

City of Newton Proposed BERDO

Building Emissions Reduction and Disclosure Ordinance

May 28, 2024

Version: WF and PEG 5-16-24

City Council Resolution Calling for BERDO

- Resolution passed unanimously in April 2022
- “NOW, THEREFORE BE IT RESOLVED, That the City Council commits to developing an ordinance that will require large property owners to report energy use and emissions to the city annually, and in subsequent years demonstrate reductions in energy use and emissions to meet benchmarks established for their building type, with the goal of becoming carbon neutral by 2050.”

What is BERDO?

- BERDO is an ordinance that will require large buildings to report energy and emissions to the City.
- It requires large buildings to gradually reduce GHG emissions over time to zero by 2050.
- BERDO is necessary for the City to meet its Climate Action Plan target of zero emissions by 2050.

Why BERDO?

- Efficient approach to advancing Climate Action Plan targets through 2050
- Substantially reduces Newton's total emissions by regulating a small number of buildings
 - 293 buildings, 179 owners, 19.3 million sq. ft.
- **Buildings**: 1.3% of buildings. 0.7% of owners, 14% of gross floor area (GFA)
- **Emissions**: 34% of buildings emissions and 23% of Newton emissions
- Consistent with local strategies in Greater Boston area
 - Boston BERDO 2.0 (2021)
 - Cambridge BEUDO amendments (2023)
 - Watertown BERDO (planned 2024)

Discussion

- BERDO Team
- Why BERDO
- Buildings Covered
- Compliance Timeline
- Electricity Excluded from Emission Standard
- Reporting Simplified

Discussion

- Boston as a Model
- Rate of Emissions Reduction
- Compliance Flexibility
- Example Compliance Pathways
- Enforcement
- Emissions Investment Fund

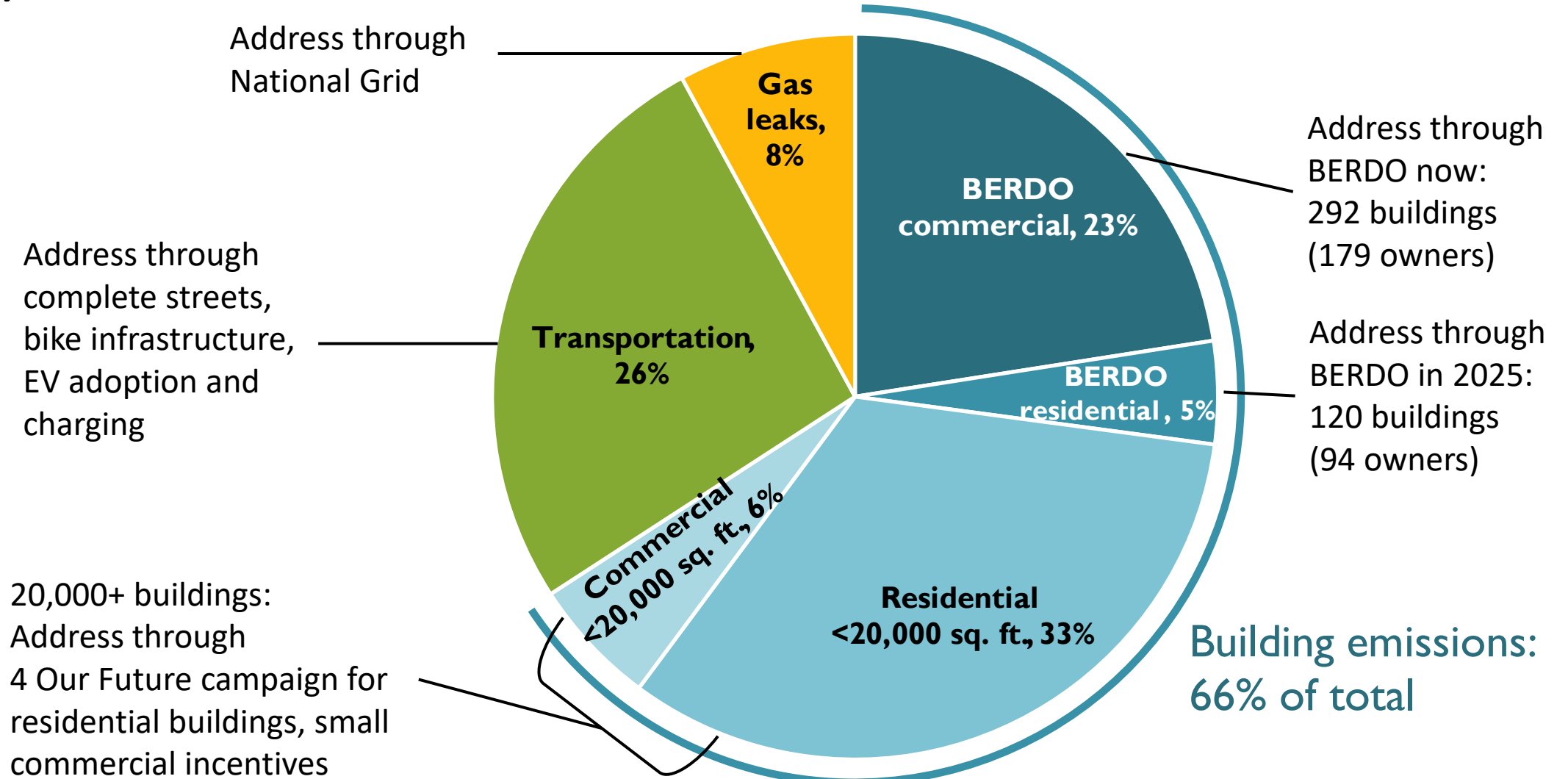
Newton BERDO Team

Subject matter experts developing BERDO policy since March 2022

- **City Staff:**
 - **Policy leads:** Bill Ferguson, Ann Berwick, Liora Silkes, Andrew Lee
 - **Coordinating with:** Josh Morse, Barney Heath, John Sisson
- **NCCE:** Halina Brown, Phil Hanser, Michael Gevelber
- **Green Newton:** Dan Ruben
- **Consultant:** Philip Eash-Gates, Synapse Energy Economics

Why BERDO?

**Newton's GHG emissions:
City goal of carbon neutral by 2050**



Note: "Commercial" includes institutional and industrial buildings

Buildings Covered

- BERDO covers commercial buildings
- Exception: state and federal buildings
- 293 buildings $\geq 20,000$ sq. ft. GFA
- Mayor proposes to add residential buildings $\geq 20,000$ sq. ft. GFA in April 2025, including centrally heated residential condos

Policy Design: Covered Buildings

| Scope | Number of buildings | Number of owners | Gross floor area (sq. ft.) | Emissions (Metric tons CO2e) | % of Newton emissions, all sectors |
|--|---------------------|------------------|----------------------------|------------------------------|------------------------------------|
| All buildings \geq 20,000 sq. ft. GFA | 413 | 267 | 26,624,758 | 202,794 | 28% |
| Only commercial buildings \geq 20,000 sq. ft. GFA. (No residential buildings). | 293 | 179 | 19,308,136 | 167,860 | 23% |

Proposed Covered Buildings

- Large impact by regulating a small number of buildings
 - 293 buildings, 179 owners, 19.3 million sq. ft.
- **Buildings**: 1.3% of buildings, 0.7% of owners, 14% of gross floor area (GFA)
- **Emissions**: 34% of buildings emissions and 23% of Newton emissions

| Tier | Description | Count of Buildings | Number of Owners | Total GFA (sq. ft.) | Emissions (metric tons CO ₂ e) | |
|--------------|---------------------------------------|--------------------|------------------|---------------------|---|-------------|
| 1 | Commercial, GFA ≥ 100,000 sq. ft. | 47 | 29 | 8,631,279 | 77,774 | 46% |
| 2 | Commercial, GFA 50,000–99,999 sq. ft. | 70 | 41 | 4,948,885 | 42,246 | 25% |
| 3 | Commercial, GFA 35,000–49,999 sq. ft. | 67 | 51 | 2,825,059 | 23,480 | 14% |
| 4 | Commercial, GFA 20,000–34,999 sq. ft. | 109 | 94 | 2,902,913 | 24,381 | 15% |
| Total | All covered buildings | 293 | 179* | 19,308,136 | 167,860 | 100% |

*Note that the total number of covered building owners is less than the sum of the rows, because some owners appear in multiple tiers.

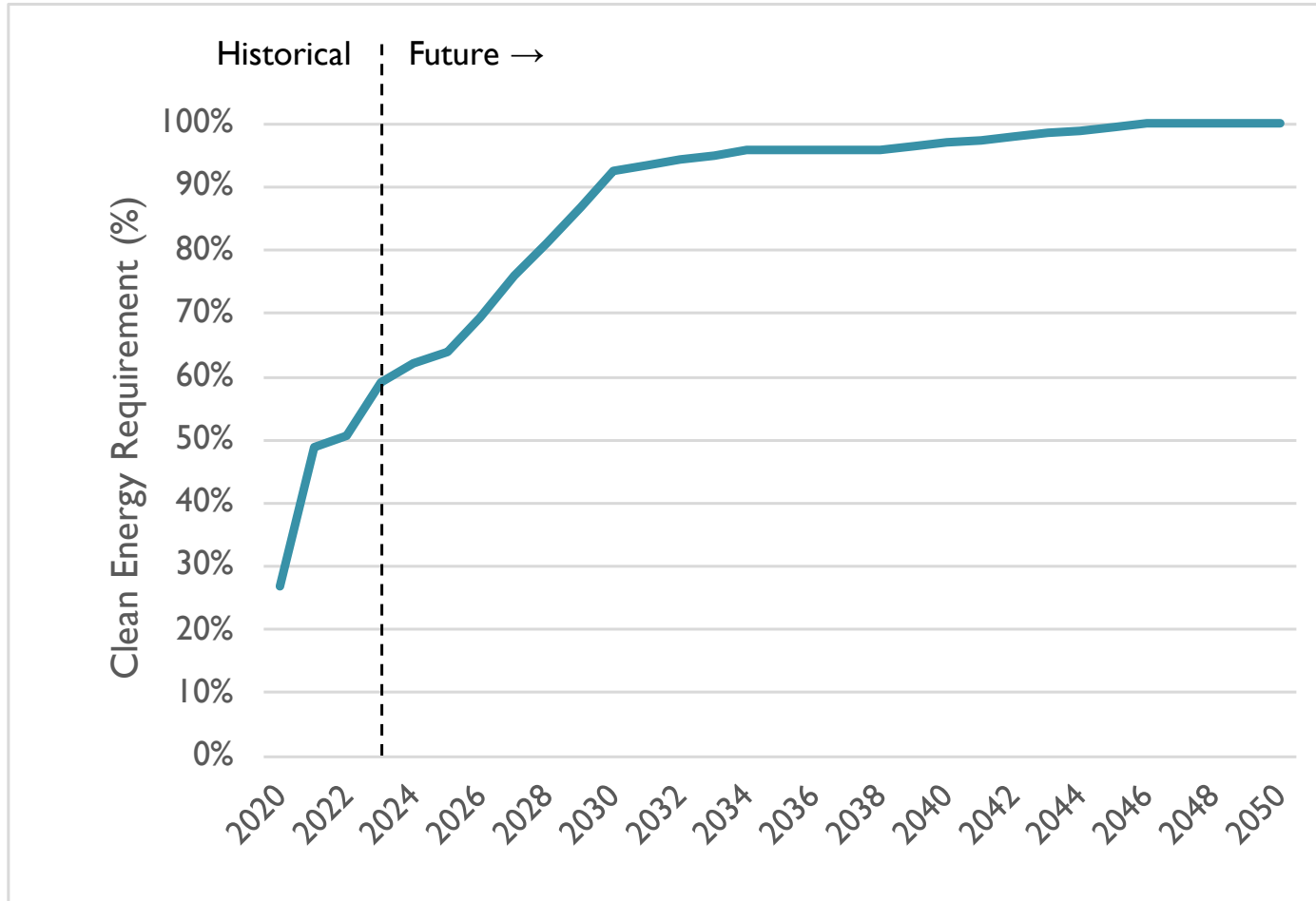
Proposed Compliance Timeline

| Building Tier | Building Tier Description | Buildings count | 1st Energy and Emissions Report Due | 1st Emissions Compliance Year | 1st Report under Emissions Compliance |
|---------------|---------------------------------------|-----------------|-------------------------------------|-------------------------------|---------------------------------------|
| Tier 1 | Commercial \geq 100,000 sq. ft. GFA | 47 | Sept. 15, 2025 | 2027 | Sept. 15, 2028 |
| Tier 2 | Commercial 50,000–99,999 sq. ft. GFA | 70 | Sept. 15, 2026 | 2028 | Sept. 15, 2029 |
| Tier 3 | Commercial 35,000–49,999 sq. ft. GFA | 67 | Sept. 15, 2026 | 2029 | Sept. 15, 2030 |
| Tier 4 | Commercial 20,000–34,999 sq. ft. GFA | 109 | Sept. 15, 2026 | 2030 | Sept. 15, 2031 |

Electricity Excluded from Emission Standard

- Because State policy eliminates grid emissions over time, BERDO can exclude electricity
- Greatly simplifies reporting and compliance
 - Will cover onsite natural gas, oil, and propane emissions only
 - Owners will report electricity use, but not electricity emissions
- Reporting is covered in more detail later

Massachusetts Clean Electricity Regulations



- Combined clean and renewable electricity procurement mandates:
 - 92 percent by 2030
 - 100 percent by 2050
- Technologies included in statutes:
 - Solar
 - Wind
 - Ocean
 - Fuel cells with qualified fuel
 - Qualified landfill methane gas
 - Large hydro
 - Low-impact, small hydro
 - Qualified biomass
 - Geothermal
 - Nuclear
 - Municipal waste

Source: [Massachusetts Department of Environmental Protection 310 CMR 7.75: Clean Energy Standard \(CES\)](#)

Newton BERDO Simplifies Reporting

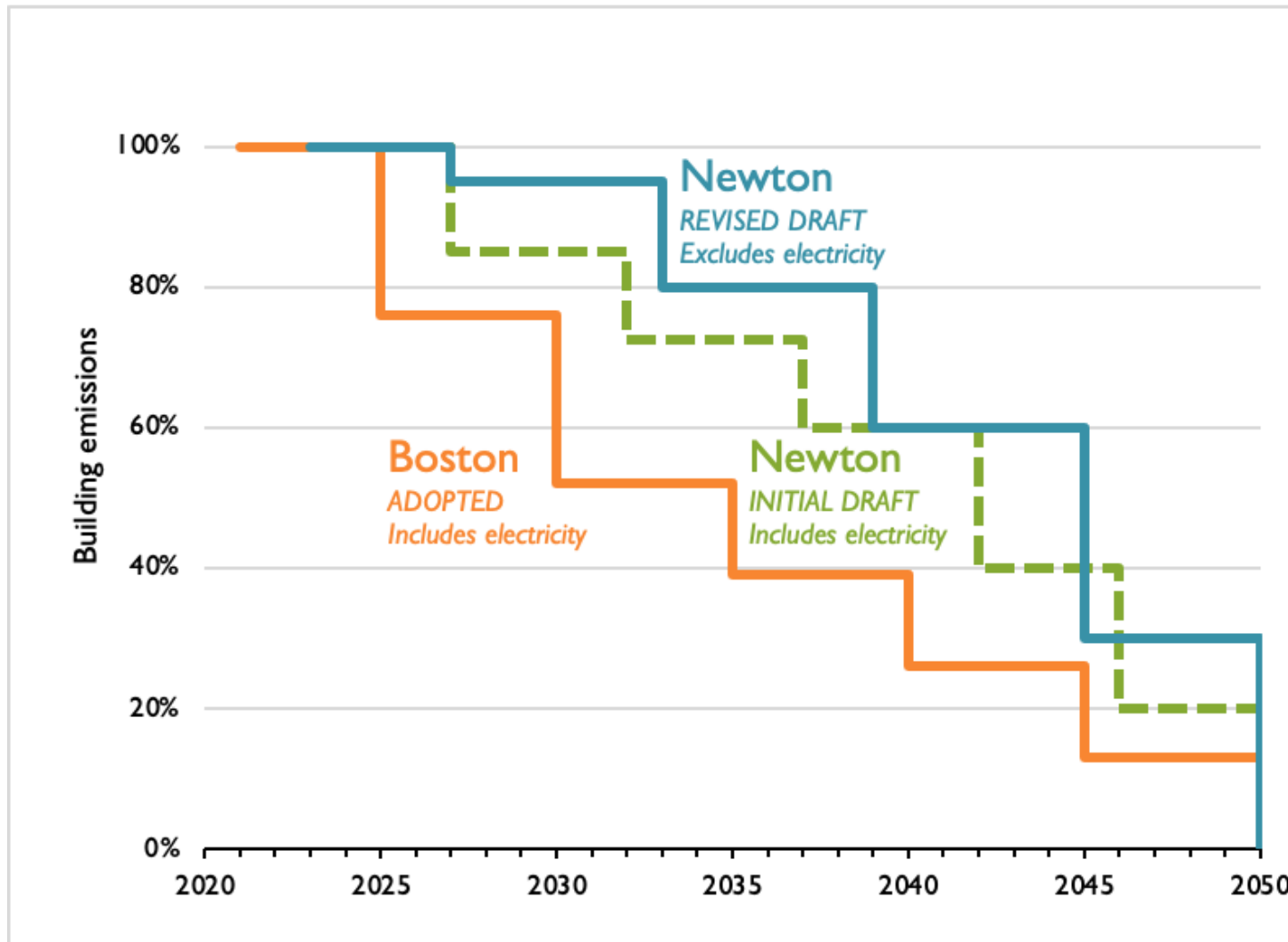
- Submit reports via ENERGY STAR Portfolio Manager
 - Free, industry-standard, widely adopted webtool
 - Junior staff learned the tool and reported 30 City buildings in about 15 hours
- Report all energy use—electricity, natural gas, fuel oil, propane
 - Annually for the prior year
 - One bill per utility account provides 12 months data
 - Receipts for delivered fuels—fuel oil and propane
- The City will provide training and education

Boston as a Model: Proposed Differences

- **Building types**: Initially excludes residential—apartments and condos
- **Scale**: 47 buildings in year 1 (vs. 3,975 in Boston), ramping to 293; lower staff demand
- **Scope**: Includes direct emissions only; excludes electricity emissions
- **Timeline**: Requirements phased in over 4 years, beginning in 2027 (vs. 2025 in Boston)
- **Compliance periods**: aligned with capital planning cycles
- **Stringency**: Reductions are more gradual; first major decrease in 2033 (vs. 2025 in Boston).
- **Enforcement**: Penalties begin in year 3 of emission standards

Proposed Rate of Emissions Reduction

In light of stakeholder input, revised trajectory is more gradual than Boston's and than proposed at prior ZAP Committee hearing (Nov. 13, 2023).



Newton Proposed Rate of Emissions Reduction

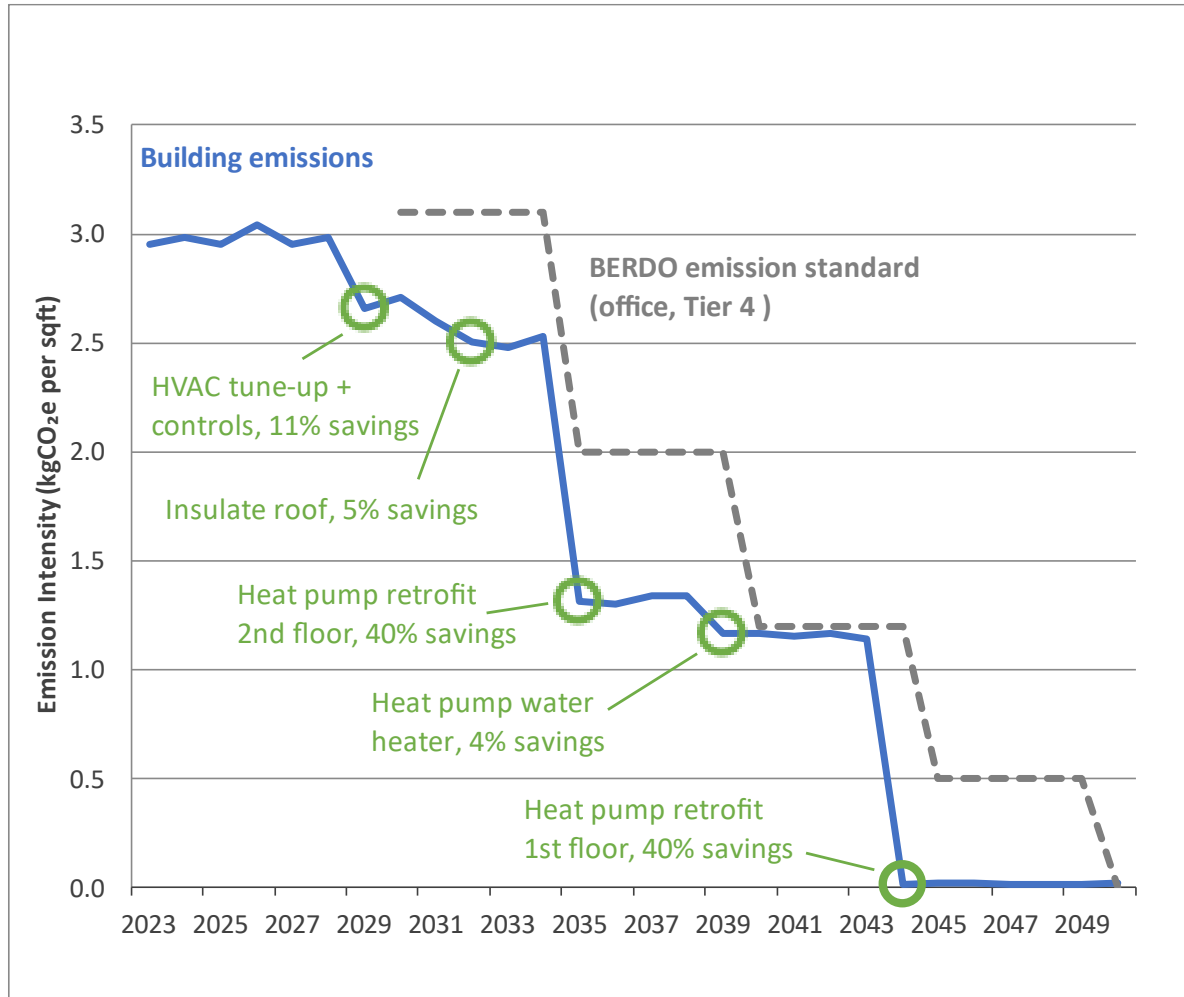
| Building use | Emission standards (kgCO ₂ e/sq. ft.) | | | | |
|--------------------------|--|----------|----------|----------|----------|
| | Period 1 | Period 2 | Period 3 | Period 4 | Period 5 |
| Assembly | 6.1 | 3.7 | 2.3 | 1.1 | 0.0 |
| College/University | 9.5 | 5.7 | 3.5 | 1.5 | 0.0 |
| Education | 4.1 | 2.8 | 1.9 | 0.9 | 0.0 |
| Food Sales & Service | 6.8 | 4.4 | 3.2 | 1.5 | 0.0 |
| Healthcare | 14.3 | 9.2 | 6.5 | 3.2 | 0.0 |
| Lodging | 4.6 | 3.1 | 2.1 | 1.0 | 0.0 |
| Manufacturing/Industrial | 3.9 | 2.9 | 2.2 | 1.0 | 0.0 |
| Office | 3.1 | 2.0 | 1.2 | 0.5 | 0.0 |
| Retail | 3.4 | 2.3 | 1.4 | 0.6 | 0.0 |
| Services | 6.5 | 4.2 | 2.9 | 1.4 | 0.0 |
| Storage | 2.5 | 1.8 | 1.3 | 0.6 | 0.0 |
| Technology/Science | 14.6 | 10.7 | 6.7 | 2.8 | 0.0 |

Includes direct GHG emissions only (electricity emissions excluded)

Proposed Compliance Flexibility

- **Phased implementation**: Tiers by building size phased in over time
- **Penalties delay**: Not levied prior to 3rd year of emissions requirement
- **Portfolios**: Combine emissions rating of 2 or more buildings
- **Individual Compliance Plans**: Allows a change of schedule
 - Choose a base year from 2013 to now and follow percentage-based reduction schedule
 - Period 1: 95%, Period 2: 80%, Period 3: 60%, Period 4: 30%, Period 5: 0%
- **Hardship Plans**: Allows change of emissions
 - Accommodates unique circumstances or conditions
 - Considerations: financial hardship, regulatory or contractual restriction, technical or operational constraint (e.g., utility service electrical capacity)
- **Multiple Compliance Pathways**: Energy efficiency, phased electrification, alternative compliance payment (ACP)

Compliance Pathway Example



Building profile:

- 30,000 sq. ft. office building
- Built 1980, 2-story
- Natural gas use
 - Space heating (95%)
 - Water heating (5%)
- New roof needed by 2032
- Separate heating systems for 1st and 2nd floors

Enforcement

- Non-compliance penalties begin the 3rd year of the effective date of emissions requirements
- Penalties are \$300 per day (Boston maximum of \$1,000 per day)
- Penalties for:
 - Failure to submit a report
 - Inaccurate report
 - Failure to meet emissions standard

Proposed Emissions Investment Fund

- Fines, fees, and penalties are placed in a special City fund
- Fund to be administered by the Climate/Sustainability Office and can be used for:
 - Projects that benefit environmental justice populations in Newton
 - Costs to the City to administer BERDO
 - Costs to the City to comply with BERDO
 - Costs to local non-profits (such as affordable housing providers) to comply
 - Education related to implementation of BERDO

Extra Slides

Residential Context

- Mayor proposes to add residential buildings \geq 20,000 sq. ft. GFA in one year, April 2025. Includes adding centrally heated condos.
- Residential was being phased in anyway. This does not delay it.
- Residential \geq 20,000 sq. ft. GFA accounts for 5% of emissions, commercial accounts for 23%
- One-year delay allows additional time for planning and evaluation
- The Cambridge City Council removed residential from the emissions requirement last June 2023. Through thorough planning, Newton has a better chance of including residential in BERDO

Remaining Issues with Residential Bldgs.

BERDO Team working with residential owners on the following issues:

- Understanding the impact on housing costs
- Addressing increased cost impacts on housing
- Impact on affordable housing and EJ communities
- Identifying contacts for condo associations
- Identifying centrally heated condo buildings
- Available technologies
- Utility incentives for technologies

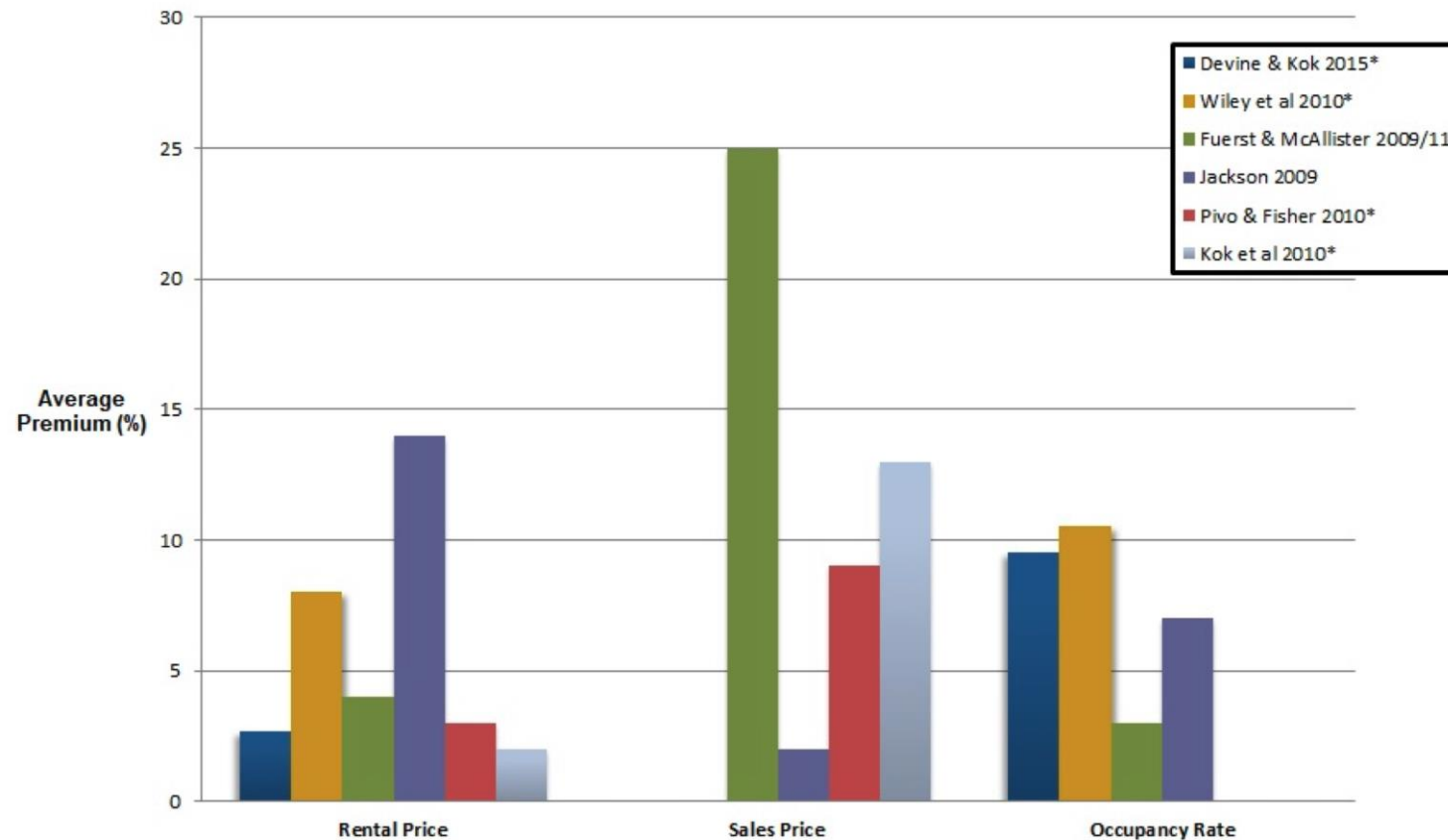
Residential Buildings

- Extensive BERDO Team discussions about including in BERDO
- Initially excluded to give BERDO Team additional time to assemble information, evaluate costs, develop case studies, and meet with stakeholders
- Table shows potential impact of adding residential, including +5% of citywide emissions

| Tier | Description | Count of Buildings | Number of Owners | Total GFA (sq. ft.) | Emissions (tons CO ₂ e) (% total GHG) | |
|--------------|-------------------------------------|--------------------|------------------|---------------------|--|------------|
| R1 | Residential, ≥50,000 sq. ft. | 37 | 35 | 4,988,829 | 23,721 | +3.4% |
| R2 | Residential, 20,000–49,999 sq. ft. | 83 | 60 | 2,356,977 | 11,427 | +1.6% |
| Total | All Potential Res. Buildings | 120 | 94 | 7,198,737 | 35,148 | +5% |
| Total | All Covered Buildings | 413 | 267 | 26,506,873 | 201,930 | 28% |

Potential Market Value Impacts

Added Value of ENERGY STAR-Labeled Commercial Buildings in the U.S. Market

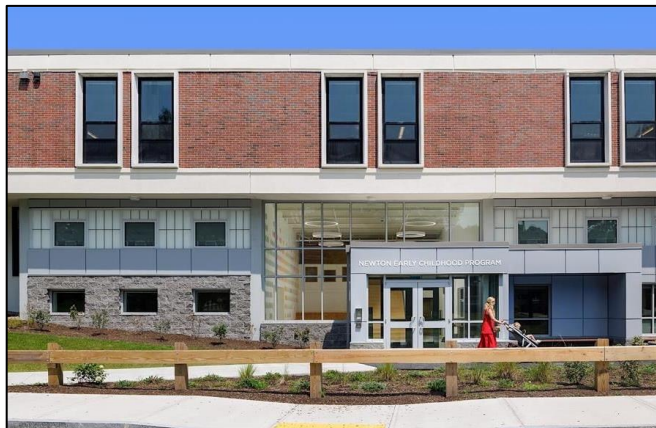


Source: Institute for Market Transformation

Retrofit Case Examples: Cost to Achieve Zero Emissions

- BERDO Team evaluated completed projects, reviewed literature, and obtained quotes
- Net incremental costs to building owners typically in the range of \$5-20 per sq. ft.

| Building | Type | Location | Size (sq. ft.) | Description | Project cost | | Net cost | | |
|--------------------------------|-------------|----------|----------------|---|--------------|-----------|-----------|-----------|--|
| | | | | | \$ | \$/sq. ft | \$ | \$/sq. ft | |
| Newton Early Childhood Program | Education | Newton | 42,000 | All-electric heat pumps | \$1,570,600 | \$37.4 | -\$176,00 | -\$4.2 | Net cost less standard gas boiler with heating distribution system |
| Auburndale Library | Services | Newton | 5,500 | All-electric heat pump, insulation, air sealing | \$75,000 | \$13.6 | \$30,400 | \$5.5 | Net cost less standard gas boiler after rebate |
| Apartment | Residential | Newton | 25,000 | All-electric central heat pump and water heater | \$415,000 | \$16.6 | \$227,500 | \$9.1 | Net cost less standard gas boiler |



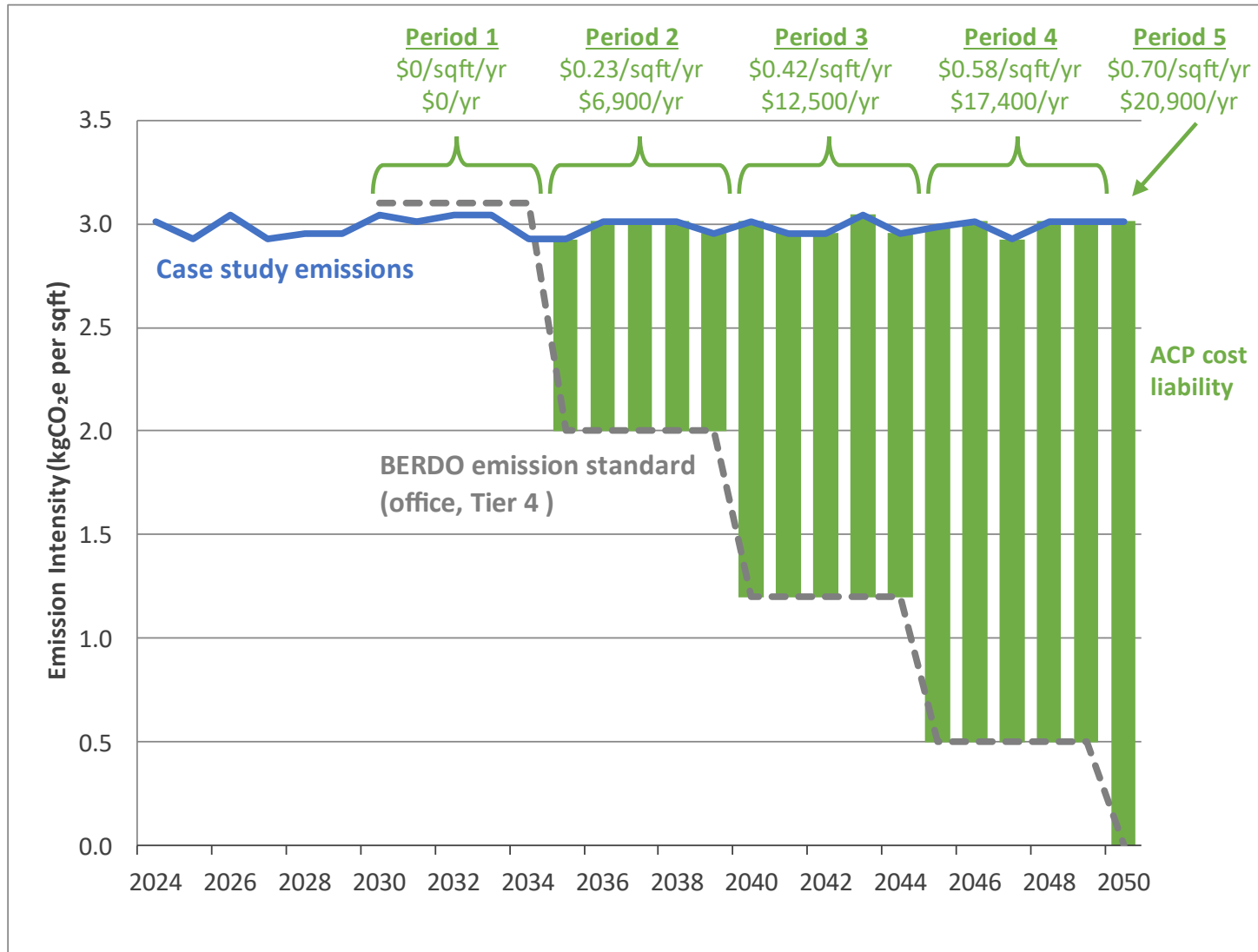
Retrofit Case Examples: Cost to Achieve Zero Emissions

| TOTAL | RESIDENTIAL | | | | | | | | | COMMERCIAL | | | | | |
|--|---------------|----------|------------|-------------------|----------|------------|-------------------|----------|------------|----------------|----------|------------------------------|------------------|----------|------------------------------|
| | Single Family | | | Small Multifamily | | | Large Multifamily | | | Small & Medium | | | Large Commercial | | |
| | Low | High | Per (Unit) | Low | High | Per (Unit) | Low | High | Per (Unit) | Low | High | Per (Unit) | Low | High | Per (Unit) |
| Benchmarking | | | | | | | \$580 | \$750 | building | \$580.00 | \$750.00 | building | \$580.00 | \$750.00 | building |
| Basic Efficiency 10–14% | \$3,100 | \$5,400 | unit | \$2,600 | \$4,300 | unit | \$2,300 | \$3,800 | unit | \$2.60 | \$4.20 | sq ft | \$2.60 | \$4.20 | sq ft |
| Efficiency 15–30% | \$8,200 | \$12,200 | unit | \$7,200 | \$10,200 | unit | \$6,600 | \$9,200 | unit | \$8.60 | \$11.50 | sq ft | \$8.60 | \$11.50 | sq ft |
| Deep Energy Retrofit 30%+ | \$20,600 | \$33,500 | unit | \$19,000 | \$30,200 | unit | \$18,100 | \$28,500 | unit | \$33.65 | \$40.36 | sq ft | \$33.65 | \$40.36 | sq ft |
| Space Heating/ Cooling Electrification | \$19,500 | \$20,500 | unit | \$9,000 | \$11,000 | unit | \$11,600 | \$12,200 | unit | \$4.00 | \$11.33 | sq ft | \$19.00 | \$28.00 | sq ft |
| Water Heating Electrification | \$3,000 | \$3,100 | unit | \$1,180 | \$2,740 | unit | \$890 | \$1,180 | unit | \$0.79 | \$0.88 | sq ft | \$0.44 | \$0.52 | sq ft |
| Dryer Electrification | \$1,000 | \$1,800 | unit | \$1,300 | \$2,600 | building | \$1,300 | \$2,600 | building | | | sq ft | | | sq ft |
| Miscellaneous | | | | | | | | | | \$1.50 | \$2.00 | sq ft | \$1.50 | \$2.00 | sq ft |
| Cooking Electrification | \$1,400 | \$2,900 | unit | \$1,400 | \$2,900 | unit | \$1,400 | \$2,900 | unit | \$16.00 | \$20.00 | sq ft of kitchen space | \$16.00 | \$20.00 | sq ft of kitchen space |
| Gas Disconnection | \$400 | \$600 | unit | \$600 | \$800 | building | \$600 | \$800 | building | \$800.00 | \$1,000 | building | \$1,200 | \$1,600 | building |
| Panel up- grades | \$4,400 | \$4,500 | unit | \$11,540 | \$89,600 | building | \$179.2k | \$281k | building | \$20k | \$40k | building | \$68k | \$128k | building |

Source: Jones, B. 2021.

Costs based on published literature, case studies, construction cost estimators, and interviews with industry professionals.

Alternative Compliance Payment (ACP) Example

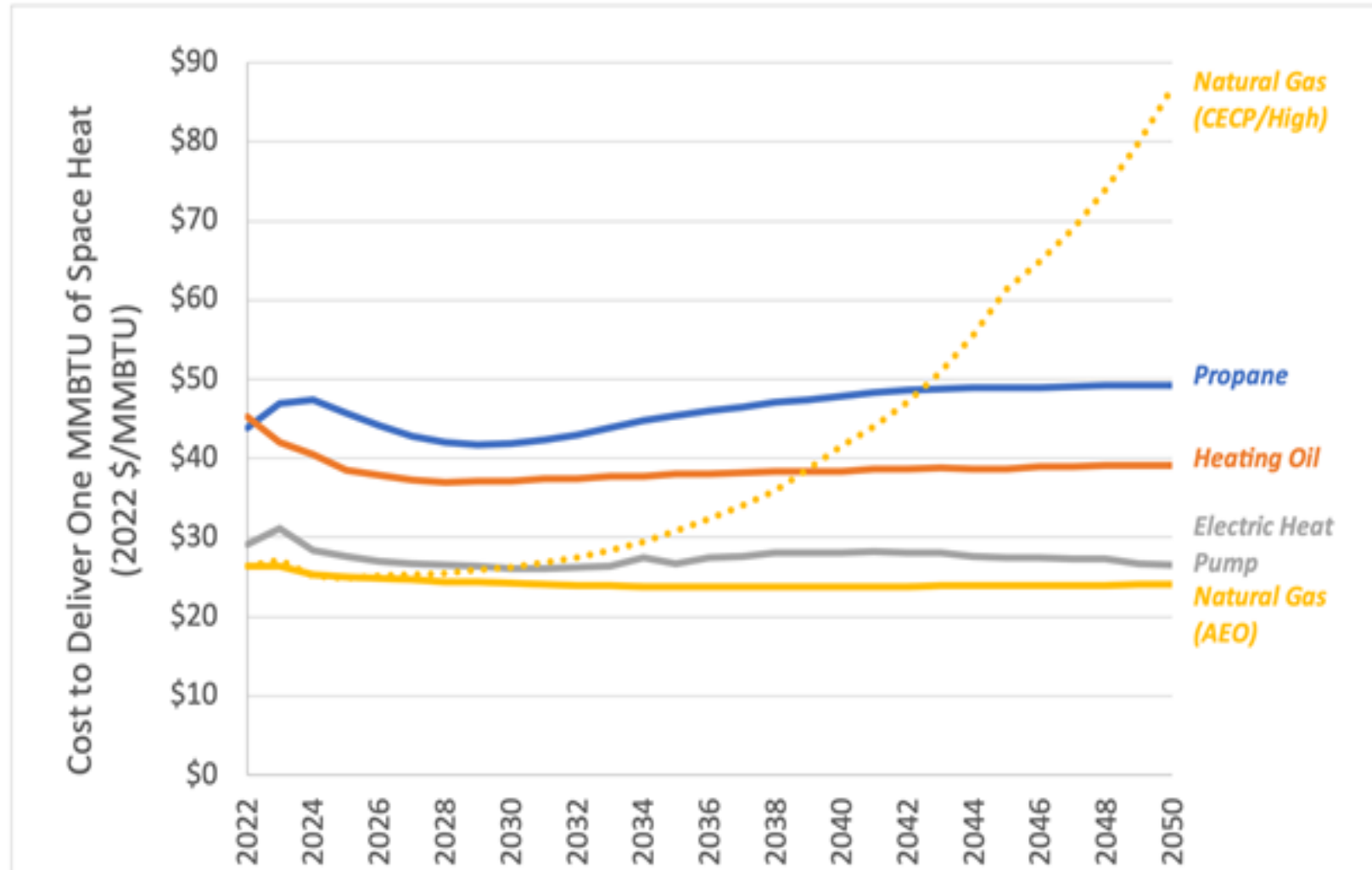


Building profile:

- 30,000 sq. ft. office building
- Natural gas use, annual:
 - 1,685 MMBtu
 - \$28,350
 - \$0.95 per sq. ft.
- ACP costs:
 - \$0 through 2034
 - Rises to \$0.70 per sq. ft. (\$20,900 total) per year
 - 2050 Cumulative: \$205,000

Energy Operating Costs for Heating

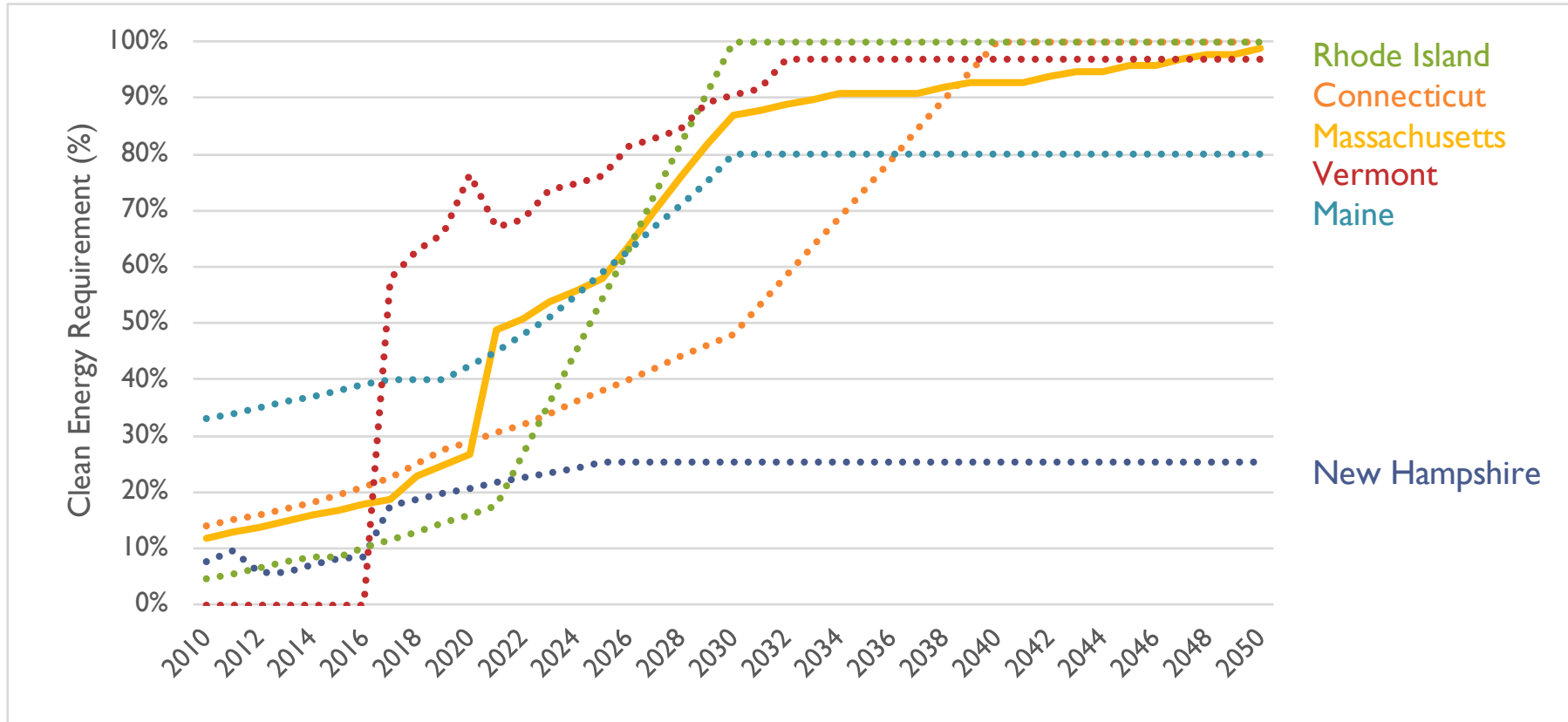
Figure 4. Residential delivered heat cost comparison, using AEO 2023-based fuel price projections



CECP = MA Clean Energy and Climate Plan
AEO = U.S. EIA Annual Energy Outlook

New England Clean Energy Regulations

Most other states in New England have similar requirements



Commonwealth of Massachusetts Department of Energy Resources. 2021. 225 CMR 15.00 Renewable Energy Portfolio Standard- Class II.

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Commonwealth of Massachusetts Department of Environmental Protection. 2022. Background Document on Proposed Amendments to: 310 CMR 7.75 Clean Energy Standard.

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Maine Public Utilities Commission. 2021. Annual Report on New Renewable Resource Portfolio Requirement. Report for 2019 Activity. Presented to the Joint Standing Committee on Energy, Utilities and Technology.

New Hampshire Public Utilities Commission. "Electric Renewable Portfolio Standard (RPS)." Available at: https://www.puc.nh.gov/Sustainable%20Energy/Renewable_Portfolio_Standard_Program.htm.

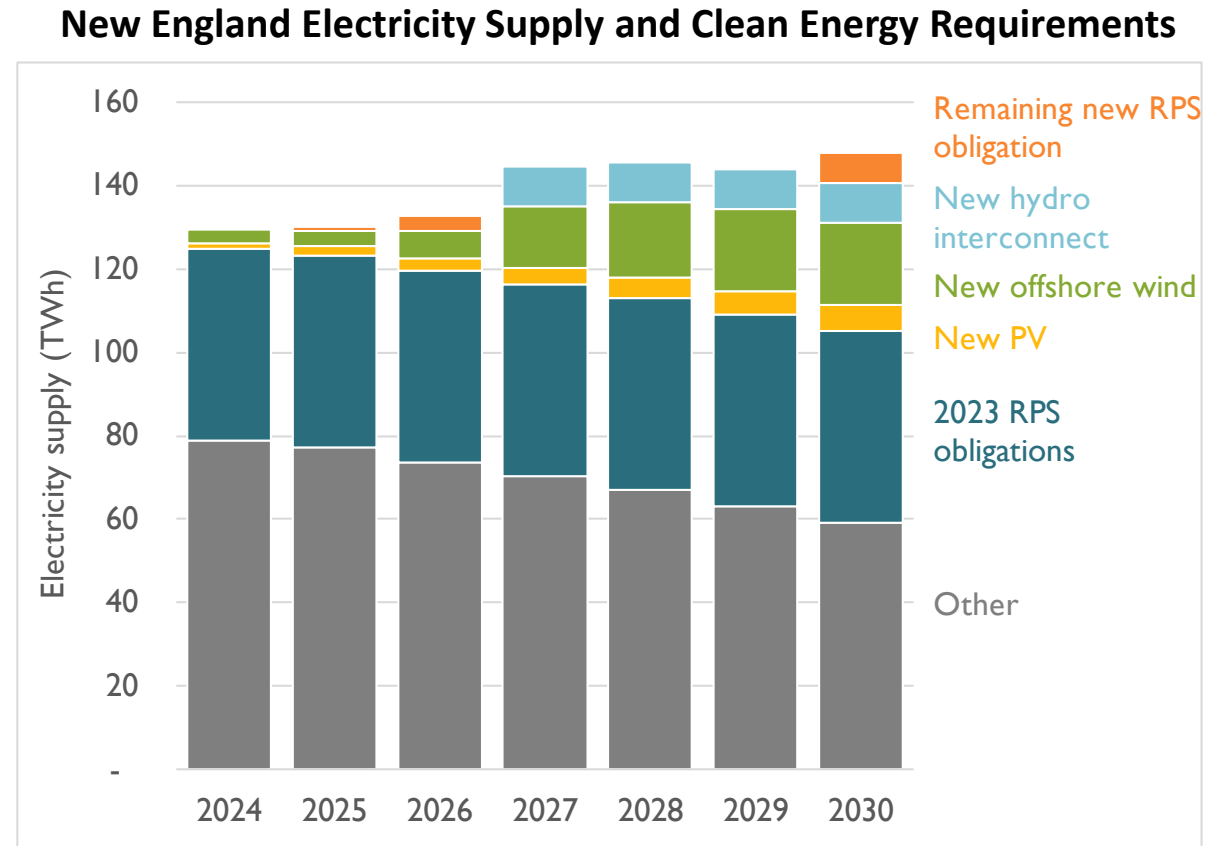
Rhode Island Public Utilities Commission. 2022. Rhode Island Renewable Energy Standard Annual Compliance Report for Compliance Year 2020.

Vermont Department of Public Service. 2021. 2021 Annual Energy Report. A summary of progress made toward the goals of Vermont's Comprehensive Energy Plan. Prepared for the Vermont General Assembly.

Vermont Department of Public Service. 2022. 2022 Annual Report on the Renewable Energy Standard.

New England Clean Energy Regulations

- In 2022, New England achieved greater than 55% clean energy supply
- New renewable projects are needed to meet state mandates by 2030
- Planned offshore wind, PV, and hydro interconnect projects will meet most of the requirements
- Remaining obligations not covered by planned projects range from 1% of load in 2025 to 5% in 2030, with excess production in some years
- Remaining obligations can be met in several ways
 - New renewable projects that are not yet planned
 - Renewable imports from adjacent grid regions
 - “Banked” renewable energy certificates
- Potential offshore wind and transmission project delays may pose a risk to meeting states’ obligations

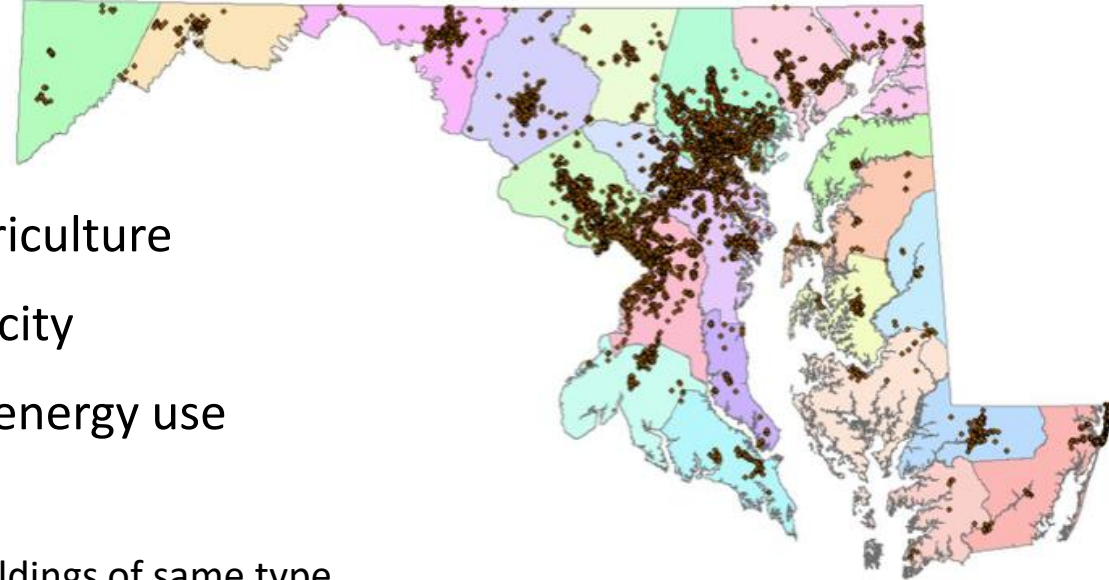


Planned Offshore Wind Projects

| Location | Name | Completion Date | Capacity (MW) | Current Status | Offtaker State |
|----------|---------------------------|-----------------|---------------|--------------------|-----------------------------|
| ME | New England Aqua Ventus I | 2024 | 12 | Permitting | ME |
| MA/RI | Revolution Wind | 2026 | 704 | Permitting | RI (400 MW) and CT (304 MW) |
| MA | Vineyard Wind 1 | 2024 | 800 | Under Construction | MA |
| MA | SouthCoast Wind 1a | 2028 | 804 | Permitting | MA |
| MA | SouthCoast Wind 1b | 2029 | 400 | Permitting | MA |
| MA | New England Wind I | 2027 | 800 | Permitting | MA |
| MA | New England Wind II | 2027 | 1232 | Permitting | MA |

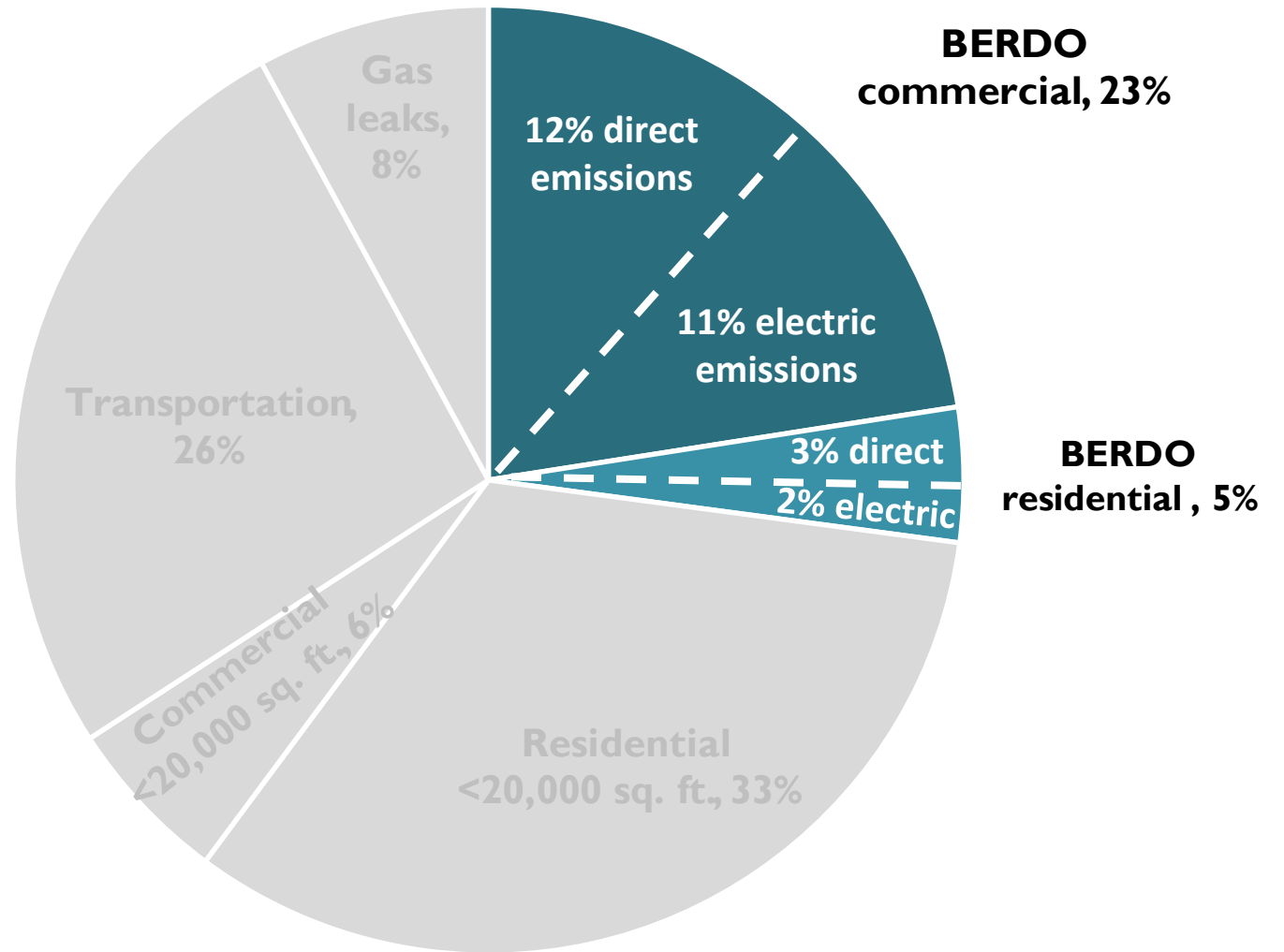
Maryland Building Energy Performance Standards

- Covers buildings $\geq 35,000$ sq. ft.
- Exempt buildings: historic, schools, manufacturing, agriculture
- Does not regulate indirect GHG emissions from electricity
- Regulates “direct greenhouse gas emissions” and site energy use
 - Net direct GHG emissions standards
 - 20% reduction by 2030 compared with 2025 average buildings of same type
 - 60% reduction by 2035 compared with 2025 average buildings of same type
 - Net-zero direct GHG emissions by 2040
 - Site energy use intensity (EUI) standards
 - Yet to be established, but will require straight line progress toward final 2040 EUI target
 - Intended to reduce GHG, peak load, and energy costs
 - Likely not necessary in Newton to reduce GHG (Maryland RPS caps out at 50 percent in 2030)



Why BERDO?

**Newton's GHG emissions:
City goal of carbon neutral by 2050**



Note: "Commercial" includes institutional and industrial buildings

Legal Authority

- Newton Law Department has reviewed
- This is new territory legally
- Boston BERDO may be challenged by building owners