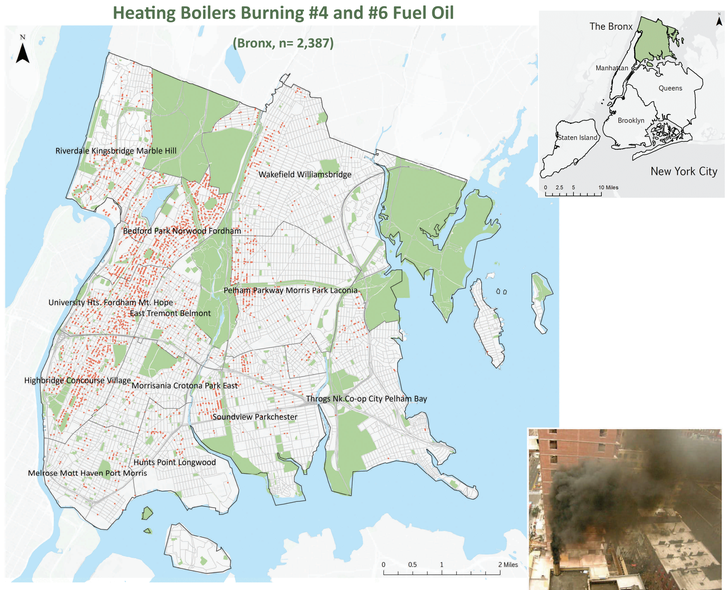
Prioritizing the Conversion of Heating Boilers in the Bronx

Heating Boilers Burning #4 and #6 Fuel Oil




Credit: Environmental Defense Fund

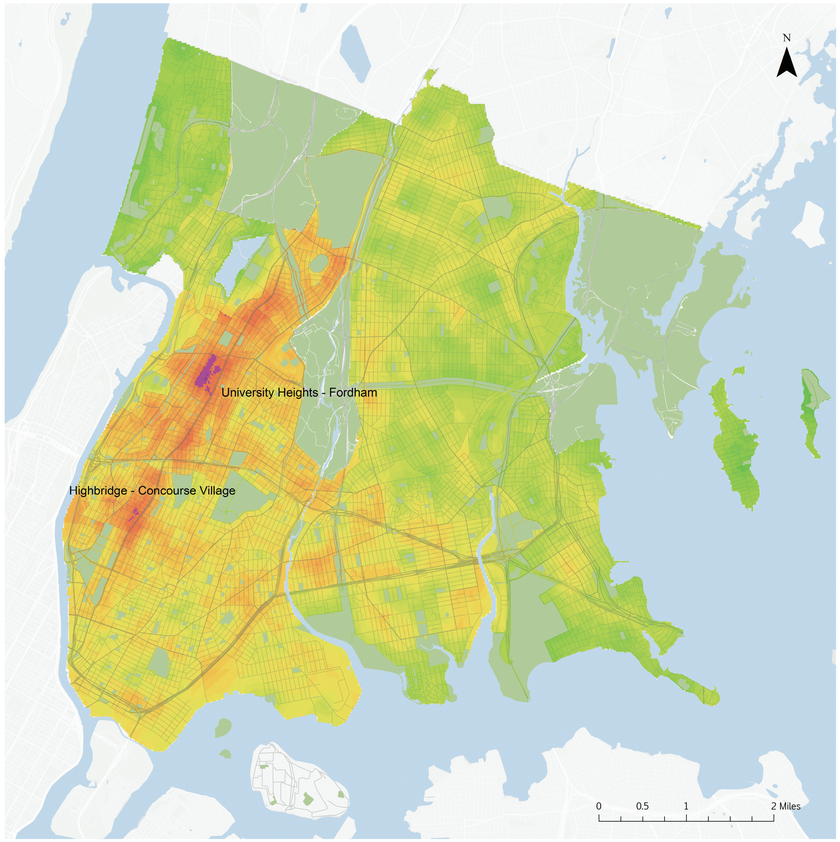
Purpose

In New York City, there are almost 8,900 buildings that heat with fuel oils #4 and #6, heavy industrial grade heating fuels. New York is one of the few U.S. cities that still allows use of these fuels in buildings. Found in multi-unit apartment buildings and public facilities across the five boroughs, "dirty" boilers contribute almost 90 percent of all heating related air pollution in the city. Particulate matter pollution from heating oils #4 and #6 is contaminated with nickel and other heavy metals, and has been linked to respiratory and cardiovascular disease. New York City children, especially, exhibit high rates of asthma when compared to peers nationally.

In 2010, the New York City Council passed legislation mandating the phase out of heating oils #4 and #6 by 2030. However, there are loopholes in the legislation that could delay boiler conversion still further, waivers that can be negotiated between the New York City Department of Environmental Protection and building owners based on financial hardship. In particular, buildings with low-income tenants have limited streams of operating funds, and often do not have capital available for major repairs like boiler replacement. With dirty boilers already unevenly distributed across the city, and with the pollution from these boilers compounded by other environmental burdens, how can New York more equitably pursue boiler phase out?

This project pilots a methodology for prioritizing the phase out of dirty boilers in the Bronx, where 2,387 boilers burning #4 and #6 fuel oils are still in operation.

Priority Neighborhoods for Dirty Boiler Phase Out



Dirty Boiler Phase Out

Score

- 3 (Low Priority)
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24 (High Priority)

Methodology

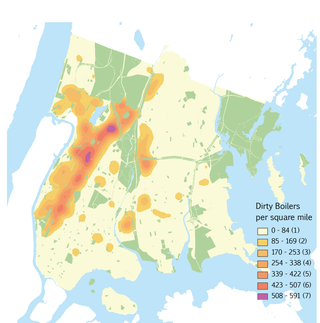
This approach to prioritizing the phase out of heating fuels #4 and #6 in the Bronx is influenced by GIS methodologies that consider multiple environmental burdens and their health impacts on vulnerable populations (Maantay 2007; Pearce et al). Boiler locations were obtained from NYC Department of Buildings and geocoded, prior to creating a raster surface of boiler density. Along with considering the density of dirty boilers in the Bronx, in developing my model, I selected five additional factors relevant to the environmental health and vulnerability of Bronx residents: proximity of high traffic roads, proximity of parks and open space, poverty rate, concentration of wintertime particulate matter (PM2.5), and proximity of elementary schools (a proxy for the presence of young children). Raster surfaces were created for each of these factors, reclassified and scored (high priority to low priority), and then used to generate a final map that combines these six factors, demonstrating high priority locations for dirty boiler phase out.

Results of Pilot Analysis

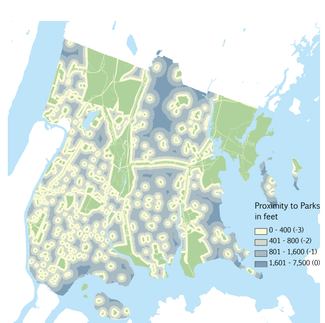
The scoring of multiple environmental and health vulnerability factors resulted in a boiler conversion prioritization map of the Bronx that ranges from low priority sites (combined score = 3) to high priority sites (combined score = 24). The prioritization map produced shows that the phase out of boilers using #4 and #6 fuel oils should be prioritized in the Bronx neighborhoods of University Heights—Fordham (top priority) and Highbridge-Concourse Village.

This pilot analysis could be expanded to include neighborhoods citywide. The methodology could be used to target funding, low/no-interest loans and other resources to the neighborhoods most in need of boiler conversion, reducing disparity in the transition to cleaner heating fuels citywide. Further analysis could use additional data to strengthen and refine this methodology, for instance, incorporating data on relevant health outcomes linked to particulate matter pollution (respiratory and heart disease) or data on existing building conditions (physical structure, building code violations, and owner financial stability).

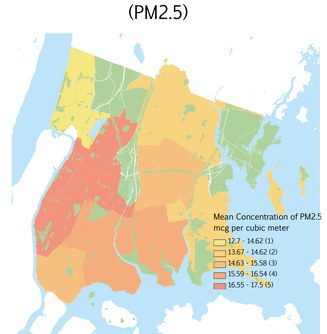
Boilers Burning #4 or #6 Fuel Oils



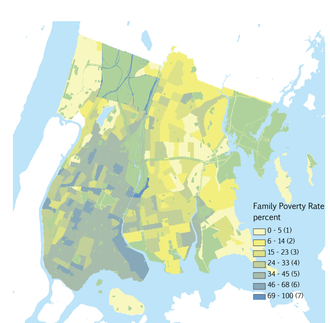
Distance to Parks



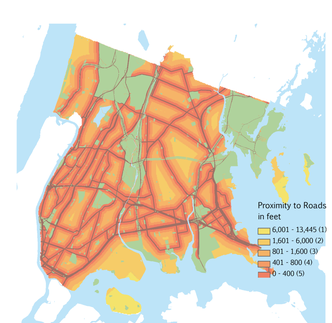
Concentration of Particulate Matter (PM2.5)



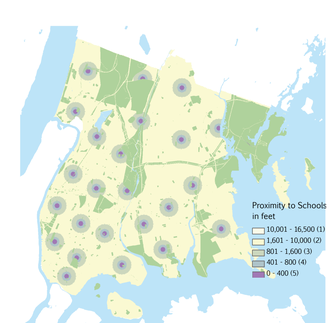
Families Living in Poverty



Distance to High Traffic Roadways



Distance to Elementary Schools



Tufts

Cartographer: Emily E. Earle
May 9, 2012 · UEP 232 · Tufts University
Urban + Environmental Policy + Planning

Projection: NAD 1983 State Plane New York Long Island (Ft)

Data Sources: NYC Department of Buildings/ Environmental Defense Fund (2010); U.S. Census Bureau: 2010 Census, American Community Survey 2006-2010; NYC Citywide IT Services (2007; 2012); NYC Department of City Planning (2007; 2012); NYC Community Air Survey (2009); NYC Department of Health (2009); ESRI Data ArcMap 10 (2009).

References:

Maantay, J. (2007). Asthma and air pollution in the Bronx: Methodological and data considerations in using GIS for environmental justice and health research. *Health & Place* 13:32-56.

Office of the Manhattan Borough President. (2011). Tenants and Toxins: converting dirty boilers in New York City's affordable housing stock. Report. Available: http://www.libertycontrol.net/uploads/mbpo/TenantsToxinsFinal.pdf [accessed 14 July 2011].

Pearce, J.R., Richardson, E.A., et al. (2010). Environmental justice and health: the implications of the socio-spatial distribution of multiple environmental deprivation for health inequalities in the United Kingdom. *Transactions of the Institute of British Geographers* 35:522-539.