



February 13, 2023

Dear Newton City Council,

Greater Boston Physicians for Social Responsibility (GBPSR) is a physician-led group of health professionals and community members working to address two of the existential threats to human health: nuclear war and climate change. Our members are nationally-recognized experts in public health, cancer epidemiology, occupational medicine, environmental health, emergency medicine, disaster preparedness, and the health effects of climate change.

We are writing to express our support for Newton to adopt the opt-in Specialized Code. As clinicians, we know that buildings are a significant contributor to our state's outdoor¹ and household air pollution,² and carbon emissions.³ Having a net-zero stretch code gives us a path to significantly reduce Newton's carbon emissions and it incentivizes the use of electric appliances which reduce air pollution. We urge the Council to prioritize a timely implementation of a net-zero building standard; it is a crucial step towards achieving our climate goals, environmental justice and improved air quality.

Climate Change: We need to move to net-zero buildings immediately: not only will a strengthened building code lower emissions now, but will be far less costly than requiring retrofits later. According to the Massachusetts Clean Energy and Climate Plan for 2050, we will already have to retrofit more than a million buildings with heat pumps to meet our climate targets.

¹ US Environmental Protection Agency. National Emissions Inventory. 2014.

https://edap.epa.gov/public/extensions/nei_report_2014/dashboard.html#trend-db Accessed 10/9/19.

² US Environmental Protection Agency. The Inside Story: A Guide to Indoor Air Quality. <https://www.epa.gov/indoor-air-quality-iaq/inside-story-guide-indoor-air-quality> Accessed 4/8/19.

³ Commonwealth of Massachusetts. Mass GHG Emissions Trends. <https://www.mass.gov/service-details/ma-ghg-emission-trends> Accessed 10/9/19.

It's imperative that we meet our greenhouse reduction targets: over a hundred health organizations have warned that climate change is a health emergency⁴ and the UN Inspector General calls the climate crisis "a code red for humanity." Climate change is affecting our health in many ways, from more vector-borne illnesses, like Lyme disease, to a steep increase in respiratory illnesses, heart attack, stroke and heat related illness. A net-zero stretch code like the Specialized code will help us reach our climate mitigation goals and will have important public health benefits for Newton residents.

Air Quality: There is a growing body of evidence that net-zero buildings, built with electric heating and cooling and electric appliances, result in better outdoor and indoor air quality, while using fossil fuels like natural gas and coal to heat and cool are the chief drivers of indoor and outdoor air pollution.

Natural gas and renewable natural gas are composed predominantly of methane. The byproducts of burning methane are nitrogen dioxide (NO₂), carbon monoxide (CO), particulate matter smaller than 2.5 microns (PM_{2.5}) and volatile organic compounds (VOCs). These byproducts are released directly into homes when burned in gas cooking stoves and are vented into neighborhoods when burned for space and water heating, contributing to significant amounts of indoor^{5 6} and outdoor air pollution.⁷ NO₂ and other nitrogen oxides in ambient air contribute to particle formation and to the chemical reactions that make ground-level ozone. In Massachusetts, buildings powered by fossil fuels contribute five times more outdoor nitrogen oxides (a precursor to smog) and twenty times more outdoor fine particulate pollution than electricity generation.⁸ Outdoor air pollution is associated with increased rates of asthma, chronic obstructive pulmonary disease (COPD), and cardiovascular disease.^{9 10} Air pollution from burning fossil fuels contributes to morbidities like respiratory illnesses and heart disease, and contributes to about 7600 premature deaths in Massachusetts a year.¹¹

⁴ Associated Press. Climate change is a 'health emergency,' 74 medical and public health groups warn. NBC News. 6/24/19.

<https://www.nbcnews.com/health/health-news/climate-change-health-emergency-74-medical-public-health-group-s-warn-n1020961> Accessed 10/9/19.

⁵ Tianchao Hu, Brett C Singer, Jennifer M Logue, Compilation of Published PM2.5 Emission Rates for Cooking, Candles and Incense for Use in Modeling Exposures in Residences, Ernest Orlando Lawrence Berkeley National Laboratory, 2012, p. 11, <https://www.osti.gov/servlets/purl/1172959>.

⁶ Brett C. Singer et al, Pollutant Concentrations and Emission Rates from Scripted Natural Gas Cooking Burner Use in Nine Northern Californian Homes, Lawrence Berkeley National Laboratory, 2016, p. 5, <https://escholarship.org/uc/item/859882pw>.

⁷ Dedoussi et al., Nature Feb 2020 (MIT study- supplemental material).

⁸ US Environmental Protection Agency (EPA). National Emissions Inventory. 2014.

https://edap.epa.gov/public/extensions/nei_report_2014/dashboard.html#trend-db

⁹ Guarnieri M, Balmes JR. Outdoor air pollution and asthma. Lancet. 2014;383(9928):1581-92.

¹⁰ US Environmental Protection Agency. Outdoor Air Quality: What are the trends in outdoor air quality and their effects on human health and the environment?.

<https://www.epa.gov/report-environment/outdoor-air-quality#exposure> Accessed 10/9/19.

¹¹ Abel, D. Burning fossil fuels kills an estimated 350,000 Americans a year, including 7,600 in Massachusetts, study finds. Boston Globe Feb. 9, 2021.

<https://www.bostonglobe.com/2021/02/09/metro/burning-fossil-fuels-kills-an-estimated-350000-people-year-study-finds/> Accessed 2/20/22

About 50% of households in Massachusetts cook with gas stoves and are exposed to significant amounts of indoor air pollution. Nitrogen dioxide (NO₂), a byproduct of burning methane, has been determined by the EPA as “likely causal” of the development of asthma and “causal” of asthma exacerbations.¹² Cooking with gas stoves also contributes to household air pollution. Children living in homes with gas cooking stoves have a 42% higher risk of current asthma.¹³ A recent study found that cooking with gas is attributable to 15% of asthma cases in Massachusetts.¹⁴ A longitudinal study in Massachusetts showed that children with asthma had more severe and frequent asthma symptoms if they lived in homes with gas cooking stoves.¹⁵

Natural gas and RNG, when delivered to homes and businesses, leak other co-pollutants like benzene. Recent Harvard and Stanford¹⁶ studies show that natural gas leaks from gas stoves even when they are off, leaking benzene and other carcinogens into the air.¹⁷ These studies are particularly concerning because the medical community agrees that there are no safe levels of exposure to benzene,¹⁸ meaning any amount of exposure to benzene comes with health risks. It has been recommended that regulatory agencies should strive to achieve near-zero exposure to benzene.¹⁹ Acute exposure to benzene results in dizziness, tremors, nausea, vomiting, headache, and drowsiness. Chronic exposure to benzene has been shown to cause bone marrow suppression and acute lymphocytic leukemia.²⁰

Environmental Justice: Asthma is a public health challenge in Massachusetts. In Newton, 1 in 9 children have an asthma diagnosis and that rate drops to 1 in 6 in nearby Boston.²¹ Air pollution is a driver of health disparities in asthma.²² ²³ By reducing air and carbon pollution in new buildings, Newton will also be addressing one of its most pressing public health problems across the Commonwealth.

¹² <https://www.epa.gov/isa/integrated-science-assessment-isa-oxides-nitrogen-health-criteria>

¹³ Lin W, Brunekreef B, Gehring U. Meta-analysis of the effects of indoor nitrogen dioxide and gas cooking on asthma and wheeze in children. *Int J Epidemiol.* 2013;42:1724–1737. doi:10.1093/ije/dyt150

¹⁴ Gruenewald T, Seals BA, Knibbs LD, Hosgood HD III. Population Attributable Fraction of Gas Stoves and Childhood Asthma in the United States. *International Journal of Environmental Research and Public Health.* 2023; 20(1):75. <https://doi.org/10.3390/ijerph20010075>

¹⁵ Belanger K, Holford TR, Gent JF, Hill ME, Kezik JM, Leaderer BP. Household levels of nitrogen dioxide and pediatric asthma severity. *Epidemiology.* 2013;24(2):320-330. doi:10.1097/EDE.0b013e318280e2ac.

¹⁶ *Environ. Sci. Technol.* 2022, 56, 4, 2529–2539

¹⁷ *Environ. Sci. Technol.* 2022, 56, 14, 10258–10268 Publication Date: June 28, 2022 <https://doi.org/10.1021/acs.est.1c08298>

¹⁸ Smith MT. Advances in understanding benzene health effects and susceptibility. *Annu Rev Public Health.* 2010;31:133-48 2 p following 148. doi: 10.1146/annurev.publhealth.012809.103646. PMID: 20070208; PMCID: PMC4360999.

¹⁹ Lanphear BP. Low-level toxicity of chemicals: No acceptable levels? *PLoS Biol.* 2017 Dec 19;15(12):e2003066. doi: 10.1371/journal.pbio.2003066. PMID: 29257830; PMCID: PMC5736171.

²⁰ ATSDR. (2007); Toxicological Profile for Benzene. Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA, 1-438.

²¹ <https://matracking.ehs.state.ma.us/Health-Data/Asthma/pediatric.html>

²² Tessum, C. W., Paoletta, D. A., Chambliss, S. E., Apte, J. S., Hill, J. D., & Marshall, J. D. (2021). PM2.5 pollutants disproportionately and systemically affect people of color in the United States. *Science Advances*, 7(18), eabf4491.

²³ Forno E, Celedón JC. Health disparities in asthma. *Am J Respir Crit Care Med.* 2012;185(10):1033–1035. doi:10.1164/rccm.201202-0350ED

We urge the City Council to opt-in to the Specialized Code. Adopting a net-zero standard will make our air healthier now, and our climate safer for generations to come.

Sincerely,

A handwritten signature in black ink, appearing to read 'Brita Lundberg', with a long horizontal flourish extending to the right.

Brita Lundberg, MD
Chair of the Board, Greater Boston Physicians for Social Responsibility