric**
 - a) BCCE Green 100 is close to parity with basic rates from Eversource and includes significantly higher amounts of renewable energy
- 2) **Renewable Energy Purchases**
 - a) Price varies based on RECs purchased at owners discretion
- 3) **BERDO Alternative Compliance Payments**
 - a) Estimated Cost of **ACPs** for Mixed Fuel buildings = **0.6% - 5.5% of total operational costs**



NEXT STEPS

4

NEXT STEPS

1. Develop NZC How - to - Comply Guide & educational outreach for Small and Large Projects
2. Embodied carbon data collaboration & collection
3. Develop Equitable Electrification Plan

THANK YOU. QUESTIONS?



Planning Department

CITY of BOSTON
