Why BERDO and why it should include large residential buildings now

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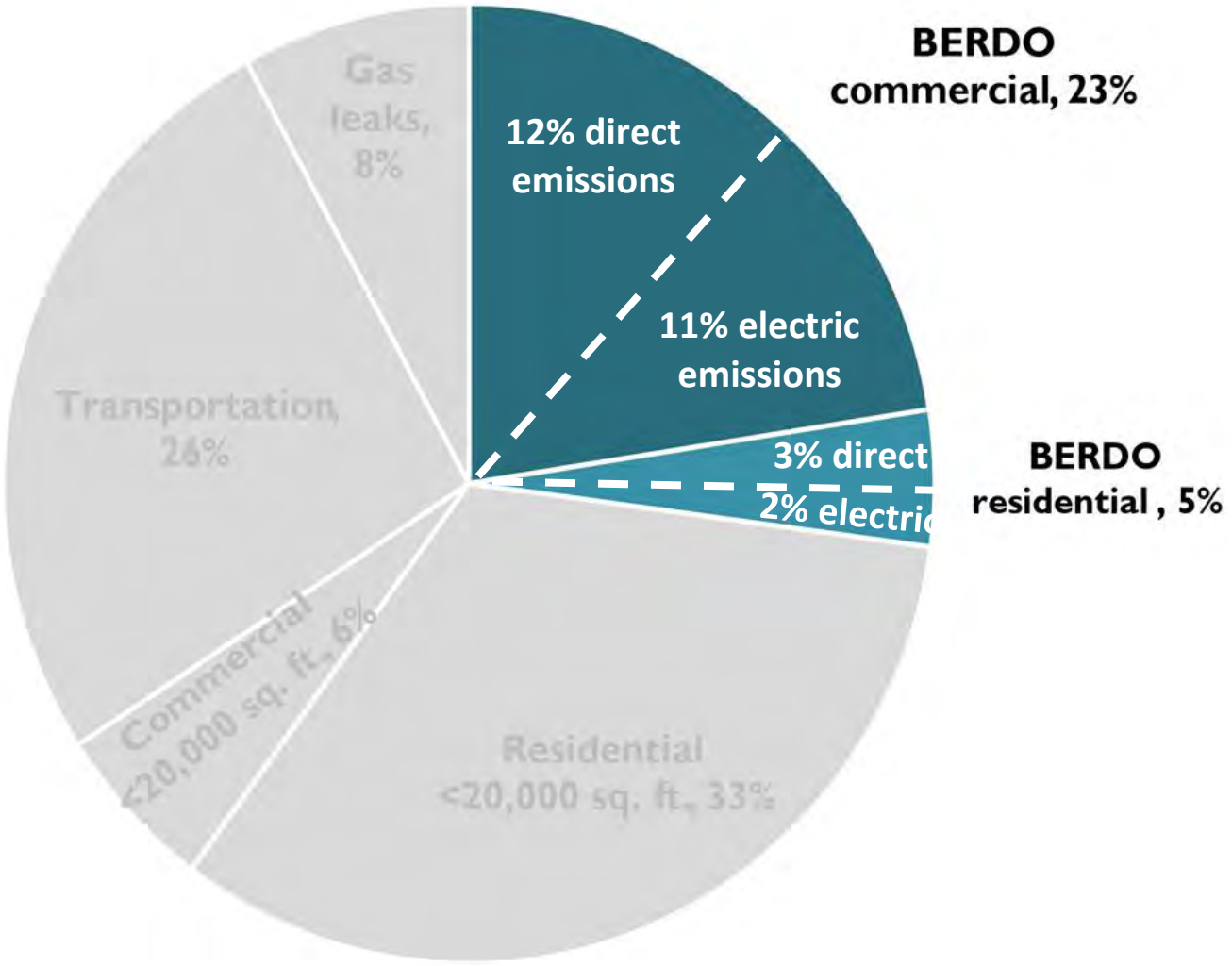
Why BERDO?

Commercial ≥ 20,000 sq. ft. GFA accounts for 23% of Newton's emissions

Residential ≥ 20,000 sq. ft. GFA accounts for an additional 5% of Newton's emissions

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



Note: "Commercial" includes institutional and industrial buildings

Residential Buildings

Tier	Description	Count of Buildings	Number of Owners	Total GFA (sq. ft.)	Emissions (tons CO_2e)	Emissions (% 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%**

Residential BERDO

- The City proposes to return to the City Council in April 2025 and modify the BERDO ordinance to add residential buildings ≥ 20,000 sq. ft. GFA. Residential buildings included are limited to centrally heated apartment buildings and condominiums.
- The City is not proposing to delay residential implementation, only when they would be part of the Ordinance. BERDO's residential buildings fall into in Tier 3 which begins in 2029 and Tier 5 which begins 2031.
- The Cambridge City Council removed residential from the emissions requirement last June 2023 largely because of condominium owner opposition.

The City's claimed information needs for including residential bldgs. in BERDO

- Understanding the cost impact on market price housing costs.
- Understanding the cost impact on affordable housing.
- How to deal with cost impacts on housing.
- Identifying contacts for condo associations.
- Identifying centrally heated condo buildings.
- Identifying availability and cost of new electrification technologies.
- Identifying utility incentives for technologies.

Those information needs for including residential bldgs. remain whether they are included in the current ordinance or in an amended ordinance a year from now. The City isn't proposing to delay the Residential implementation schedule.

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.

Non-Newton resources

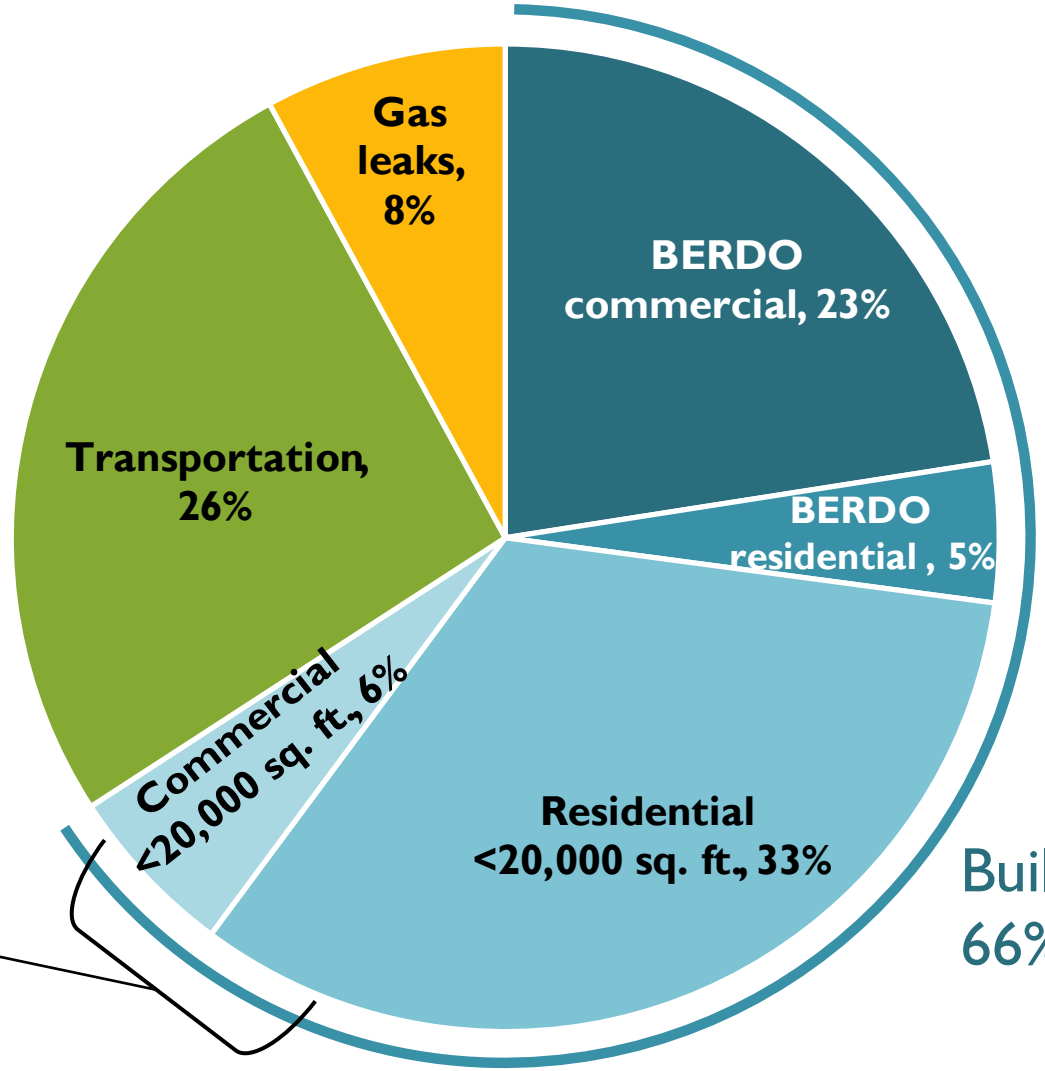
- Boston's Retrofit Resource Hub
- Built Environment
- USDOE Better Buildings Toolkit
- RMI
- UK Green Building Council

Bottom Line

- Delaying the inclusion of large residential buildings doesn't help anyone
  - The technologies for the large residential buildings are similar, if not the same, as those for non-residential buildings
  - Analysis Paralysis - It is impossible to anticipate all of the issues that might arise from implementing BERDO for all large buildings
  - In the meantime, the environmental impacts of fossil fuel use continue to accumulate.

BERDO is a first step to greening our built environment.

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



Smaller commercial and residential 39% of total

Building emissions: 66% of total