2023-24 Urban Research Grant
Claire Wigglesworth

"The Environmental Impact of Housing, Transit, and Energy Policy in Cambridge, Massachusetts"

A Holistic Evaluation of Cambridge's Net-Zero Action Plan

Abstract

In 2015, the City of Cambridge implemented the Net-Zero Action Plan to establish the goal of reaching net-zero greenhouse gas emissions in all sectors by 2050. This research project examines the potential impact of three recent policies– the Cycling Safety Ordinance, the Building Energy Use Disclosure Ordinance, and the Affordable Housing Overlay– on citywide greenhouse gas emissions. Over the past two decades, the construction of bike lanes is estimated to have reduced transportation emissions in Cambridge by 10%. This suggests that the Cycling Safety Ordinance's plan to build 25 miles of bike lanes within the next 5 years may influence commuter mode shift to bikes, thereby reducing the city's transportation footprint. The Building Energy Use Disclosure Ordinance mandates energy reporting and emissions reductions for large commercial buildings and is projected to reduce emissions by 93% in regulated buildings. However, concessions made to secure policy passage, such as reliance on carbon offsets and the exclusion of residential buildings from emissions reductions requirements, may minimize its potential impact. The Affordable Housing Overlay increases housing affordability by upzoning Cambridge's squares and main streets. In addition to social and economic benefits, upzoning has the potential to decrease household emissions. Multi-family housing tends to have lower energy consumption and transportation emissions than single-family housing (the difference is largest for suburban or rural areas). Finally, this research project discusses the reasons for community opposition to municipal policies, underscoring the importance of diverse stakeholder input and coordination. Overall, the interplay of these three policies highlights the need for cities to consider a range of housing, transit, and energy policies to achieve net-zero greenhouse gas emissions.

Introduction

As the world becomes increasingly urbanized, cities are key instruments for tackling climate change. The World Bank estimates that over half of the world lives in urban areas, expected to grow to 70% by 2050.[1] Cities account for about 70% of global greenhouse gas emissions.[2] However, residential and transportation emissions tend to be lower in cities than less urban areas. Shared heating and cooling in urban homes lower emissions from residential energy use, with attached walls and smaller volumes/floor areas.[3] Because of their density, cities also make walking, biking, or riding public transit viable options for transportation.[4] This decreases reliance on light-duty vehicles,[5] accounting for 58% of transportation emissions in the United States.[6]

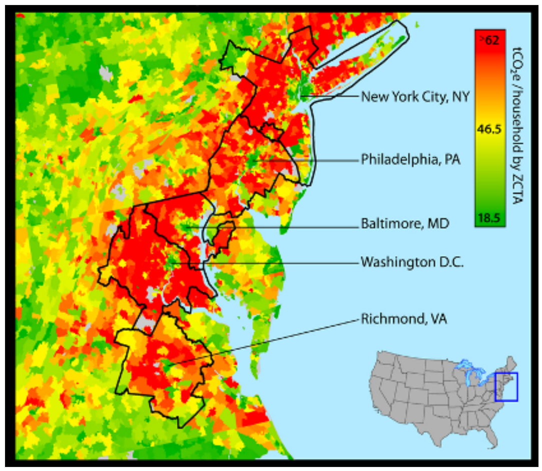


***Figure 1**. U.C. Berkeley's Cool Climate research group illustrates the relationship between density (urban v. rural) and carbon footprint. Denser areas in urban centers on the east coast have lower household emissions (residential and transportation) than less denses suburban zones.*[7]

In recent years, federal environmental policy has shifted focus to reducing greenhouse gas emissions– "decarbonization" -- as the main pathway to mitigate climate change. In 2021, the Biden Administration established the goal of achieving net-zero greenhouse gas emissions across all sectors by 2050. This entails a 25% reduction in emissions from 2005 levels by 2025,

[1] The World Bank, "Urban Development Overview." 2023.
[2] Lwasa, S. et al. "Urban Systems and other Settlements." *Intergovernmental Panel on Climate Change,* 2022, page 87.
[3] Timmons et al., "Location matters: Population density and carbon emissions from residential building energy use in the United States." *Energy Research and Social Science,* Vol 22. December 2016.
[4] William Meyer, "The Environmental Advantage of Cities: Countering Commonsense Antiurbanism". *MIT.* 2013.
[5] According to the National Household Transit Survey, Americans living in rural areas drive 70% (10 miles) more than those living in cities. Source: U.S. Federal Highway Administration, "National Household Travel Survey." 2022.
[6] EPA, "Fast Facts on Transportation Greenhouse Gas Emissions". 2021.
[7] Christopher M. Jones and Daniel M. Kammen. "Spatial Distribution of U.S. Household Carbon Footprints Reveals Suburbanization Undermines Greenhouse Gas Benefits of Urban Population Density." *Environ. Sci. Technol*., 2013.

and a 50% reduction by 2030.8 Congress also passed the Inflation Reduction Act, providing tax credits for clean energy, energy efficiency retrofits in homes, electric vehicles9, and grants for reducing embodied carbon in construction.10 Additionally, the Bipartisan Infrastructure Law appropriates $6.4B to a Carbon Reduction Program, aimed at reducing emissions from transportation.11 These federal statutes are important to spur top-down change for regional governments to decarbonize.

Motivated by federal action, over 600 local governments have drafted climate action plans to reduce emissions in cities.12 Climate action plans often set ambitious net-zero targets but lack effectiveness. Evaluating climate action plans in 50-largest cities in the United States, researchers at Brookings found that most cities' decarbonization strategies were constrained by funding: energy efficiency retrofits in older buildings and modern grids to distribute clean electricity are expensive.13 This research paper argues that a third factor significantly impacts cities' abilities to decarbonize: neighborhood opposition to change.

Climate action plans typically address emissions from the highest contributing sectors: buildings, transportation, and electricity.14 This paper focuses on three policies that impact decarbonization in housing, transportation, and energy for the City of Cambridge. Although Cambridge is a progressive city, neighborhood and institutional actors attempt to hinder the development of environmental policy. This paper explores the opportunities and limits of the Cycling Safety Ordinance, Building Energy Use Disclosure Ordinance, and Affordable Housing Overlay, balancing stakeholder input with holistic efforts to decarbonize.

[8] US Dept. of State and Executive Office of the President. "The Long-term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050". *The White House.* November 2021, page 3.
[9] US Dept. of Treasury. "FACT SHEET: How the Inflation Reduction Act's Tax Incentives Are Ensuring All Americans Benefit from the Growth of the Clean Energy Economy." 20 October 2023.
[10] EPA. "Inflation Reduction Act Programs to Fight Climate Change by Reducing Embodied Greenhouse Gas Emissions." 2023.
[11] US Dept. of Transportation, "Carbon Reduction Program." 2021.
[12] Markolf, Sam et al. "Pledges and progress: Steps towards greenhouse gas reductions in the 100 largest cities across the United States." *Brookings.* October 2020.
[13] Kane et al., "Not According to Plan: Exploring Gaps in City Climate Planning and the Need for Regional Action." *Brookings. September* 2022.
[14] Kane et al., "Not According to Plan: Exploring Gaps in City Climate Planning and the Need for Regional Action." *Brookings. September* 2022.

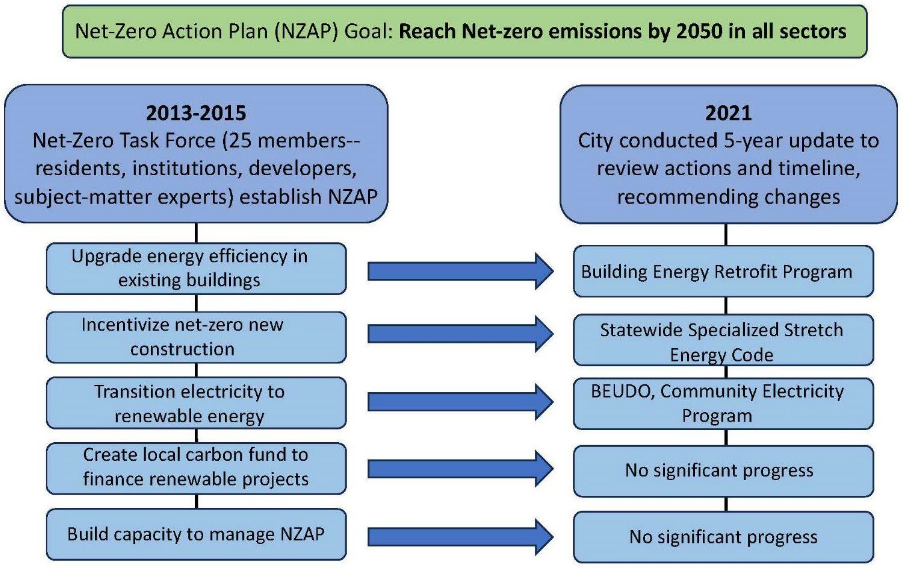


Figure 2. *Summarized table of changes to Cambridge's Net-Zero Action Plan, comparing 2015 and 2021 versions.*

Cycling Safety Ordinance (CSO)

The CSO was enacted in 2020 and began an ambitious 5-year plan to build 26 miles of protected bike lanes throughout the city.15 Protected bike lanes are different from standard bike lanes on roads because they include a physical separation from the bike lane to the street, such as a flex post or concrete barrier. The goal of the CSO is to provide greater accessibility to shopping, jobs, and communities by increasing bike safety with protected lanes along streets with higher traffic volumes and speeds.16

[15] City of Cambridge, "Cycling Safety Ordinance Projects". 2023. and City of Cambridge, "Cycling Safety Ordinance". 2023.
[16] City of Cambridge. "2020 Bicycle Network Vision". 2020.

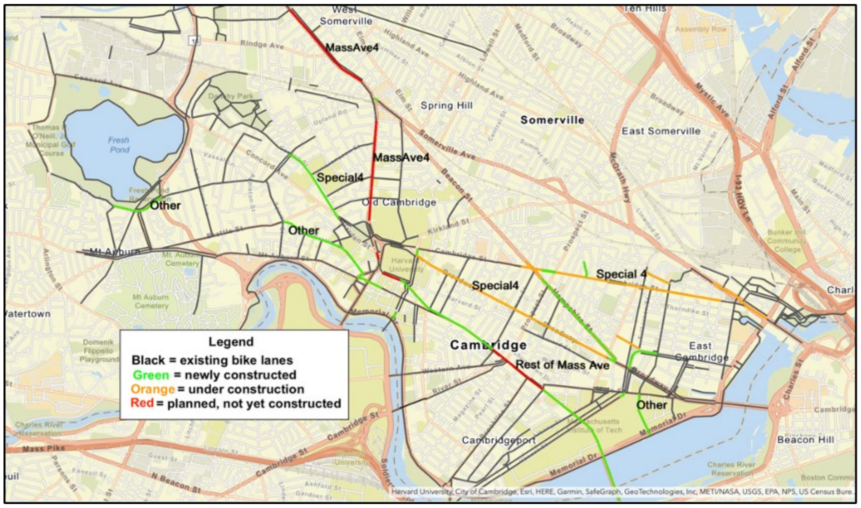


Figure 3. *Map of CSO protected bike lanes. Updated as of March 2024. Made using QGIS.*

Bike lanes have the potential to reduce emissions from transportation by encouraging commuter mode change from driving to bike-riding. The network effect is a phenomenon in which greater connectivity of bike lanes within an urban area increases bike ridership. The more places a commuter can travel to on a bike, the more ridership will increase, creating a positive feedback loop between bike lanes and ridership. In Copenhagen, extensive bike lane networks are associated with an increase in bike trips by 60% and distance traveled by bike by 90%. A longitudinal study of bike lanes in Portland, Oregon and Minneapolis, Minnesota found low stress bicycle networks (bike lanes in streets with low traffic) are associated with high ridership and high probability of choosing to bike compared to other modes of travel.[17] The CSO capitalizes on the network effect by building protected lanes on highly frequented transit corridors, connecting bike lanes from side-streets to main thoroughfares.

Protected bike lanes are also particularly influential in encouraging ridership. In Boston, a protected bike lane on Commonwealth Avenue led to increased Blue Bike ridership.[18] A study surveying 5 major US cities found increases in ridership one year after protected lanes were built to exceed overall frequencies in bike commuting. A quarter of cyclists in protected lanes self-reported their ridership had increased because of the protected lanes, with higher rates amongst

[17] Shi, Wei, "The Impacts of the Bicycle Network on Bicycling Activity: a Longitudinal Multi-City Approach" *Dissertations and Theses*. 2022.

[18] Karpinski, E. "Estimating the effect of protected bike lanes on bike-share ridership in Boston: A Case Study on Commonwealth Avenue." *Case Studies on Transportation Policy, Volume 9, Issue 3*. September 2021.

women.19 Protected lanes built by the CSO may be more effective in increasing ridership and mending gender disparities in urban cycling than non-protected lanes.

In Cambridge, bicycle commuting has grown steadily as the city has invested in bike lanes over time. The City performs an annual count of bicyclists at 16 major intersections during morning and afternoon hours. Apart from the COVID-19 pandemic, bicycle commutes have grown steadily with citywide bike lane expansion. Between 2002 and 2022, bicycle trips increased fourfold. Within the same period, bike lanes grew from covering 45 miles to 105 miles in Cambridge (Figure 4). Blue Bike ridership followed the same trend, increasing as stations became more ubiquitous (Figure 5).

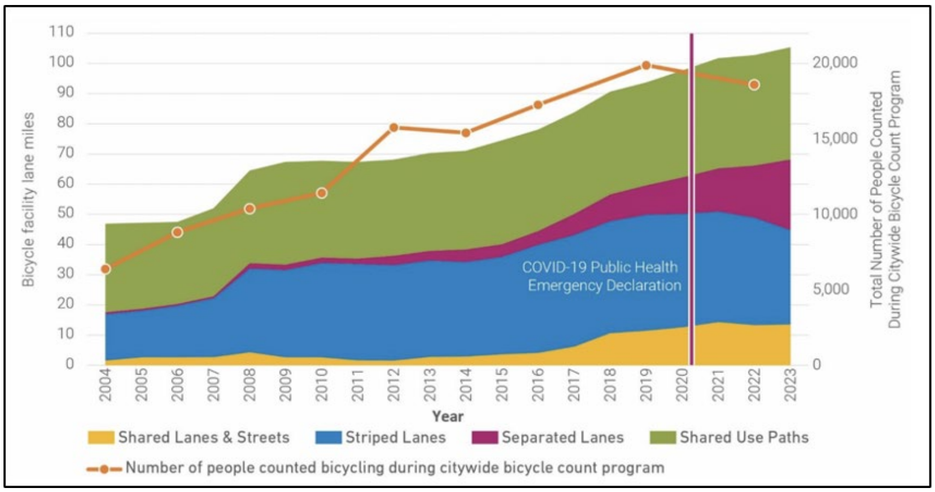
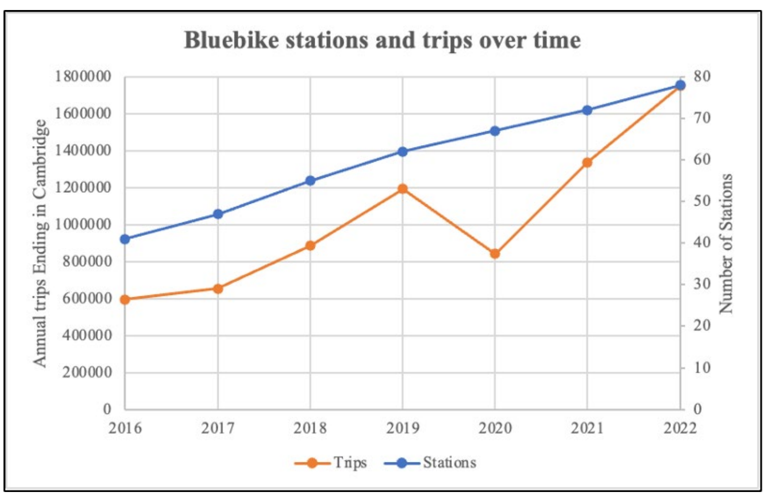


Figure 4. *Between 2004-2023, bike ridership increased concurrently with bike lane expansion.20*



[19] National Institute for Transportation and Communities. "Lessons from Green Bike Lanes: Evaluating Protected Bike Lanes in the U.S." June 2014.
[20] City of Cambridge, "Bicycling in Cambridge Data Report 2023". Page 15.

Figure 5. *Between 2016-2022, Blue bike ridership increased as the number of bike stations expanded.21*

Given the City's data on commuting-mode, we estimate the emissions reductions associated with increased bike ridership between 1990 and 2016. In 1990, on-road transportation in Cambridge produced 182,104 MTCO2e. It is assumed that all emissions are attributable to cars.22 In 2019, cars produced 125,881 MTCO2e.23 Mass DOT estimates that 24% of car trips are commuting to work.24 Applying this to Cambridge, carbon emissions reductions between 1990-2016 resulting from a decrease in driving alone or carpooling is approximately 24% of the difference between 1990 and 2019 levels: 13,493 MTCO2e. This is equivalent to 0.95% of community-wide emissions in 2019, or 10% of transportation emissions.25 While bike lane expansion increasing ridership between 1990-2016 was not the sole contributing factor, it may offer a partial explanation for this reduction.

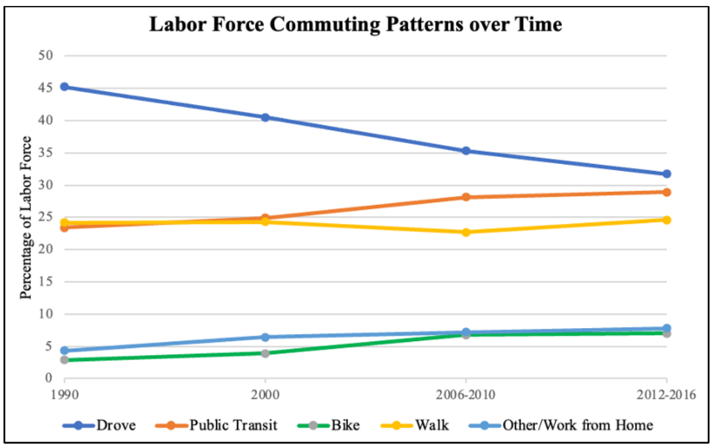


Figure 6. *Between 1990 and 2016, the percentage of Cambridge residents commuting to work by car declined by ~15%, while those commuting by public transit or biking rose by ~5%.26*

Building Energy Use Disclosure Ordinance (BEUDO)

BEUDO is Cambridge's most significant environmental policy in the building sector because it targets emissions reductions in its largest contributors. BEUDO requires annual energy-reporting from all buildings > 25,000 square feet and sets net-zero requirements for non-

[21] Annual Trip Data from: Cambridge Bicycle Safety. "Bluebikes: a transformative investment." 12 June 2023., Number of Stations from: BlueBikes, "System Data". 2023.
[22] City of Cambridge, "Climate Protection Plan". 1990, Page 24.
[23] City of Cambridge, "Community Emissions- GHG Inventory". *Community Development Department.* 2019.
[24] MassDOT, "Transportation Facts, MassDOT Planning Dept." 14 August 2015, page 4.
[25] City of Cambridge, "Community Emissions- GHG Inventory". *Community Development Department.* 2019.
[26] City of Cambridge Open Data Portal, "Labor Force Commuting Mode Split 1990 to 2016". 19 June 2023.

residential buildings (buildings > 100,000 square feet must reach net-zero by 2035, while buildings > 25,000 square feet but less than 100,000 have until 2050). The ordinance governs 8.4% of Cambridge's buildings which account for 68.5% of building sector emissions. The City estimates that BEUDO will reduce emissions in regulated buildings by 93% by 2035. Targeting energy reductions in large buildings is an effective strategy to decarbonize, though BEUDO limitations: the addition of carbon offsets, and omissions of residential buildings.

Carbon offsets were added to BEUDO to increase flexibility for large buildings to reach net-zero emissions by 2035. Offsets represent a reduction in emissions that occurs off-site, such as a new renewable energy project or carbon sequestration through reforestation.[27] By exporting emissions reductions, offsets effectively reduce the need to abate on-site[28] and therefore lower compliance costs.[29] Many large buildings owned by Harvard, MIT, or companies in the Biotechnology industry advocated for the inclusion of carbon offsets to aid the transition to net-zero. While BEUDO does not yet have specifics on the quality or cost of offsets, there are maximum limits set to ensure a building is not avoiding on-site abatement.

Figure 5 illustrates the difference in compliance pathways for large buildings purchasing the maximum amount of offsets (Scenario 1) compared to none (Scenario 3). In Scenario 1, buildings continue to emit 40% of baseline emissions through 2035, reducing emissions to net-zero by 2050. Scenario 3 presents a faster timeline to decarbonize, reducing emissions by 60% by 2030 to reach net-zero by 2035.

[27] Gurgel, Angelo. "Carbon Offsets". *MIT Climate Portal.* 8 November 2022.
[28] On-site emissions, or 'direct' scope 1 emissions, are defined by EPA as "emissions that occur from sources that are controlled or owned by an organization." Examples include emissions associated with fuel combustion in boilers, furnaces, or vehicles. Off-site emissions, or 'indirect' scope 2 emissions, occur at the generation facility such as purchased electricity. Source: EPA, "Scope 1 and Scope 2 Inventory Guidance", 21 August 2023.
[29] The compliance cost is the monetary value associated with on-site emissions reductions as required by BEUDO's performance requirements.

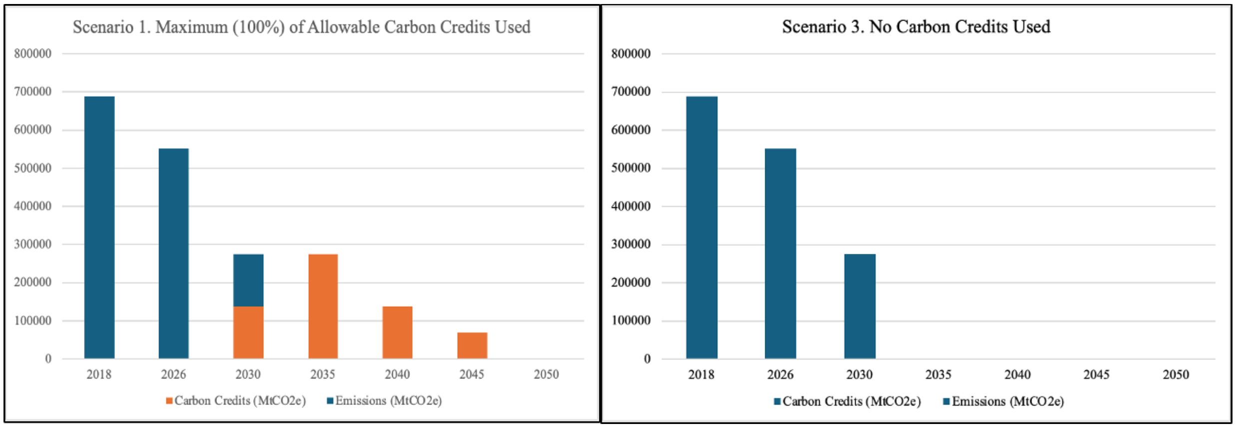


Figure 5. *Comparing pathways for purchasing carbon offsets compared to none.*

A second limitation of BEUDO is the exclusion of residential buildings from emissions reductions. Although residential buildings still have to report their annual energy consumption to the City, they have no net-zero requirement. Residential buildings makeup a substantial portion of emissions– 24% of building sector emissions, and 20% of citywide emissions.30 This political compromise was made in response to push back from the Condominium Association. Members of the Cambridge Condominiums Owners Association highlighted their perspectives at a public forum meeting in September 2022. Environmental justice was a concern; single-family homeowners use more energy per capita than multi-family, and yet tend to be wealthier and have more income to spend on emissions abatement. Therefore, the Condominium Association argued, including multi-family buildings in BEUDO but not single-family would overburden lower-income families living in multi-family residences. Additionally, there was concern about the cost of energy retrofits necessary for decarbonization.31 Many buildings in Cambridge date back to the 19th and 20th centuries, with older, less energy-efficient infrastructure.32 Ultimately, the compromise to remove residential buildings from emissions reductions was made to protect renters and homeowners from the costs of decarbonization.33

Affordable Housing Overlay (AHO)

30 City of Cambridge, "Community Emissions", 2019.

31 City of Cambridge, "Cambridge Building Emissions Public Forum." 15 September 2022.

32 Cambridge Historical Commission, "Survey of Architectural History in Cambridge: East Cambridge." *The MIT Press.* 1989, pages 86-127.

33 Interview, Seth Federspiel, 26 January 2024.

The AHO amends Cambridge's zoning code to allow for denser development in the City's squares and transit corridors. The ordinance is the first major change to the zoning code in 50 years.34 Developers can now build up to 15 stories in squares, and 12 stories on main streets. Setbacks are eliminated, allowing projects to be built closer to the property line. Floor area ratio (FAR) is increased, expanding volumes of buildings to take up a larger portion of the lot size. Off-street parking requirements are eliminated, dedicating space to units rather than driveways or lots.35 AHO projects are rented or sold to households earning up to 100% of area median income, approximately 65% of those in Cambridge.36

Upzoning amendments like the AHO can face opposition from environmental groups with a narrative known as "commonsense antiurbanism". In the Environmental Advantage of Cities, William B. Meyer describes how fears over replacing parks with buildings can overshadow the true benefits of dense development: reduced household energy consumption and transportation emissions. On a larger scale, should the same population in 100 homes move into an apartment building, the ecological footprint of the apartment is much smaller than the less-dense option.37 Interestingly, many of the City Councilors who voted for the AHO also supported the CSO (Siddiqui, Azeem, McGovern, Sobrinho-Wheeler). Although the candidates changed between 2021 and 2023, anti-development rhetoric was evident amongst opponents of both policies.

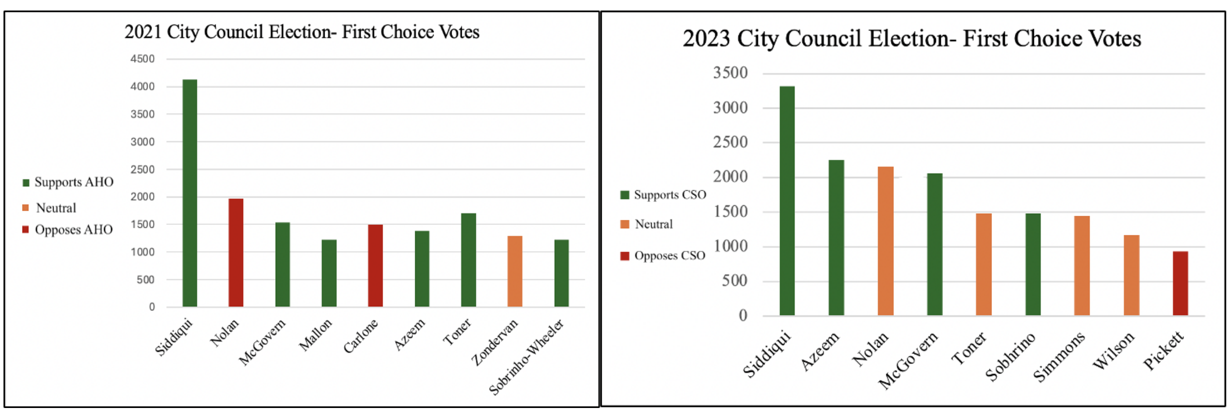


Figure 6. *City Council votes in 2021 and 2023 elections reveal a pattern in candidates supporting bike lanes and affordable housing.*

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[34] Giordano, Julian. "Cambridge City Council to Vote on Taller Affordable Housing Height Maximums." *The Harvard Crimson.* 28 August 2023.

35 City of Cambridge, "Zoning Ordinance: section 11.207: The Affordable Housing Overlay". 2021.

36 US Census, "American Community Survey 5-year estimate". 2020.

[37] Meyer, William. "The Environmental Advantages of Cities". *Massachusetts Institute of Technology.* 2013.

Though the goal of the AHO is to increase affordable housing, it has potential to reduce residential emissions by increasing housing densities in Cambridge. Across the United States, population density is negatively correlated with residential emissions. Municipalities with lower densities tend to have higher emissions from household energy use and transportation (Figure 6). Urban economists Ed Glaser and Michael Khan explain this negative relationship in their 2010 paper, 'the greenness of cities'.

"By restricting new development, the cleanest areas of the country would seem to be pushing new development towards places with higher emissions."38

Zoning laws drive up the cost of housing in denser areas by constraining supply, forcing people to move away from urban centers to suburbs in homes with more ecological disruption, driving, and energy consumption.

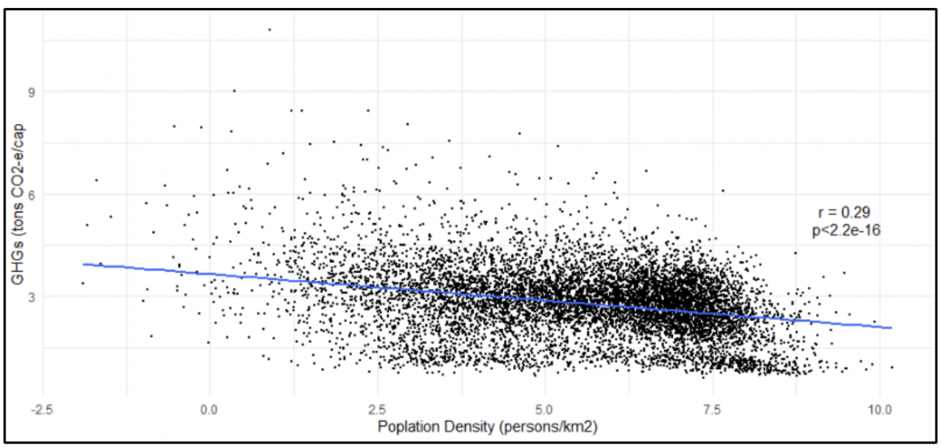


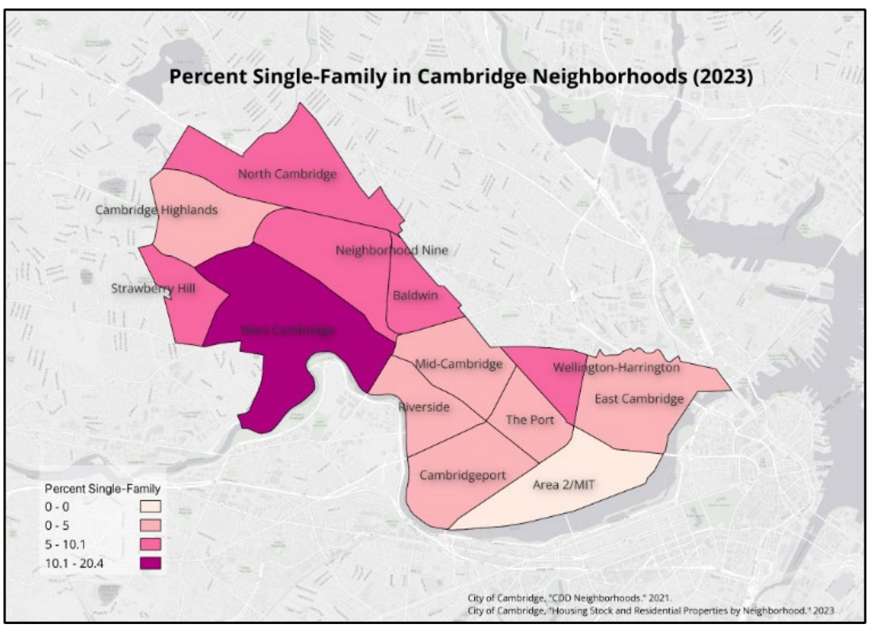
Figure 7. *Goldstein et al. graphs the carbon intensity (tCO2e/capita) from residential energy use of 93 million homes across the United States, finding a negative correlation of r=-0.29 with population density.39*

To understand how zoning impacts residential emissions in Cambridge, we compare neighborhoods' percent single-family homes and estimated per-capita residential emissions. Cambridge's zoning code allows certain housing types (single-, two-, or multi-family) to be built in certain areas, therefore mapping percent single-family by neighborhood shows an important impact of the code. Additionally, single-family homes tend to have greater residential emissions

[38] Glaser, E. and Khan, Matthew. "The greenness of cities: Carbon dioxide emissions and urban development." *Journal of Urban Economics.* May 2010.
[39] Goldstein et al., "The Carbon Footprint of Household Energy Use in the United States" July 2020.

than multi-family because of differences in (1) transportation and (2) household energy consumption. Multi-family homes tend to be located in denser environments where people commute more by public transit, walk, or bike, and make fewer trips in personal vehicles. Conversely, single-family homes make up ‘suburban sprawl’ in the United States, where people tend to commute more frequently and for longer durations by car due to the sprawling design of their built environment.40 The difference in transportation emissions between single- and multi-family homes is particularly salient when comparing urban to suburban areas, whereas dense cities like Cambridge have smaller differences. This analysis estimates residential emissions from household energy consumption.

Single-family homes also tend to have greater residential emissions due to greater household energy use. Shared walls in multi-family units facilitate the transfer of heat which accounts for the majority of household energy use in Massachusetts.41 Greater FARs in single-family homes results in a larger space to heat and cool, and more opportunities for cracks in insulation.42 Therefore, multi-family homes tend to use less energy per capita and have consequently lower per-capita residential emissions than single-family.



[40] National Resource Council, “Driving and the built environment: the effects of compact development on motorized travel, energy use, and CO2 emissions.” *Transportation Research Board*, 2009.
[41] In Massachusetts, heating accounts for 54% of household energy use, whereas the national average is 44%. Source: Energy Information Administration, “Residential Energy Consumption Survey Dashboard”. 2023.
[42] Hernandez, Daniel, Lister, Matthew, and Suarez, Celine. “Location Efficiency and Housing Type.” *EPA,* March 2011.

Figure 8. *Percentage of single-family homes tend to be higher in neighborhoods of western Cambridge than eastern.43*

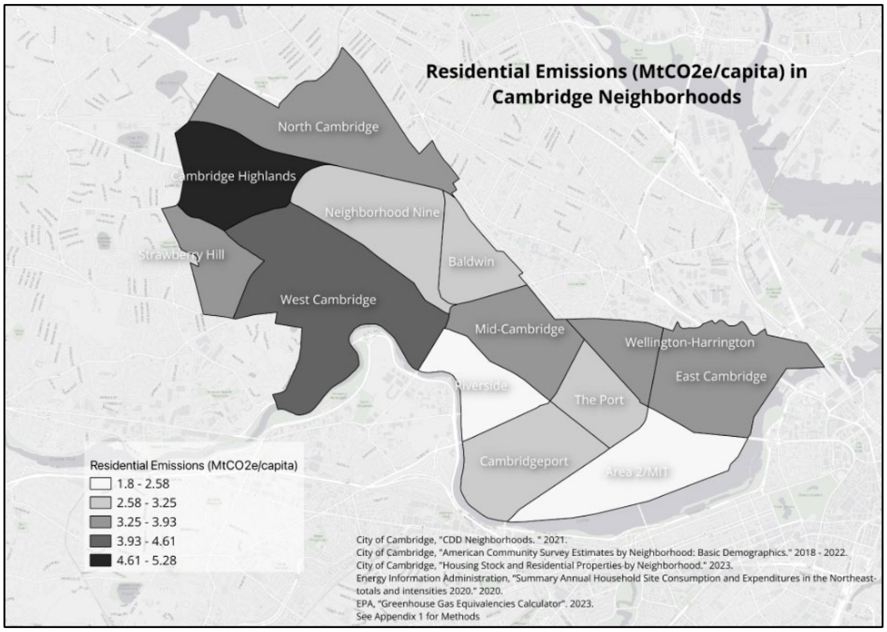


Figure 9. *Carbon intensities (tCO2e/capita) from residential energy use tend to be higher in western Cambridge.44*

Figures 7 and 8 show a clear association between percent single-family, a proxy for housing density, and residential emissions. This follows the national pattern shown in Figure 6, Goldstein et al. However, it is important to note that estimations of emissions are constrained by available data. The Residential Energy Consumption Survey (RECS) only includes regional averages of energy use by household type– the average energy use in a single-family home in the northeast may far exceed that of Cambridge. Additionally, RECS only has data for multi-family homes with up to 5 units– a multi-family home with 100 units, for example, does not have the same energy use as that of 5 units, yet RECS groups these two together.45 Despite these limitations, this analysis importantly shows how zoning contributes to residential emissions in Cambridge, and the AHO may have a positive impact by increasing density.

[43] City of Cambridge, "CDD Neighborhoods". 2021. , City of Cambridge "American Community Survey 2018-2022 Estimates By Neighborhood, Basic Demographics." 2022. , and City of Cambridge, "Housing Stock and Residential Properties by Neighborhood". 2023.
[44] Appendix 1
[45] EIA. "Residential Energy Consumption Survey (RECS): About the RECS". 2020.

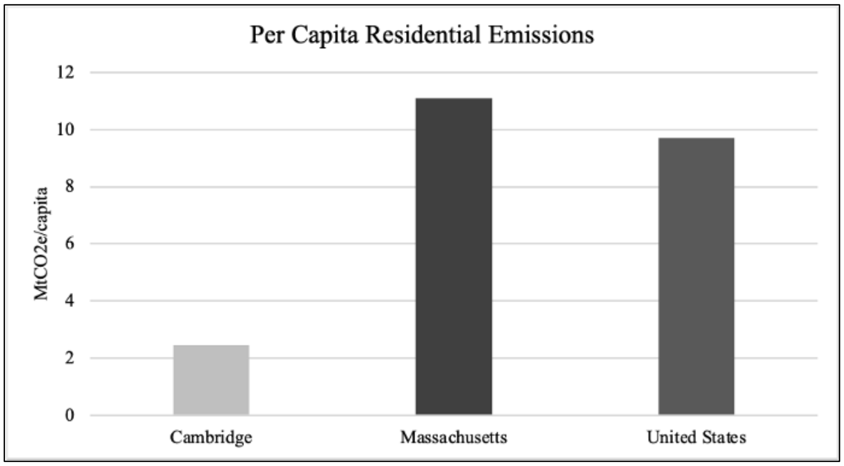


Figure 10. *Residential emissions in Cambridge compared to Massachusetts and US averages.*

On a regional and national scale, residential emissions in Cambridge are low. Per-capita residential emissions are 2.46 MtCO2e[46], while the average in Massachusetts is 11.1 MtCO2e[47] and the national average is 9.7 MtCO2e (Figure 9).[48] This may be true for ideological reasons; if people in Cambridge care more about their environmental impact they may make lifestyle choices to lower theirs. It also may be true for economic reasons; because people in Cambridge are wealthy on a national scale, they can afford to make choices that lower their carbon footprint.[49] The climate may play a role too, as seasonal temperatures in Cambridge require less heating or cooling than other homes in colder or warmer climates. Finally, the size of homes in Cambridge may also contribute to lower residential emissions; smaller homes require less energy to heat and cool than larger homes.

Conclusion

Though we cannot determine Cambridge's progress towards net-zero,[50] the city is already in a position to be one of the leaders of municipal decarbonization across the United States. Cambridge was one of the first cities in the country to write a Net-Zero Action Plan in

[46] 288,407/117,090

[47] According to RECs, households in MA use 87.7 MBTU/year. This is approximately equivalent to 11.1 MtCO2e using EPA's equivalencies calculator.
Source: Energy Information Administration, "Residential Energy Consumption Survey Dashboard". 2023. and EPA, "Greenhouse Gas Equivalencies Calculator". 2023.

[48] Energy Information Administration, "Residential Energy Consumption Survey Dashboard". 2023.

[49] Carbon emissions and household income are correlated. Goldstein et al., "The Carbon Footprint of Household Energy Use in the United States" July 2020.

[50] Data are not yet available to observe emissions reductions. BEUDO implemented performance requirements in 2023, and the only data available as of March 2024 are emissions between 2015-2022.

2015 and is one of the only cities with concrete policy to reach net-zero in large buildings by 2035. Ithaca, New York adopted a similar resolution– the Green New Deal– to reach net-zero "community wide" by 2030[51], but has since seen little progress.[52] The City's Sustainability Director even stepped down in 2022 citing serious concern for achieving the goal on time.[53] While writing a decarbonization plan is one issue, achieving net-zero is an entirely other one. The CSO, AHO, and BEUDO policies have shown that decarbonization requires diverse stakeholder commitment. Cities can learn from Cambridge's policies that required a coordinated effort between industry, community, and government actors to pass.

Although Cambridge has an aggressive plan to decarbonize the building sector, it leaves out emissions from transportation, waste management, embodied carbon, and more. The most effective way to achieve net-zero is to prioritize policies centered around emissions reductions that are within the government's powers, supported by stakeholders, and achievable within a feasible timeline. Cambridge's NZAP checked all these boxes. It limits the scope to large buildings within Cambridge's borders. It was designed by people that represented the voices of diverse communities, the Net-Zero Task Force. It established a concrete timeline to decarbonize in the next 15 to 30 years. While the City cannot mandate that residents stop driving, it can control emissions from buildings that contribute a significant portion to the citywide carbon footprint. It can also build bike lanes to encourage sustainable modes of transit. Finally, it can build dense, affordable housing to encourage lower residential energy use. Although some sources of emissions are inevitably left out, NZAP's goals and the CSO, AHO, and BEUDO policies ultimately work together to chart the path towards net-zero for the City of Cambridge.

[51] City of Ithaca, "Green New Deal." 2019.
[52] Redelmeier, Rebecca. "Halfway to Ithaca's Green New Deal deadline, progress is mixed." *WXXI News NPR.* 20 February 2024.
[53] Jordan, Jimmy. "Aguirre-Torres details resignation from Ithaca sustainability leadership, fears over Green New Deal." *The Ithaca Voice.* 7 November 2022.

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