

Introduction

- The purpose of this research is to address the concerns of the health effects of ambient air pollutants for the community partners of the EQUIPP* lab in Robeson County, North Carolina.
- PurpleAir air quality monitors provide a low cost method of collecting real time PM2.5 data.
- However, there are siting concerns with their need to be plugged into an outlet for power, thus restricting the amount of air flow they receive.
- There are also significant concerns with the accessing of data from the monitor's built in SD card.
- To address these issues and to create a more efficient method of collecting accurate data, we sought to create a standardized solar-powered set-up with remote data access.

Developing a Standardized Configuration

- Conducted a literature review through mainly popular sources to craft a design for the configuration.
- Took a trial-and-error approach for implementing our design through multiple prototypes.
- Analysis of efficacy of performance through temporal data methods.

Significance

- Hot spot implementation allows for real-time access to $PM_{2.5}$ data in Robeson County
- Standardized model can be easily replicated across entire monitoring network
- Community partners can be informed and actively involved with the air quality in their region
- Real-time data allows for transparency with community partners
- Accuracy in data collected contributes to active research being conducted by the UNC School of Nursing, UNC Gilings School of Global Public Health, and EPA.

Future Perspective

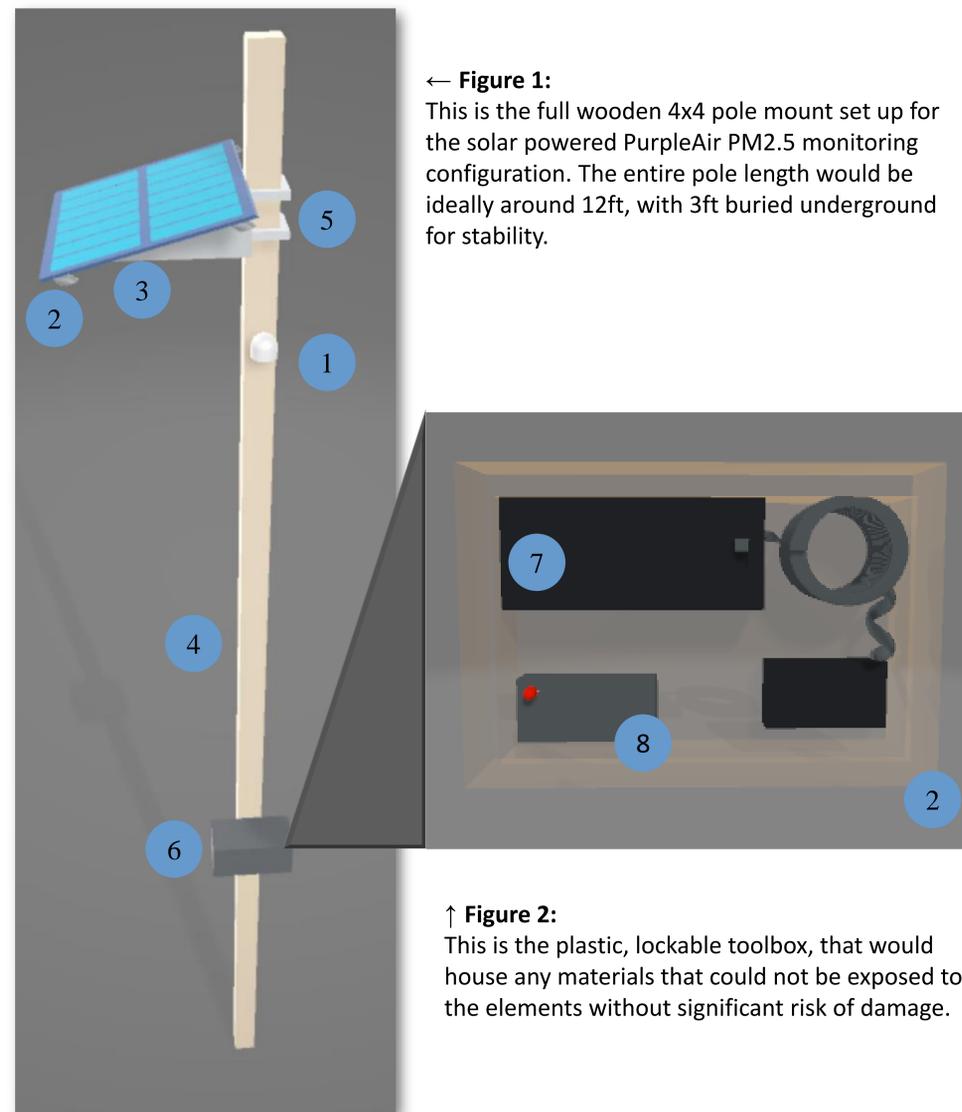
- The preliminary results suggest that the configuration generated allows for a cost effective and accessible method for acquiring PM2.5 data in Robeson County North Carolina.
- However, there are still significant concerns pertaining to quality of materials and the accuracy of their data collection methods.

Acknowledgements

- Old Main Stream Academy: Pembroke, NC
- The Lumbee Tribe of North Carolina
- Dr. William Vizuete, Department of Environmental Science and Engineering

Results

TinkerCAD Models of Mount Configuration and Battery Box



← **Figure 1:**
This is the full wooden 4x4 pole mount set up for the solar powered PurpleAir PM2.5 monitoring configuration. The entire pole length would be ideally around 12ft, with 3ft buried underground for stability.

↑ **Figure 2:**
This is the plastic, lockable toolbox, that would house any materials that could not be exposed to the elements without significant risk of damage.

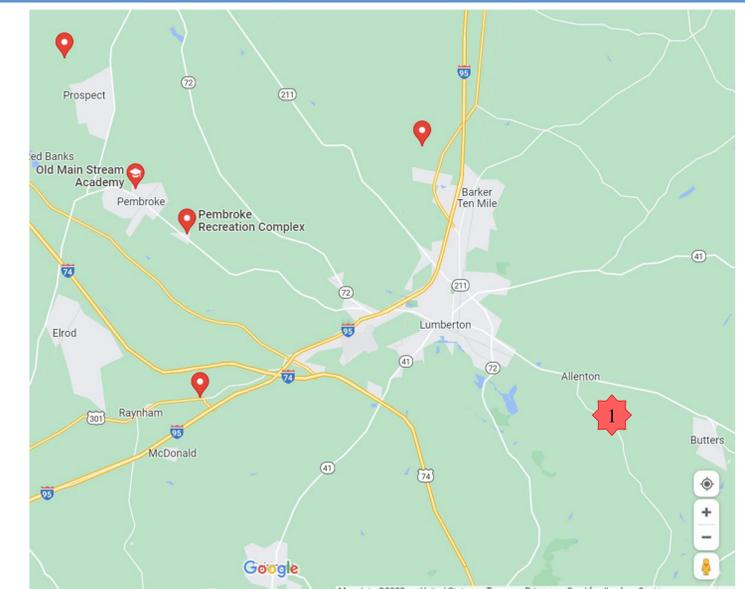
Material Expenses

Key	Material Name	Price
1	PurpleAir PA-II-SD	\$279.00
2	50 Watt Solar Panel Kit with Wiring and Solar Charge Controller	\$107.99
3	Renogy Solar Panel Pole Mount	\$67.29
4	Pressure treated Wooden 4x4	\$29.28
5	Square 4in U-Bolts	\$11.76
6	Craftsman 16-in Black Plastic Lockable Tool Box	\$10.98
7	12v 20 Ah Lithium Ion Phosphate Battery	\$98.99
8	Cellular Hotspot	\$59.99
9*	Master Lock Steel Combination Padlock	\$5.98
10*	Master Lock 6ft Looped End	\$12.98
11*	20-Pack 14-in Nylon Zip Cable Ties	\$4.28
12*	Metal Cable Tie	\$1.38
13*	3/4 in x 10 ft PVC Conduit	\$10.63
14*	Micro USB Cable, 3pack 6ft	\$8.99
Total		\$700.53

- **Items in Key correspond to TinkerCAD figure labels.**
- Materials were chosen based on cost effectiveness, keeping in mind the goal of creating a network of these solar-powered configurations.

* Items **not** included in TinkerCAD Model

Existing Purple Air $PM_{2.5}$ Monitor Network



This is the current network of PurpleAir monitors in Robeson County, NC. Location marker 1 is the only solar powered monitor in the network. All other monitors are improperly sited.

References



EQUIPP LAB
Environmentally-Engaged Communities and Undergraduate students
Investigating for Public Health Protection