

# The Story of Roxbury



Roxbury is a Boston neighborhood home to 60,000 residents from a diverse range of cultural backgrounds. Considered an **environmental justice community**, Roxbury residents experience a disproportionate amount of air pollution due and respiratory conditions. Community advocates have worked to improve the wellbeing of Roxbury residents for decades, and community members continue to uphold that tradition today.

## 1 Nubian Square

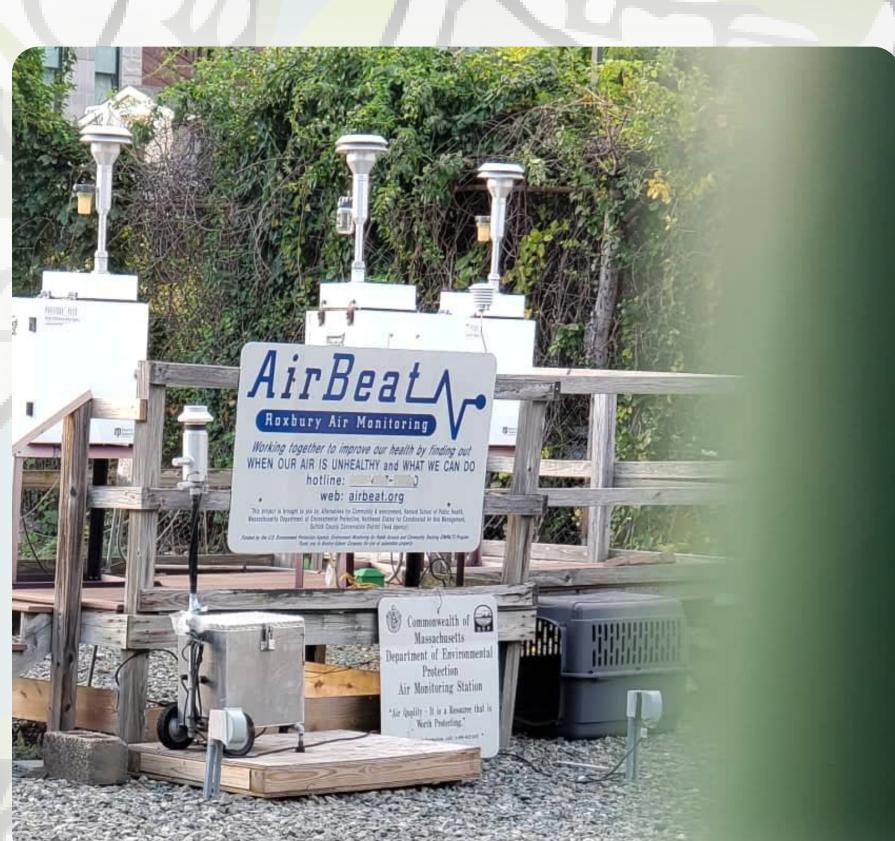
Roxbury has a proud history of **grassroots activism**. A prominent example is the renaming of Nubian Square. Previously known as Dudley Square, after a proponent of slavery, the square was renamed in 2019 after a community-led push.

"Nubian" honors a past local business that resided in the square as well as the African Nubian Empire. To residents, the name represents Black autonomy, ingenuity, and culture.



## 2 Roxbury Love

You can catch a glimpse of the complex, diverse, and resilient history of Roxbury in the numerous murals scattered throughout its neighborhoods. Painted by local artists, "Roxbury Love" by Deme5 and Kwest and the Breathe Life trilogy by Rob Gibbs (shown below) are meant to "promote positivity, share energy, and lift up images that reflect the community back to itself."



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## 3 AirBeat Sensor

AirBeat was a pilot project funded by a grant from the EPA's EMPACT program in 1999. At that point in time, Roxbury was home to more than 15 truck and bus depots within a one mile radius, amounting to around 1,150 diesel vehicles that significantly deteriorated the quality of air in Roxbury. In partnership with ACE, AirBeat established an advanced air quality monitoring station in what was then called Dudley Square. Although its data is not accessible to the community (and lacks temporal and spatial resolution to be useful for our work), it was one of the first projects to bring attention to the issue of air quality in Roxbury and helped pave the way for air quality initiatives today.

## Fairmount Line

In 2012, the Fairmount Line was extended to Fairmount Station, bringing reliable commuter rail service to the heart of Roxbury. Although it helped connect Roxbury to other Boston neighborhoods, its reliance on diesel engines also contributes to air pollution in the community in the form of particulate matter, nitrogen oxides, and volatile organic compounds. By examining how the Fairmount Line impacts air quality, we can better support vehicle electrification initiatives in the future.

# Spring 2023 Semester

## Co-designs

This semester, we held co-design sessions with three community advocates to help determine how data from an outdoor sensor network can assist with policy advocacy work.



**Wig Zamore**  
Community Researcher



**Sara Arman**  
Health Equity Corps  
Coordinator at  
Greenroots



**Mary Claire Kelly**  
Legal Advocate  
at ACE

## Insights



Policy change typically happens through long term health studies that link pollution to severe health outcomes.



Collecting personal stories can assist with policy advocacy at statewide agencies.



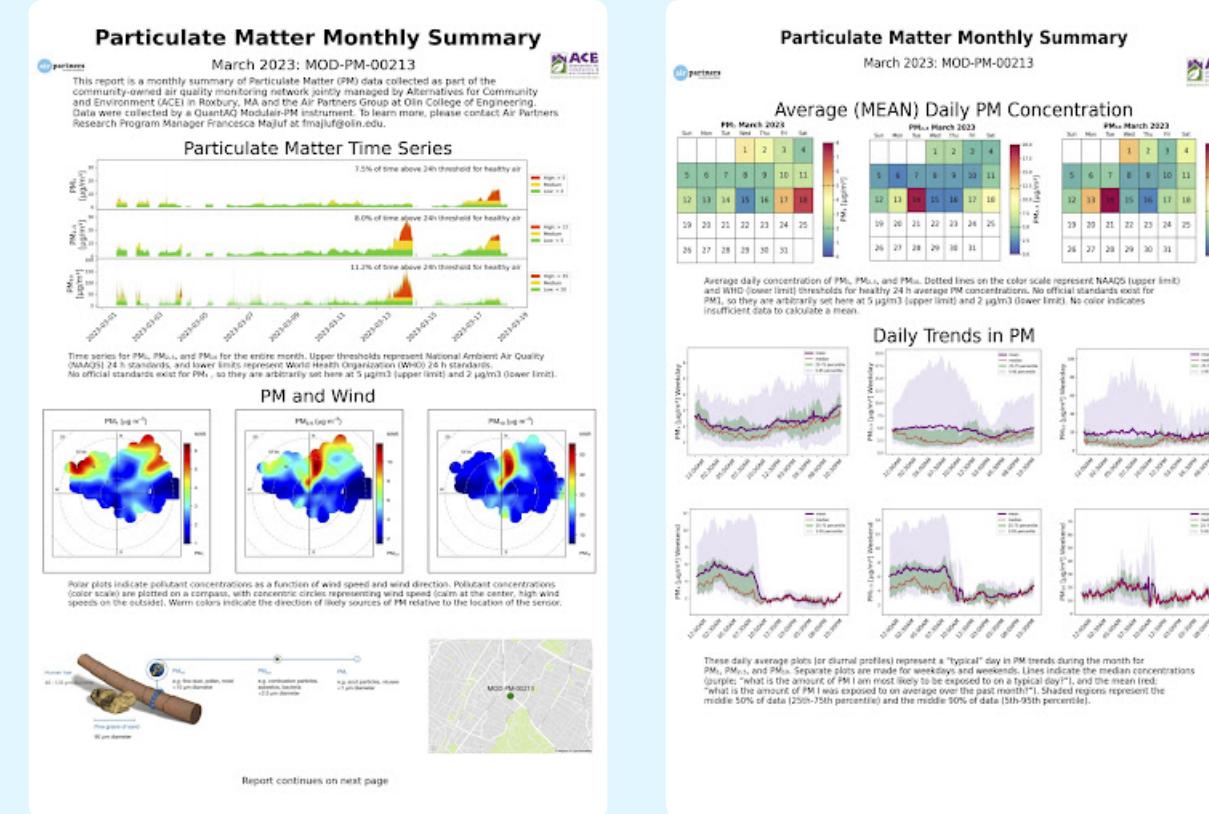
Linking air quality to specific bus or train lines can help with vehicle electrification efforts.



Showing long term historical and projected future trends can provide a compelling narrative.

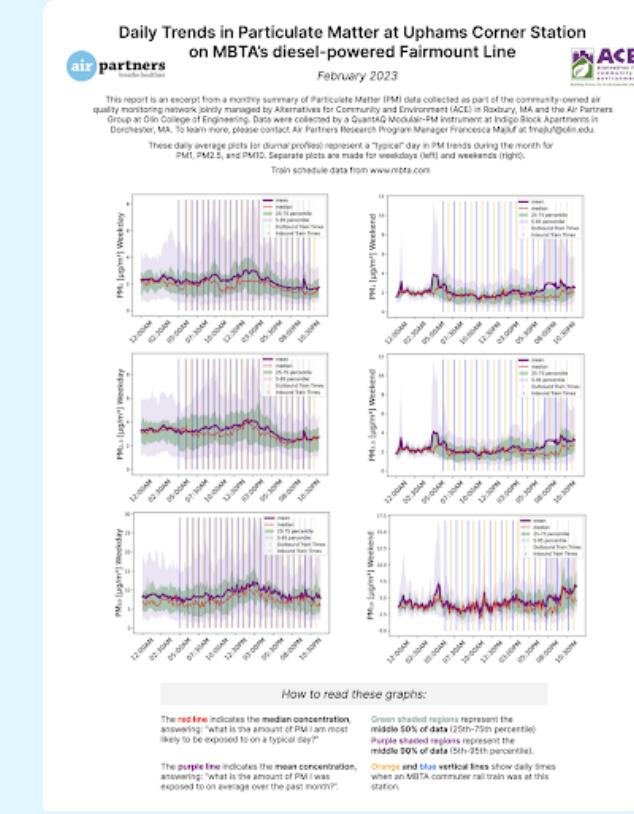
## Data Tools

### Outdoor Sensor Static Monthly Report



The public can now download air quality reports for any of the 18 sensors around Roxbury. These reports are being used by ACE at community events and hearings to help explain the state of air quality in Roxbury. Other organizations have also expressed interest in using this data tool.

### Commuter Line Pollution Report



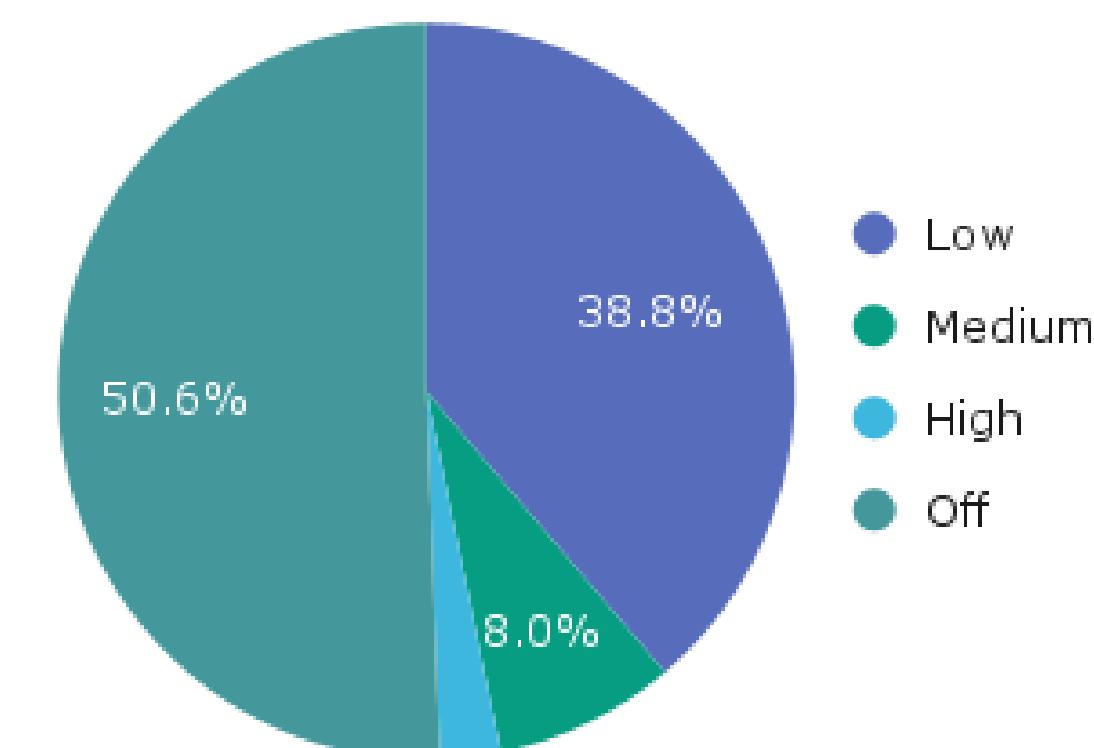
Our analysis of emissions from the Fairmount Line using data from a nearby sensor highlights impacts of pollution sources on the community. Our findings can support policy changes towards electrification of public transportation.

## HEPA Pilot Analysis

Last semester, we ran a HEPA pilot program at Indigo Block, a mixed income apartment complex in Roxbury. 20 households completed the pilot and 44 purifiers were distributed. This semester, we looked at the data we collected to determine how effective and affordable it is to rely on purifiers for air pollution mitigation.



### Typical Usage Pattern



We collected usage data from 10 households between November 2022 and March 2023, with a total of 848 days worth of data. Based on that information, we found the typical usage pattern for HEPA purifiers.

### Electricity costs

With an average electricity cost of 22 cents per kiloWatt hour, each purifier costs about \$5.45 per month to run, assuming that residents continue to run purifiers with the same usage patterns.

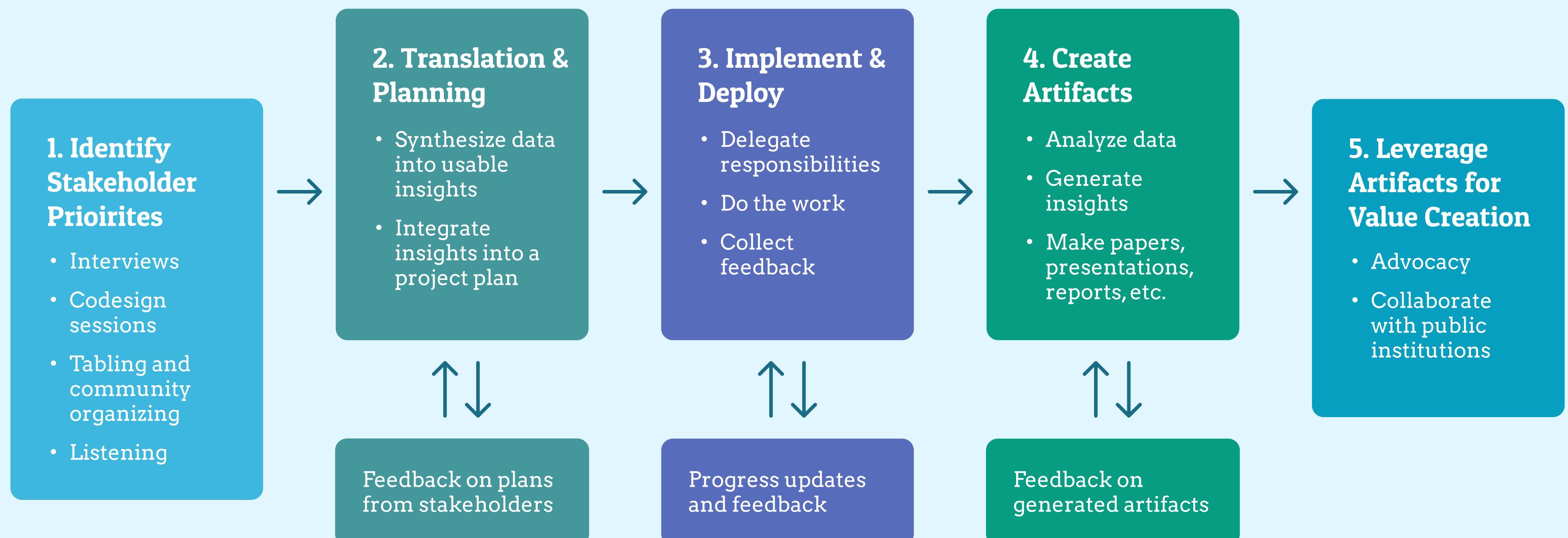
So far 5% of pilot participants have left the program specifically due to reasons related to electricity cost.

<b>Cost of electricity</b>	\$0.22 per kWh
<b>Average Power</b>	32.68 W
<b>Estimated cost per month</b>	\$5.45
<b>Estimated cost per year</b>	\$65.40

# The Airproofing Strategy

## Our Model

Our goal is to support environmental advocacy groups in their efforts to address air pollution in their communities. To this end, we've spent the last several years developing a loose framework to guide this process. Each step of this framework requires multiple iterative feedback cycles with our stakeholders to ensure that we're partnering with, rather than leading the efforts to reduce air pollution.



## Applied to Roxbury

### Community Partner



ACE is a community organization focusing on multiple environmental justice initiatives, including air quality policy advocacy and facilitating youth empowerment programs.

Learn more at [ace-ej.org](http://ace-ej.org)!

### Airproofing: A 3 Pillar Strategy

#### Local Air Quality Monitoring



Installing community owned sensors and determining sources of indoor and ambient air pollution

#### Short Term Air Pollution Mitigation



Installing HEPA air purifiers and quantifying their effectiveness in residents' homes

#### Long Term Action from Data



Making insights from data accessible and actionable for partners working on policy change

## What's Next?

Finish sensor installations, data product creation and HEPA purifier distributions in the next year.

Continue to document and share our work with the community.

Replicate the successes from Roxbury in another neighborhood in the Boston area.

### Important Considerations

Data products must be accessible and useful for our community partners in the long term.

The cost of electricity shouldn't pose a burden or prohibit residents from participating in any program.

Long-term maintenance of sensors network and data tools is critical. Is this something we steward or hand off?

Making this program more accessible and reaching a larger, more equitable group of people.