Newton Building Energy Disclosure and Reporting Ordinance (BERDO)

Synapse Energy Economics, Inc.

Zoning and Planning Committee Hearing

September 23, 2024

Philip Eash-Gates, PE CEM

Agenda: Questions from Prior Hearings

Context	
Feasibility and Cost of Complying	• Will Newton require quick decarbonization like Boston and Cambridge? • When will owners need to reduce emissions? • How will BERDO affect energy costs? Is decarbonization affordable? • What financial resources are available? • Do case studies show that decarbonization is achievable?
Case Studies	
Technical Assistance and Support	• Does the City have adequate staffing? • What resources are available to help building owners comply?
Reporting Energy Data	• How challenging is it to use Energy Star Portfolio Manager? • Can building owners obtain tenant energy data? • Has reporting been challenging in Boston? How will Newton be different?
Impacts of BERDO on Newton	• What will BERDO cost taxpayers? • How will BERDO affect property values and Newton's tax base?

Context

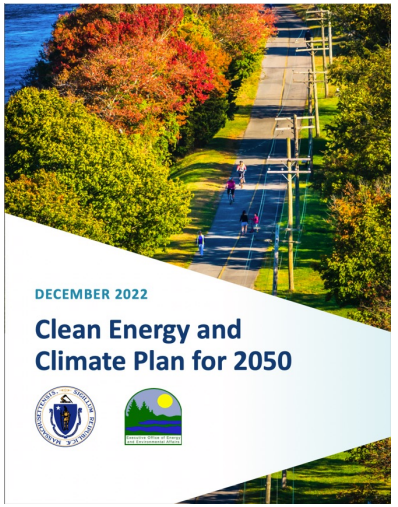
Building Performance Standards

- Leading policy tool available to local government for building decarbonization
  - Large impact, few regulated buildings, resilient to legal challenge
- 17 jurisdictions have adopted performance standards
- 35+ more have committed to adoption by 2026

STATUS OF BUILDING PERFORMANCE STANDARDS IN THE UNITED STATES

Sources: IMT, National BPS Coalition

Massachusetts Context



- Supportive environment for local decarbonization policies
- Tapestry of supply- and demand-side initiatives
  - Renewable Portfolio Standard and Clean Energy Standard
  - Proposed Clean Heat Standard
  - Mass Save program for energy efficiency and electrification
  - Federally funded programs through *Inflation Reduction Act*
- Net zero emissions in 2050 required under *Global Warming Solutions Act* (GWSA) and Clean Energy and Climate Plan (CECP)
- Newton BERDO efforts toward decarbonizing offers benefits:
  - Hedges against uncertainty in state planning to meet GWSA requirements
  - Phased decarbonization avoids early replacement, lowering costs
  - Reduces exposure to rising gas rates under state policy

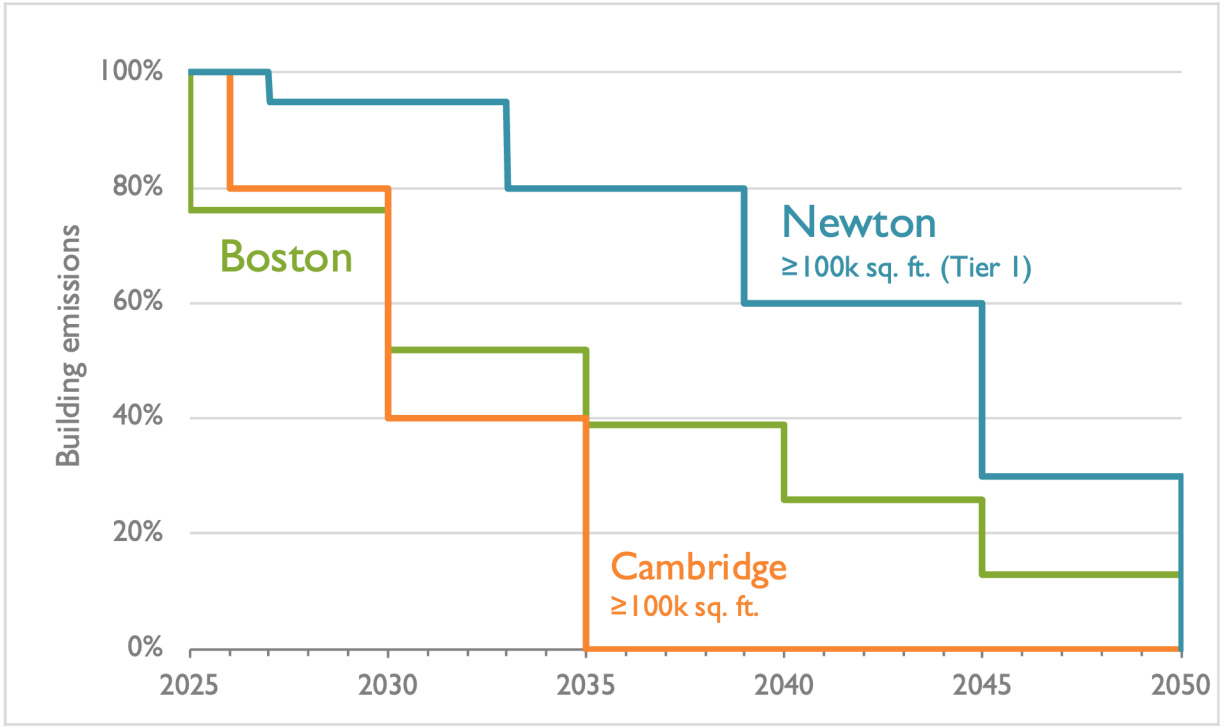
Feasibility and Cost of Complying

Pace of Decarbonization

Will Newton require quick decarbonization like Boston and Cambridge?

- Newton standards are aligned to capital planning cycles
- Reductions are comparatively later, less frequent, and more gradual

BUILDING PERFORMANCE STANDARD EMISSION LIMITS IN MASSACHUSETTS



Notes:

Boston and Cambridge include electricity emissions

Cambridge allows carbon offsets for buildings ≥100,000 sq. ft.

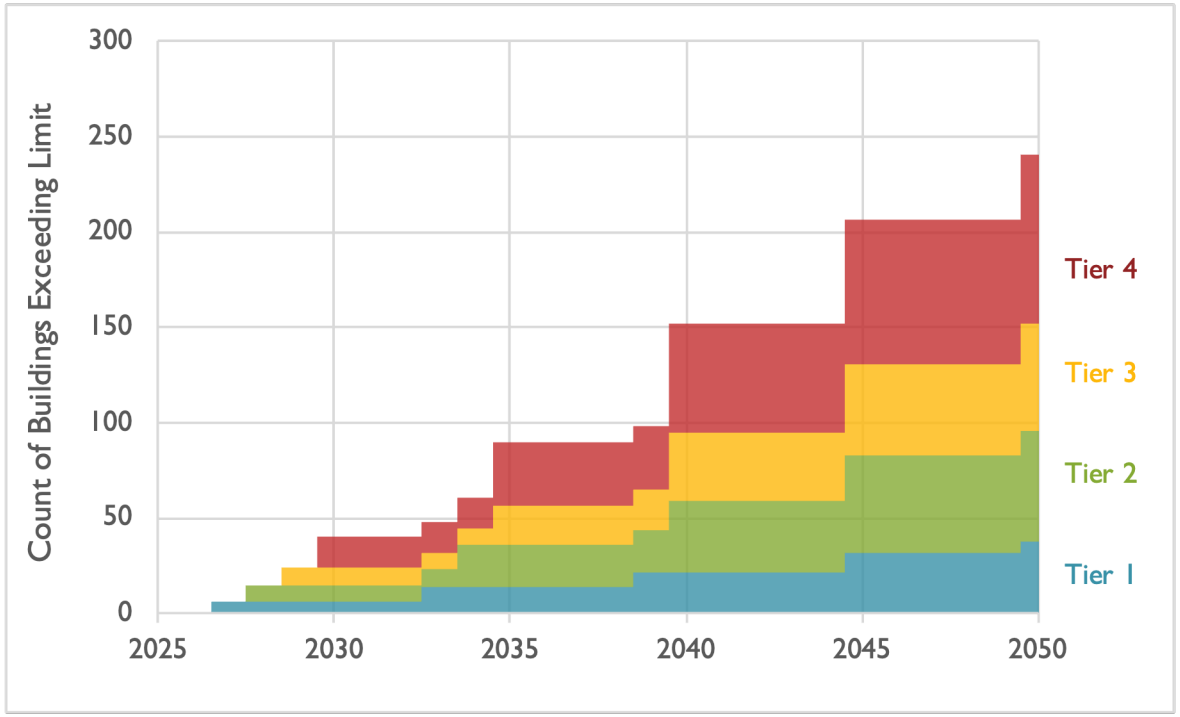
Newton and Cambridge have slower pace for buildings <100,000 sq. ft.

Pace of Decarbonization

When will owners need to reduce emissions?

- About 10 buildings impacted each year; 40 buildings by 2030
- Most buildings (67%) will comply until 2040
- All public and non-profit affordable housing buildings (nine total) comply until 2040

COUNT OF BUILDINGS OVER BERDO LIMITS (IN ABSENCE OF UPGRADES)



Notes:

Assumes Newton buildings have similar performance as Boston buildings of same type

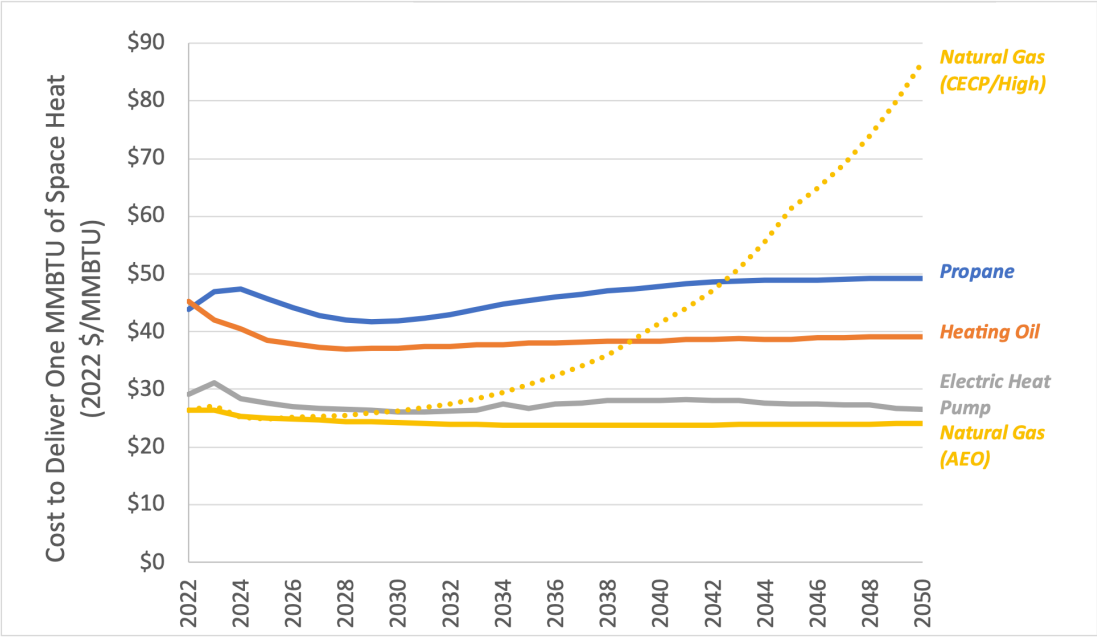
Does not total to 293 buildings because all-electric buildings will not need to make changes.

Cost of Complying: Energy

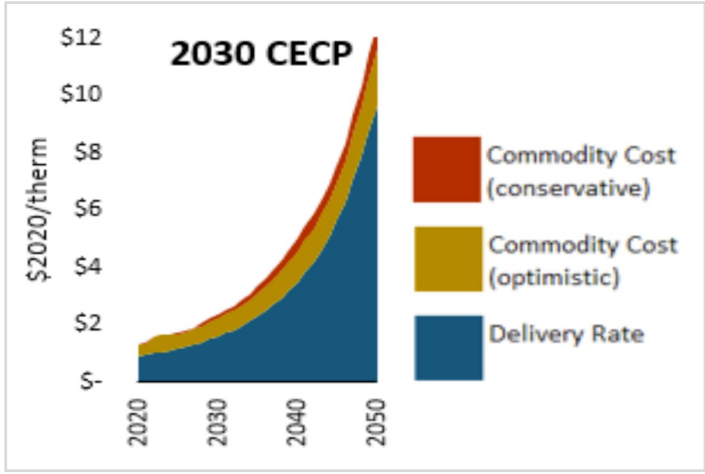
How will BERDO affect energy costs?

- Studies for MA DEP and MA DPU forecast heat pumps to be less expensive to operate than gas heating by 2030 under CECP
- Gas heating costs are expected to rise to 300%–700% of current costs by 2050
- BERDO reduces exposure to rising gas rates

MASSACHUSETTS SPACE HEATING COST FORECAST



MASSACHUSETTS NATURAL GAS COST FORECAST



Sources: Sustainable Energy Advantage and Synapse Energy Economics for MA DEP, 2023 (Link)

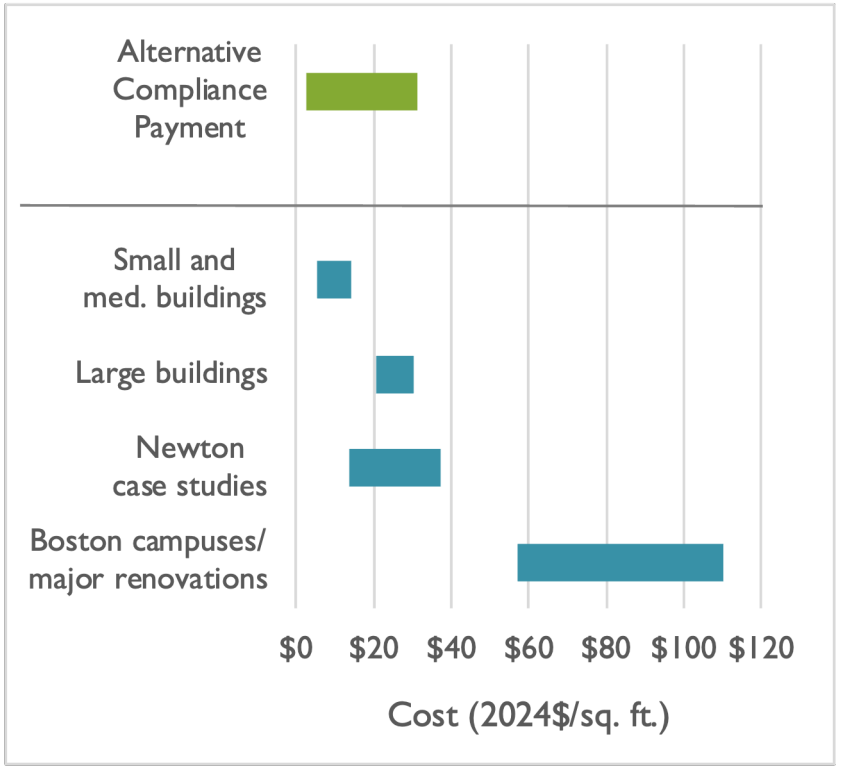
Energy+Environmental Economics and Scott Madden Management Consultants for MA DPU, 2022. (Link)

Cost of Complying: Capital Costs

Is decarbonization affordable?

- Synapse and BERDO Team evaluated completed projects, published literature, contractor quotes, and interviews with industry professionals
- Costs vary by building type and size
- Typical costs:
  - One-time: $5–35 per sq. ft. before incentives
  - Amortized: $0.40–$3.00 per sq. ft. annual (at 6% over 20-year equipment life)

BUILDING UPGRADE COSTS BEFORE INCENTIVES



Sources: Jones, B. 2021, Synapse 2024, City of Newton 2024, City of Boston 2024, Synapse 2024, various contractors

Cost of Complying: Capital Costs

Is decarbonization affordable?

- Amortized: $0.40–$3.00 per sq. ft. annual
- Compared to annual operating costs:
  -  **Commercial rent** for offices in Newton: $42 per sq. ft. (+4% costs)
  -  **Multifamily rent** in Newton: $2,810 per unit (+4% costs)
- Incentives will reduce net costs

Sources: National Association of Realtors 2024

Cost of Complying: Financial Support

What financial resources are available?

Combined incentives up to $20+ per sq. ft.

Low- and no-interest loans

- **Mass Save commercial incentives**: $9.00–$15.00 per sq. ft.
  - Heat pumps: $2,500–$4,500 per ton
  - Heat pump water heaters: $1,000–$2,200 per unit
  - Deep energy retrofits: $1 per sq. ft.
- **179D Federal tax deduction** for commercial retrofits: $0.50–$6.00 per sq. ft
  - Sliding scale for achieving 25–50% energy savings: $0.50–$1.00 per sq. ft.
  - **Plus** $2.50–$5.00 per sq. ft. for meeting prevailing wage and apprenticeship requirement
  - Capped at price of retrofit

mass save®
Savings through energy efficiency

Cost of Complying: Financial Support

What financial resources are available?

- **Low- and no-interest financing** for energy upgrades
- Property Assessed Clean Energy (PACE):
  - Low-interest loans to commercial and multifamily owners
  - Repaid through property taxes with terms up to 20 years
  - Available through MassDevelopment and DOER
  - Can reduce tax liability
- Massachusetts Community Climate Bank:
  - Loans for affordable housing
  - $70 million to date in seed funding
  - Available through MassHousing
- Eversource and National Grid:
  - 0%–2% interest loans up to $500,000
  - Terms up to 7 years
  - Incentives used to buy down interest rate

Combined incentives up to $20+ per sq. ft.

Low- and no-interest loans

nationalgrid

EVERSOURCE

Case Studies

Local Case Studies

Buildings in Newton

1.	181 Lexington Apartments	*Planning phase*
2.	Newton Early Childhood Program	*Complete*
3.	Auburndale Library	*Complete*
4.	First Unitarian Universalist Society in Newton	*Multiple phases complete*
5.	Chapman Construction and Design office	*Phase 1 complete*

Project costs

- Before incentives: $14 to $37 per sq. ft.
- After incentives: $10 to $32 per sq. ft.
- Incremental cost vs. fossil fuel equipment: –$4 to +$5 per sq. ft.

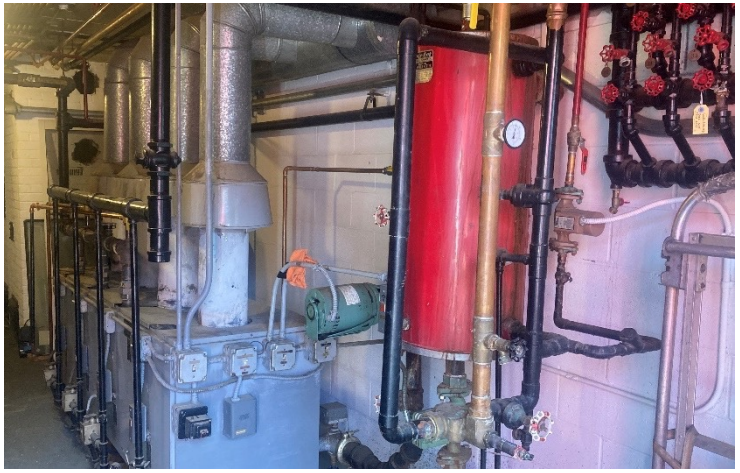
Energy savings

- Energy use: 53% to 76% MMBtu savings
- Cost: 41% cost decrease to 18% cost increase (due to rate increases; gas prices will increase)

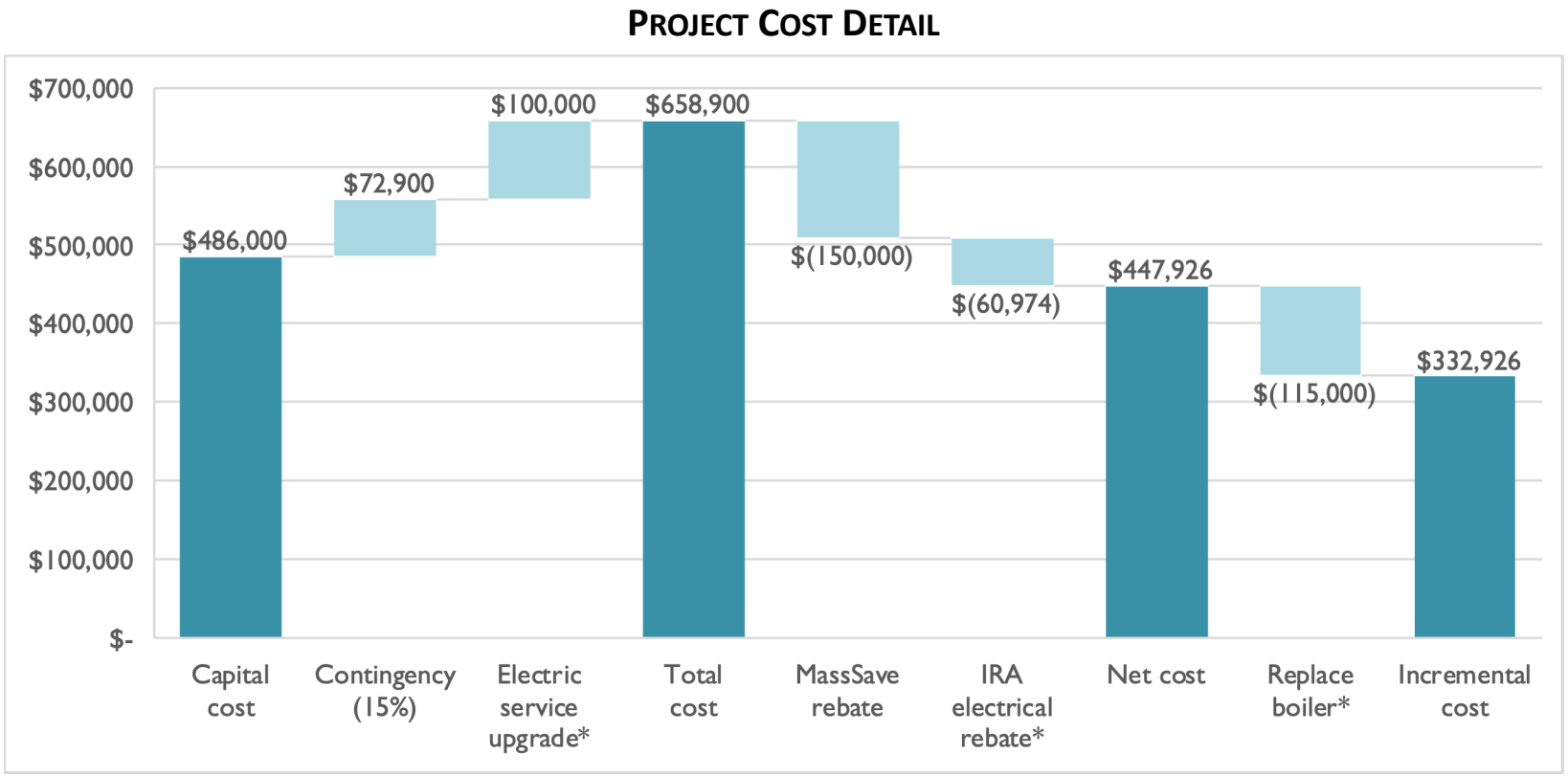
181 Lexington Street

- **Location:** Newton, MA
- **Sector:** Multifamily
- **Project size:** 24,570 sq. ft. (30 units)
- **Emission intensity:** 3.1 kgCO2e per sq. ft.
- Complies with BERDO until 2035
- **Project scope for full decarbonization:**
  - Replace gas boilers with central heat pump for space heat and domestic hot water
  - Electrical service upgrade
- **Project cost:**
  - Total: $660,000
  - Incremental: $330,000 ($11,000 per unit)
  - Monthly per-unit cost: $80, +3% rent (financed at 6% interest, 20 year)

181 LEXINGTON STREET WITH BOILER ROOM



181 Lexington Street



- Incentives expected to reduce project costs by 32%
- Firm contractor quotation and evaluation from Mass Save
- Estimated costs: electric service upgrade, IRA rebate, boiler cost

Newton Early Childhood Program

- **Location:** Newton, MA
- **Sector:** Education
- **Project size:** 42,000 sq. ft.
- **Project cost:** $1.5 million
- **Project completed FY2022**
  - Fully decarbonized, zero direct emissions
  - Replace central boilers with all-electric VRF heat pump (lowest lifecycle cost option)
  - New roof with continuous insulation
- **Project cost**
  - Total: $1,570,000 ($37 per sq. ft.)
  - Incremental: –$655,000
    Compared to $2.2 million boiler and heating distribution replacement

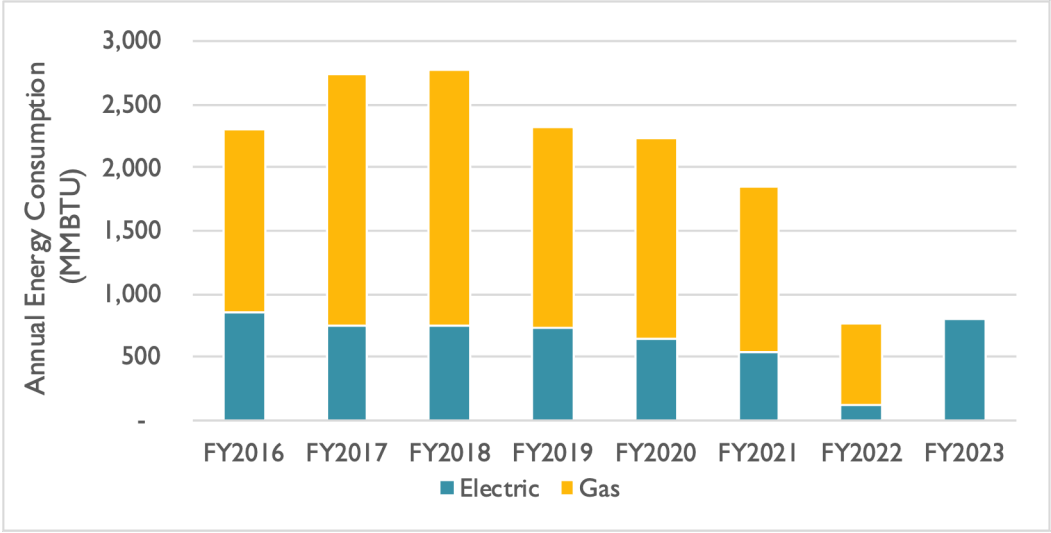
NECP WITH RETROFIT SCENARIO COSTS

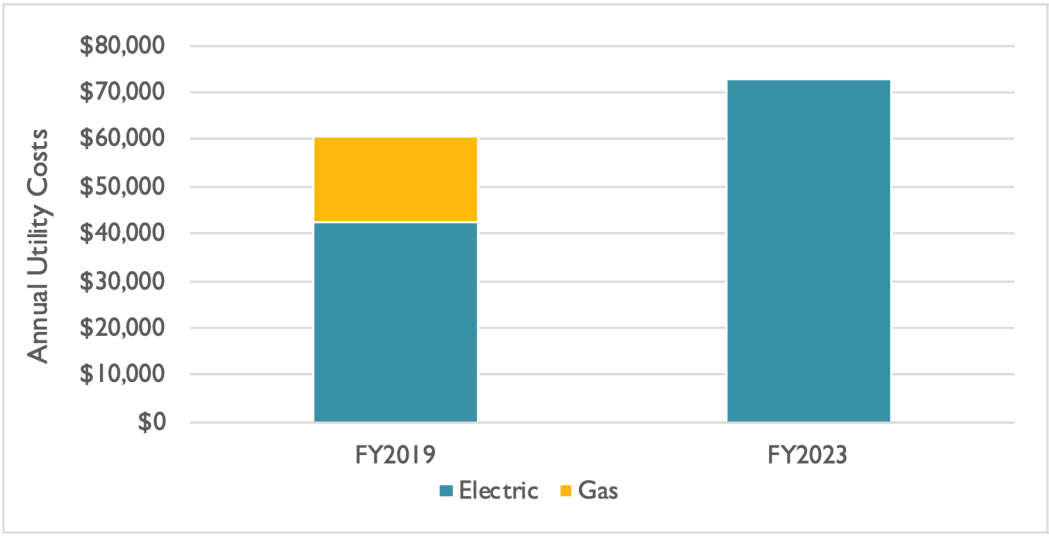
HVAC System Type	Capital Cost	Annual Electric Costs	Annual Gas Costs	Annual Maint. Costs	Total Annual Costs
Standard efficiency gas boilers	$2,005,000 (estimate)	$46,379	$26,731	$15,875	$88,985
High efficiency gas boiler	$2,225,000 (estimate)	$36,293	$18,867	$20,250	$75,410
All-electric VRF heat pumps	$1,570,000 (actual)	$42,924	$0	$23,300	$66,225

Newton Early Childhood Program

- Energy use reduced 65% (actual)
- Energy costs rose 18%
- Energy costs increased due to 55% electricity price increase
  - 2019: $0.20/kWh
  - 2023: $0.31/kWh
  - Energy costs would have been higher in 2023 with boiler

NECP UTILITY DATA





Auburndale Library

- **Location:** Newton, MA
- **Project size:** 5,484 sq. ft.
- **Project cost:** $76,000
- Historic building with architectural features
- **Project completed FY2020**
  - Fully decarbonized, zero direct emissions
  - Air-source heat pumps
  - Attic insulation and air sealing
- **Project cost**
  - Total: $76,000 ($14 per sq. ft.)
  - Would have been eligible for $22,000 in rebates under the current program

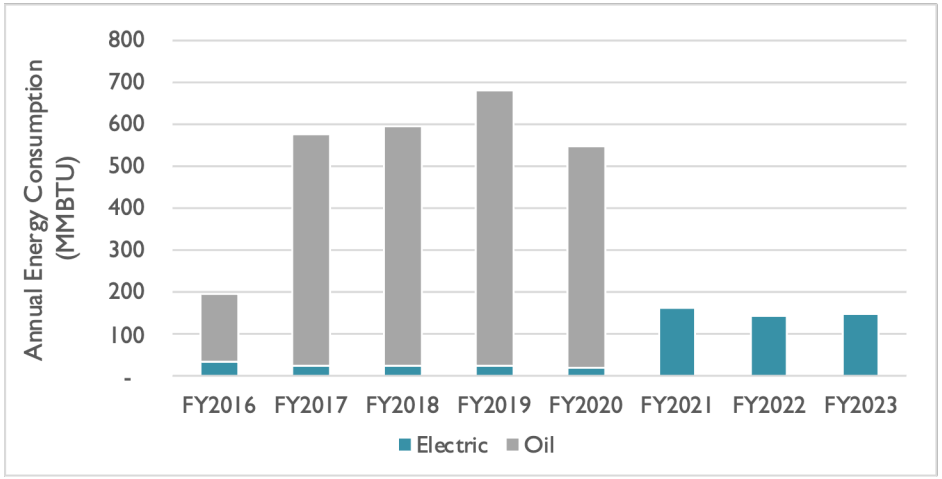
AUBURNDALE LIBRARY WITH RETROFIT COSTS

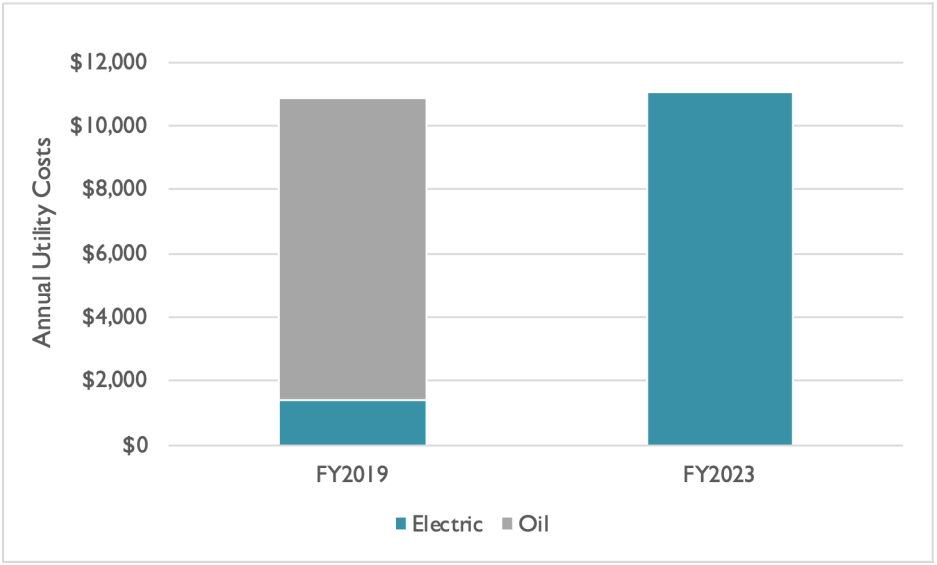
Upgrade	Upgrade Cost	Cost per sq. ft.
Insulation and air sealing	$11,610	$2
Air-source heat pumps	$64,800	$13
Total cost	$76,410	$14

Auburndale Library

- Energy use reduced 76% (actual)
- Energy costs unchanged despite 25% electricity price increase
  - 2019: $0.20/kWh
  - 2023: $0.25/kWh
  - Energy costs would have been higher in 2023 with boiler

AUBURNDALE LIBRARY UTILITY DATA





First Unitarian Universalist Society in Newton

- **Location:** Newton, MA
- **Project size:** 30,240 sq. ft.
- **Emission intensity:** 2.0 kgCO2e per sq. ft.
- Complies with BERDO until 2045
- **Phased decarbonization since late 1990s**
  - Tracking energy in Portfolio Manager
  - Staged heating replacement
    - Steam with hot water
    - Failing AC condensers with heat pumps
  - Partitioned HVAC into 19 zones
  - Temperature setback in vacant rooms
  - Remote monitoring: equipment and energy
- Example of non-profit house of worship voluntarily decarbonizing over time

UNITARIAN UNIVERSALIST BUILDING

Keys to success

- Expertise and commitment from members
- Long-term planning
- Adaptation over time
- Efficiency plus electrification

Chapman Construction and Design HQ

- **Location**: Newton, MA
- **Building type**: Office and retail
- **Project size**: 19,000 sq. ft.
- **Phase 1 completed 2010 (LEED Platinum)**
  - Solar PV, 47 kW
  - Solar thermal domestic hot water
  - Envelope: air sealing, roof insulation, wall insulation, window film
  - LED lighting with daylighting
- **Project cost:**
  - $230,000 ($12 per sq. ft.)
  - $130,000 grant from Massachusetts Technology Council
- **Energy savings:** $20,000 per year, 5-year simple payback

CHAPMAN CONSTRUCTION AND DESIGN BUILDING

Phase 2 plan, 2027

- Full decarbonization
- Further improvements to building envelope
- VRF heat pump
- Energy recovery ventilation
- Expansion of solar PV array

Technical Assistance and Support

Comparison to Boston Resources

Does the City have adequate staffing to help building owners comply?

- Relative to the number of buildings, Newton has greater staffing than Boston
- Newton reporting is simpler: no water, no district steam, no grid emissions, no tracking renewables
- Newton emission requirements phase-in over 4 years

	Boston BERDO	Newton BERDO (with residential)
Buildings	5,717*	293 (412)
Owners	3,136	179 (261)
Staff	9 FTE 635 buildings per FTE 348 owners per FTE	1 FTE 293 (412) buildings per FTE 179 (261) owners per FTE
Annual Consulting Budget	$500,000 $87 per building	$165,000 $563 ($400) per building

**Note: Boston regulates at the parcel-level, so the number of buildings is greater than shown*

City Assistance for Building Owners

What resources are available to help building owners comply?

- City will offer public trainings and one-on-one assistance
  - Use of ENERGY STAR Portfolio Manager
  - Explanation of how to obtain energy use data
  - Developing a BERDO compliance plan
  - Flexibility measure options: Building Portfolios, Individual Compliance Schedules, Hardship Plans
- City will host public seminars
  - Manufacturers and vendors: on technology solutions
  - Utilities: on available assistance and how to access it (technical assistance, rebates and incentives, financing options, aggregated energy use data)
- Newton BERDO website: resource clearinghouse with detailed FAQ

State Assistance for Building Owners

What resources are available to help building owners comply?

- MassCEC Building Performance Exchange for large building decarbonization
  - $4 million in state funding; pursuing $2 million in federal funds
  - Information and technical assistance to help comply with BERDO-like policies throughout Massachusetts
    - Centralized information on state policies, initiatives, and programs
    - Clearinghouse for financing, incentives, and qualified building professional registry
    - New offerings: tools, guidebooks, case studies, trainings, events, and seminars
  - Early rollout for communities with BERDO policies expected 2025/2026
- MassCEC Building Electrification and Transformation Accelerator (BETA)
  - Portfolio of resources to help commercial and multifamily owners electrify
  - No cost, in-depth audits to develop decarbonization plan (pilot stage)

MASSACHUSETTS CLEAN ENERGY CENTER

State Assistance for Building Owners

What resources are available to help building owners comply?

Large Building Energy Reporting (LBER) program

- Requires utilities to report energy use for large buildings
- DOER consultant assembling energy use and building information
- First LBER reports issued October 2025, but utilities can request extensions
- Key differences compared to BERDO
  - Does not require emissions reductions
  - Includes electricity emissions
  - Requires utilities to report natural gas and electricity, not building owners
- BERDO Team is monitoring LBER closely to determine if it is useful for BERDO
- BERDO ordinance language allows City to incorporate use of LBER via regulations
  "Owner…shall accurately report to the BERDO Administrator, ***via the Portfolio Manager or as required by the Regulations****"*
- City submitting comments to DOER on draft regulations to align with BERDO

Utility Assistance for Building Owners

What resources are available to help building owners comply?

- Mass Save 3-year plan (2025-2027)
  - Funded at $5 billion, including $3.5 billion for incentives
  - **$437 million for multifamily and commercial customers of Eversource and National Grid**
  - Install over **115,000 heat pumps**
  - Reduce GHG emissions by **1.0 million metric tons CO_2e**
  - Incentives for **natural gas equipment phased out** by law (more available for electrification)
  - Statewide customer call center
  - Equity: Main Streets program for downtowns, schools, **$1 billion income-based incentives**
- Rebates and Incentives: insulation, air sealing, HVAC controls, heat pump water heaters, heat pump space heating
- **Low- or no-cost financing programs**
- **Free scoping and technical assistance studies** to help owners decarbonize buildings
  - Comprehensive building assessment, portfolio prioritization, decarbonization roadmap, existing building commissioning, and more

Reporting Energy Data

Setting up Portfolio Manager

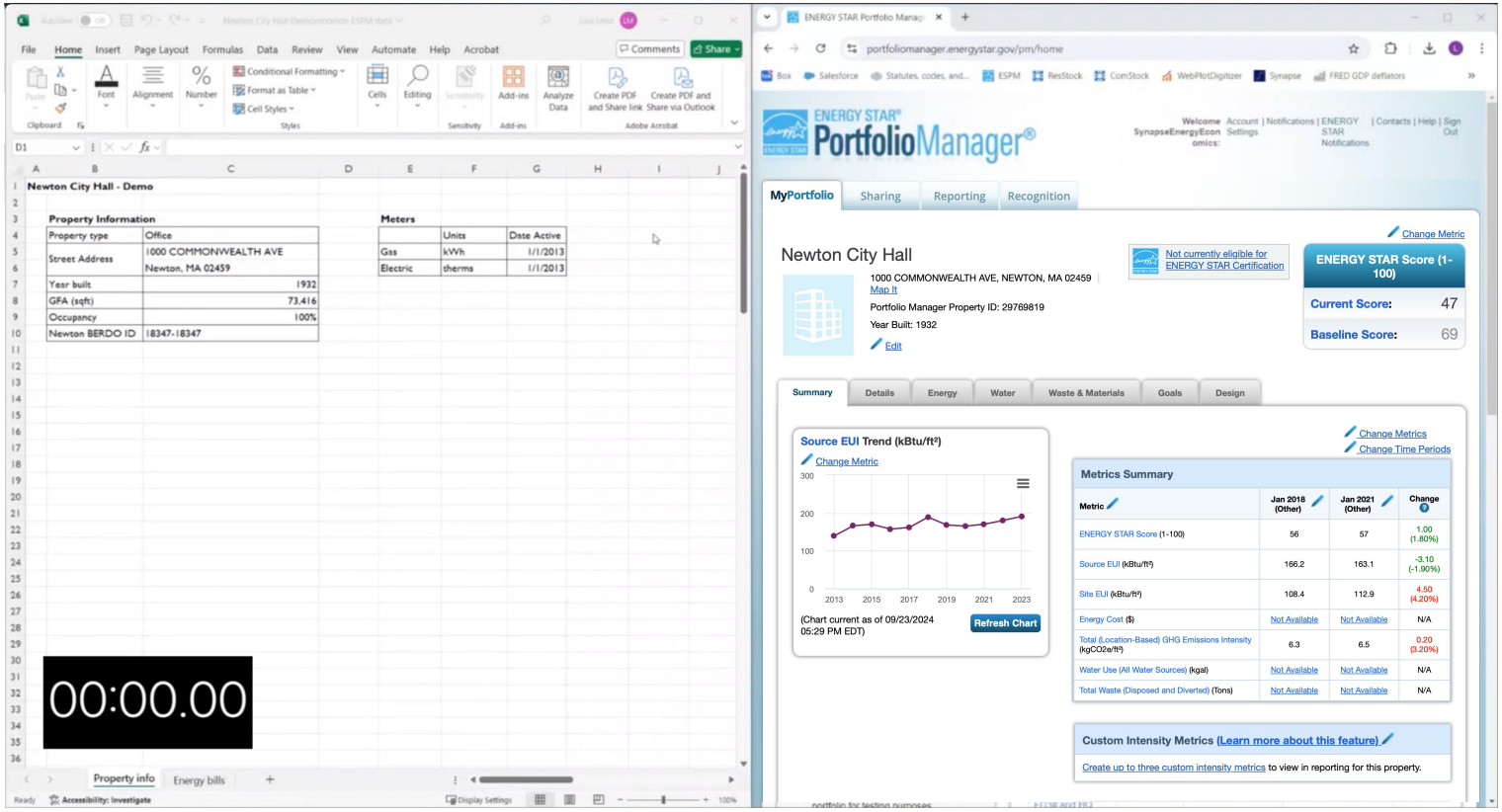
How challenging is it to use Energy Star Portfolio Manager?

- Free web-based tool, publicly available since 2000, already used for 25% of commercial building stock
- Extensive training materials, including how-to guides
- Steps:
  1. Create account: https://portfoliomanager.energystar.gov/pm/signup
  2. Obtain energy bills
     - **Gas and electric**: Bills for prior year (January bill includes 12 months prior)
     - **Oil and propane**: Delivery receipts for prior year
     - **Tenant data**: Available through utility portal and LBER reports; City will help
  3. Identify building size (sq. ft.) and ID from the list on the City of Newton website: https://newtonma.gov/newtonBERDO
  4. Enter building information and energy data into Portfolio Manager

Setting up Portfolio Manager

How challenging is it to use Energy Star Portfolio Manager?

- Junior staffer learned Portfolio Manager and reported 30 City buildings in 15 hours
- Demo video: 2 minutes to enter Newton City Hall using collected data



Setting up Portfolio Manager

Has reporting been challenging in Boston? How will Newton be different?

- Boston works with owners to resolve issues and has had nearly complete reporting (only 3.8% of 2022 reports are pending revisions)
- Newton reporting is simpler
  - Fewer utilities: no water or district steam reporting
  - Electricity emissions excluded: no grid emissions, no solar metering, no tracking renewables, no changing emission factors
  - Single platform: streamlined reporting (Boston and Cambridge uses two)

ENERGY STAR® Portfolio Manager®

Environment Department

BERDO REPORTING FORM

Welcome to BERDO Reporting!

This platform is used to submit additional information for BERDO not collected through Energy Star Portfolio Manager.

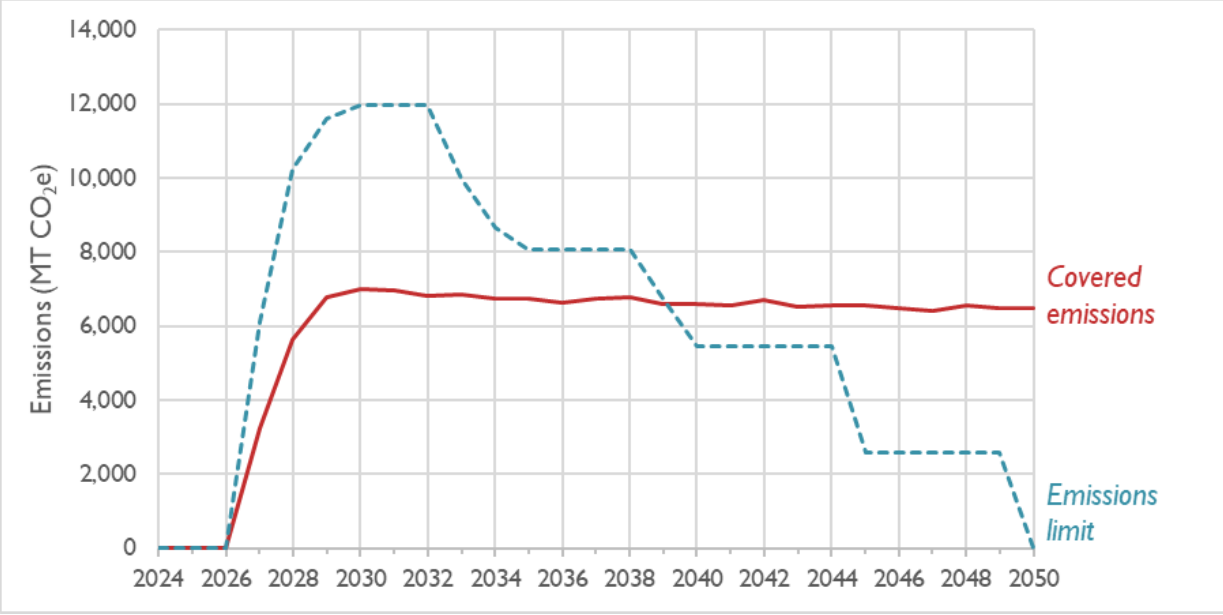
Impacts of BERDO on Newton

BERDO Administration Cost

What will BERDO cost taxpayers?

- City of Newton will hire 1 full-time personnel to administer BERDO
- City of Newton has an annual consultant budget of $165,000
- Municipal facilities will comply with BERDO until 2040 → no cost
- Total annual costs: up to $290,000 per year

MUNICIPAL FACILITY EMISSIONS COMPARED TO BERDO LIMIT

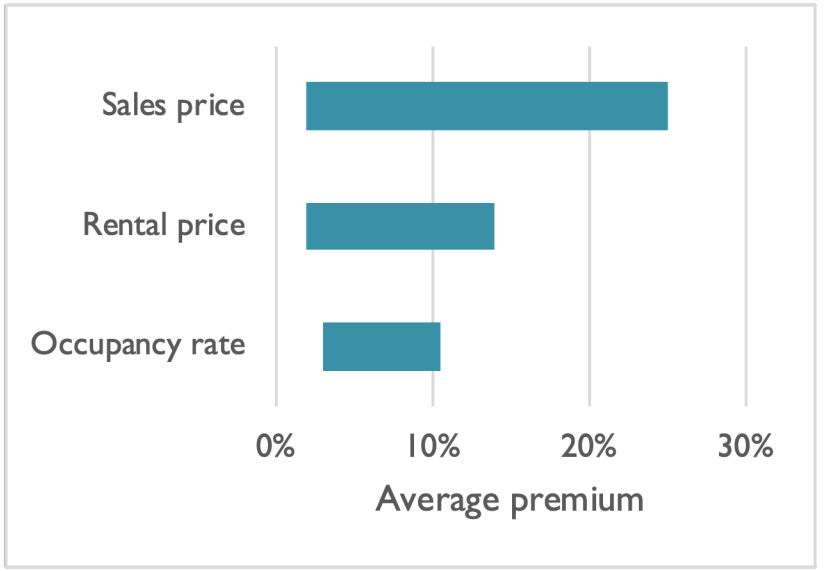


Economic Competitiveness

How will BERDO affect property values and Newton's tax base?

- Stakeholders question if BERDO will hurt Newton's economic competitiveness
- Seven peer-reviewed studies show high-performing buildings garner market premiums
  - Average sale price increase: 2–25%
  - Average rental price increase: 2–14%
  - Average occupancy rate increase: 3–11%

ADDED VALUE OF ENERGY STAR-LABELED COMMERCIAL BUILDINGS IN THE UNITED STATES



Sources (research assembled by IMT): Devine and Kok 2015, Wiley et al. 2010, Fuerst and McAllister 2009/2011, Jackson 2009, Pivo and Fisher 2010, Kok et al. 2010

Thank you!

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