

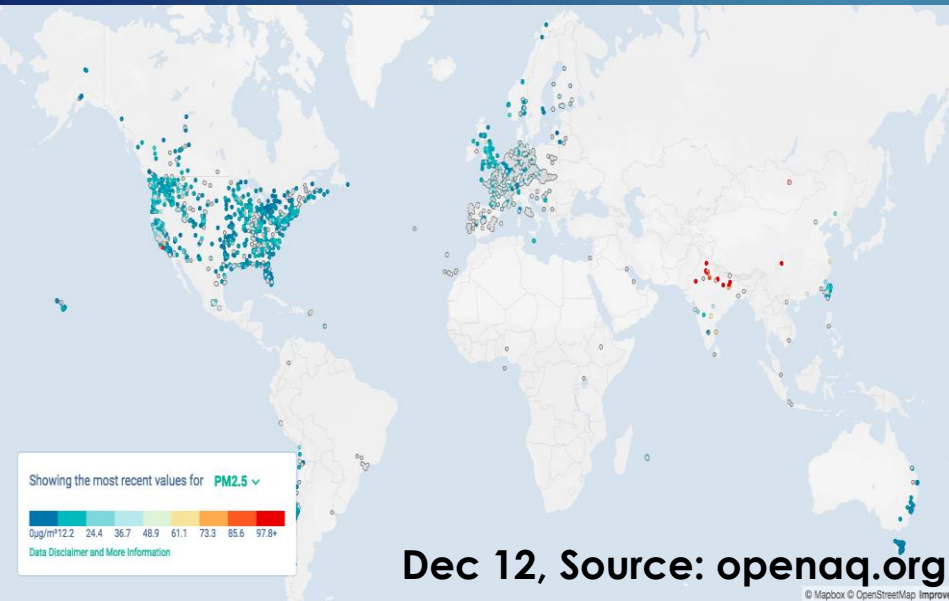
# Sensing for Community Input on Communicating Air Quality Network Concepts



AIR SENSORS INTERNATIONAL CONFERENCE  
DATA COMMUNICATIONS SESSION  
SEPTEMBER 13, 2018

# Emerging Network of Low Cost Air Quality Sensors

## Traditional Air Quality Monitoring Networks

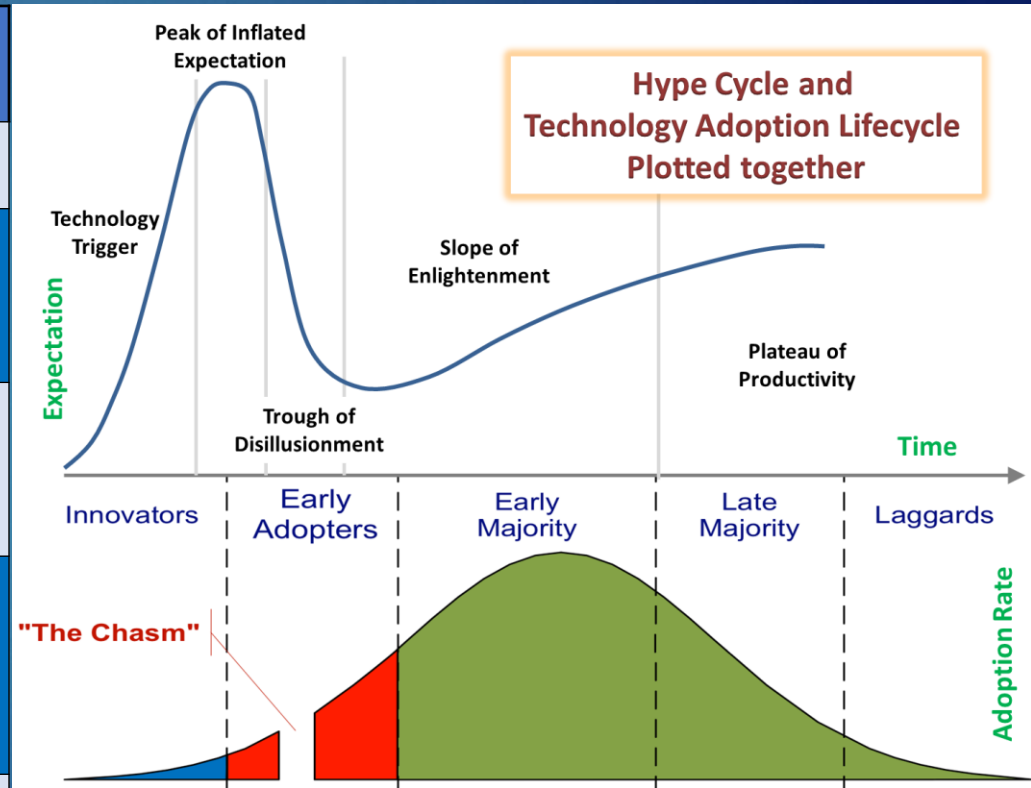


## Emerging Sensor Air Quality Networks

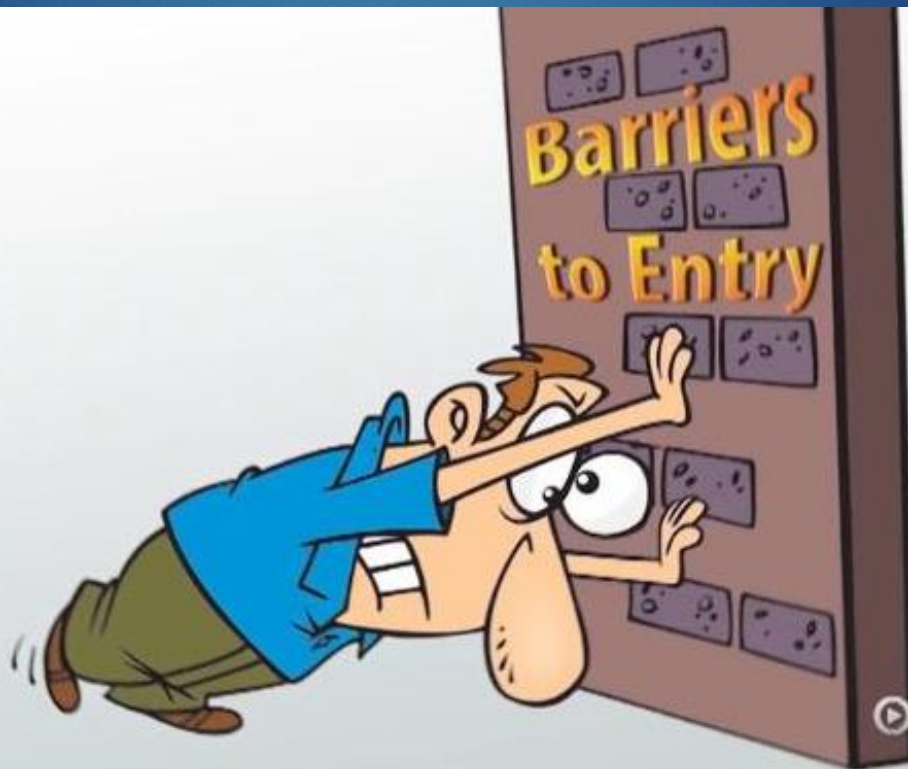


# Community and Sensor Technology Diversity

Communities	Sensors
Air Quality Awareness	Pollutants
Purpose for Air Monitoring	Application specifications?
Air Measurements Awareness	Quality
Information Tool Preferences	Technology platform/ Visualization
Time priorities	Space distribution
Socioeconomic Factors	Cost



<https://setandbma.files.wordpress.com/2012/05/technology-adoption.png>



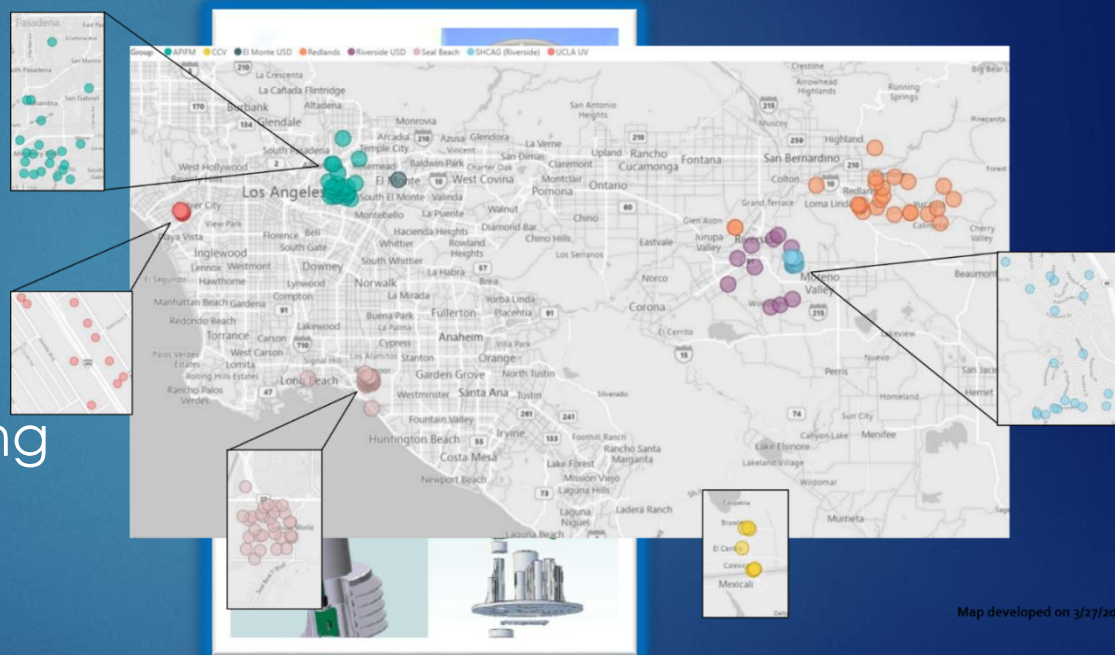
© Study.com

# Community Sensor networks Deployed

- Projects

- Multiple Air Toxics Exposure Study (MATES) V
- NASA ROSE
- Near Refinery Monitoring
- **U.S. EPA STAR Grant**

- 14 Communities
- 400 Sensors deployed



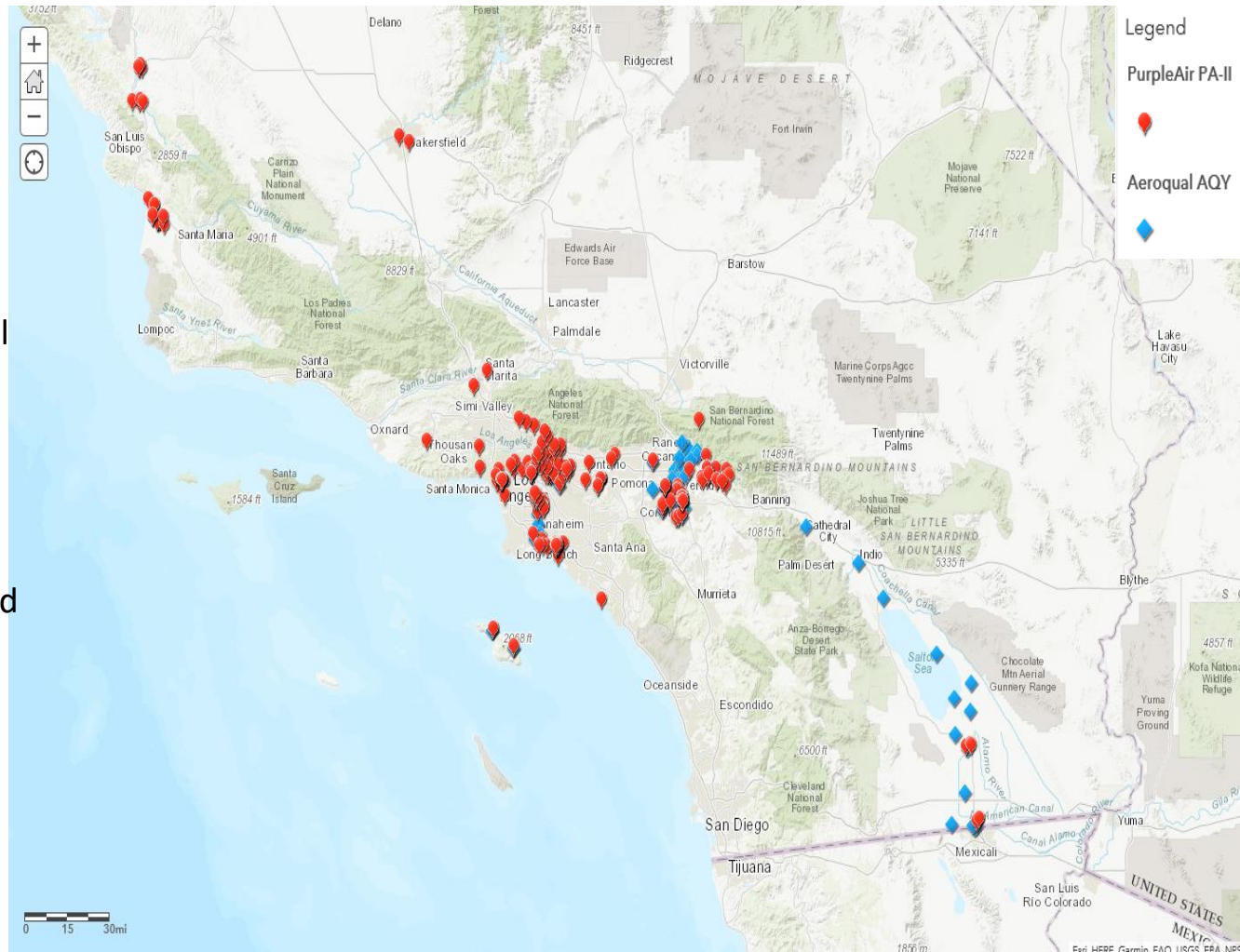
Map developed on 3/27/2018

# Engage, educate, and empower California communities on the use and applications of “low-cost” air monitoring sensors



## Specific aims:

1. Develop educational material for communities
2. Evaluate / identify candidate sensors for deployment
3. Deploy selected sensors in California communities
4. Communicate lessons learned to the public



# THE INSTALLATION GUIDE EVOLUTION



## Measuring AIR QUALITY in your community

South Coast AQMD, in collaboration with Sonoma Technology and the UCLA Fielding School of Public Health will be forming partnerships with local communities to engage, educate, and empower California communities on the use and applications of "low cost" air monitoring sensors.

### Technology for Measuring Particulate Matter

PurpleAir PA-II Dual Laser Air Quality Sensor

- 1. Dual PM sensors
- 2. Measures PM<sub>2.5</sub> and PM<sub>10</sub> along with Temperature, Relative Humidity, and Pressure
- 3. Host Requirements:
- 4. Available power source
- 5. Available Wi-Fi to log data to PurpleAir map
- 6. Easy to install with a simple screw or nail
- 7. Wi-Fi data logging with open data access at [www.purpleair.com/map](http://www.purpleair.com/map)

1. PA-II Dual Laser Sensor
2. Host device USB connection
3. Outdoor weather-resistant
4. 30 feet of cable
5. Measure sensor on the side

### Purple Air PA-II Air Quality Sensor Quick Start Guide

#### Find a location and installation

1. Look for a shaded area, ideally a north-facing part of the house.
2. Location will need to be fairly open and not in a tight space.
3. Measure sensor away from heat sources of radiators, AC units, vents, IRDJs.
4. Measure the sensor away from other cables (TV, satellite, or power lines).
5. The power supply should be measured but will not be addressed in this user manual. Make sure the unit is secured safely to avoid a tripping hazard.


#### Configure Wi-Fi

1. Ensure that the sensor is connected to power.
2. Using a Wi-Fi enabled device (cell phone, tablet, or laptop), connect to a Wi-Fi network called "Mikrotik\_junk" where junk is specific to the sensor.
3. Once Wi-Fi is connected to the "Mikrotik\_junk" network, open an internet browser and type in <http://192.168.1.2> to connect directly to PA-II and display the sensor's status and configuration page.
4. Press on the "Wi-Fi Settings" link and enter your personal Wi-Fi access name from the list, enter the password, and press save.
5. Once the monitor successfully connects to your Wi-Fi, it will start uploading data and the distribution page will be no longer be available to connect to your Wi-Fi.

#### Register your PurpleAir Device

1. From [www.purpleair.com/register](http://www.purpleair.com/register)
2. Enter a PA-II ID number (the PA-II ID sensor unique to the sensor)
3. Associated email [myemail@purpleair.com](mailto:myemail@purpleair.com) (this email is used for updates)
4. Available Choice "Sensor"
5. Location Name: Use latitude/longitude for the PA-II
6. Available Choice "Place (optional)"
7. Map location: Drag latitude and longitude readings or drag marker to your location
8. Drop sensor on the map with default settings to Register (optional)
9. Drop sensor on the map
10. Device sensor's name
11. Will not share or contribute information
12. Add your personal email or community group email address [myemail@purpleair.com](mailto:myemail@purpleair.com) (optional)
13. Add your personal or community group phone number

300  
Citizen  
→  
Scientists  
Later




## Measuring AIR QUALITY in Your Community

The South Coast AQMD, in collaboration with Sonoma Technology and the UCLA Fielding School of Public Health, will be forming partnerships with local communities to engage, educate, and empower California communities on the use and applications of "low cost" air monitoring sensors.

### Technology for Measuring Particulate Matter (PM)

PurpleAir PA-II Dual Laser Air Quality Sensor

1. PurpleAir PA-II Dual Laser Sensor
2. Location should receive supply
3. 17 Feet of Cable



Two sensors

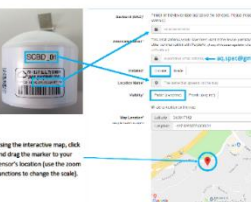
- 1. Dual PM sensors
- 2. Measures PM<sub>2.5</sub> and PM<sub>10</sub> along with Temperature, Relative Humidity, and Pressure
- 3. Host Requirements:
- 4. Available power source
- 5. Available Wi-Fi to log data to PurpleAir map
- 6. Easy to install with a simple screw or nail
- 7. Wi-Fi data logging with open data access at [www.purpleair.com/map](http://www.purpleair.com/map)

More USB power port

Page 1 of 6

### STEP 2 - Register to Your PurpleAir Device

From [www.purpleair.com/register](http://www.purpleair.com/register), an internet enabled device and input the following information:



Using the interactive map, click and drag the marker to your sensor's location (click the zoom functions to change the scale).

Page 2 of 6

### PurpleAir PA-II Air Quality Sensor Quick Start Guide


(More helpful information is available on page 6 of this guide)

#### STEP 1 - Finding a location and installation

1. Look for a shaded area, ideally a north-facing part of the house.
2. Location will need to be fairly open and not in a tight space.
3. Measure sensor away from heat sources of radiators, AC units, vents, IRDJs.
4. Measure the sensor away from other cables (TV, satellite, or power lines).
5. The power supply should be measured but will not be addressed in this user manual. Make sure the unit is secured safely to avoid a tripping hazard.

#### STEP 2 - Configure the Wi-Fi

1. Ensure that the sensor is connected to power. When powered, you will see a red LED to indicate the sensor.
2. Using a Wi-Fi enabled device (cell phone, tablet, or laptop), connect to the Wi-Fi network called "Mikrotik\_junk" where junk is specific to the sensor. This device may display an error like "Network may not be available." This is normal and should be ignored for the first step.



Page 3 of 6

### Register Your PurpleAir Device (continued)

Leave the information in this section as is, no edits needed.

Your first and last name (required)

Your email address (required)

Your phone number (optional)

After reading and agreeing to the Terms of Use and Conditions, click the box then click "Register" to complete the registration.

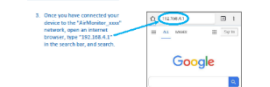
The installation is now complete and your sensor is now visible on the PurpleAir Map! [www.purpleair.com/map](http://www.purpleair.com/map)

(More helpful information is available on page 6 of this guide)

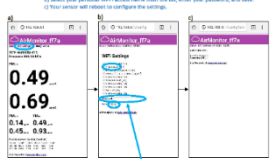
Page 4 of 6

### Confirming the Wi-Fi (continued)

3. Once you have entered your correct Wi-Fi information, your network, open an internet browser, type ["192.168.1.2"](http://192.168.1.2) in the search bar, and search.



4. If presented the Wi-Fi (continued) link, enter your password, and save. If your sensor will not connect, compare the settings.



Be sure to input the correct Wi-Fi password! Research as you register.

5. Once the monitor successfully connects to your Wi-Fi, it will start uploading data and the "Mikrotik\_junk" network will no longer be available to connect to Wi-Fi.

Page 5 of 6

### Helpful Information:

- 1. Your sensor name should be kept as is. It will remain configured with the Wi-Fi information and automatically renamed once the sensor starts back on as long as the ID is the same and password remained the same.
- 2. If your sensor does not connect, the data previously collected and uploaded to PurpleAir will still be available. However, the sensor will not collect data while the Wi-Fi is not connected to your monitoring station.
- 3. The "Mikrotik\_junk" network is only available to connect to while the sensor's configuration is Wi-Fi.
- 4. To change the information the sensor was registered with, simply repeat the configuration process with the correct updated information and the original information will be replaced.
- 5. The sensor will be included and reported again provided the new location is within 1 mile of the second name of the study. Registering the sensor with the updated information will replace the previously registered information. Contact the AQMD program at [SCAQMD@purpleair.com](mailto:SCAQMD@purpleair.com) before a relocation is completed.
- 6. If you are unable to register your sensor on the PurpleAir Map, it is possible that your sensor ID number is already an existing sensor ID number. The PurpleAir Map will "tag" the sensor's name and should appear on the map as a grey sensor. If you believe it is currently offline and not reporting data, your sensor's ID may need to be changed and/or your sensor may need to be tagged to new sensor. If you did connect your sensor on the map, it is possible that your sensor has not been configured or is not registered correctly. Repeat your sensor setup by unregistering the PurpleAir registration process with the current information and then register your sensor on the PurpleAir Map, attach a power supply by unplugging the unit, waiting 30 seconds, and plugging it back in.

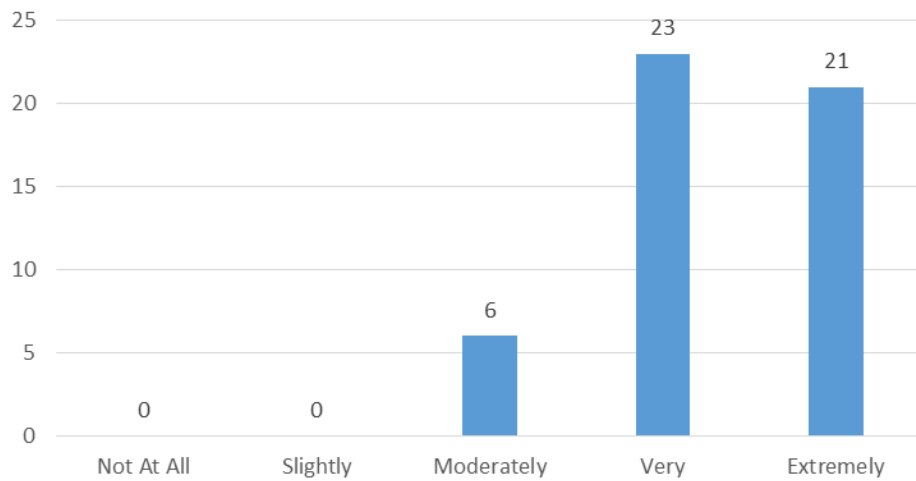
Register sensor  
Email: [myemail@purpleair.com](mailto:myemail@purpleair.com)  
Tel: +1 (909)266-2713

Page 6 of 6

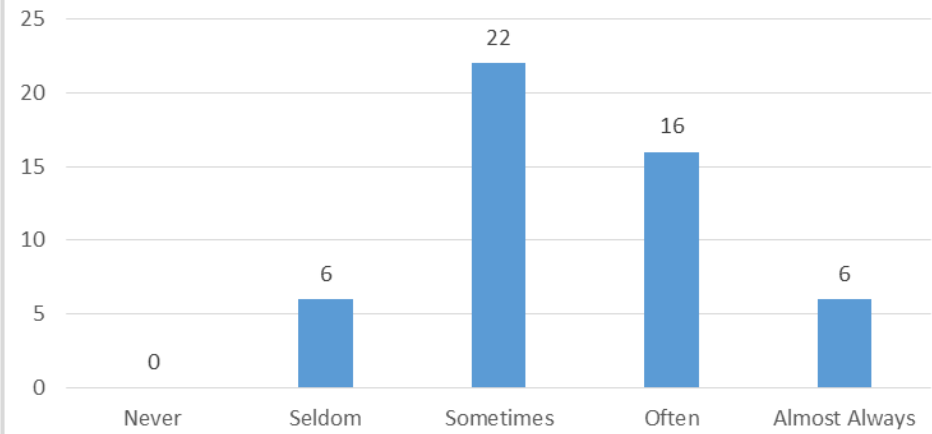
- VERSION 1, TWO PAGES
- CREATED PRIOR TO COMMUNITY GROUP MEETINGS
- INCLUDED BRIEF SENSOR INFORMATION AND INSTRUCTIONS FOR SITING, INSTALLING, CONFIGURING, AND REGISTERING
- VERSION 7, SIX PAGES
- INPUT GATHERED FROM COMMUNITY GROUP MEMBERS AND FREQUENTLY ASKED QUESTIONS CONTRIBUTED TO THE MULTIPLE VERSION EDITS
- ADDED SENSOR INFORMATION, IMAGES, SIMPLIFIED INSTRUCTIONS, VISUAL AIDS, AND A "HELPFUL INFORMATION" SECTION

# COMMUNITY SURVEYS: AIR QUALITY

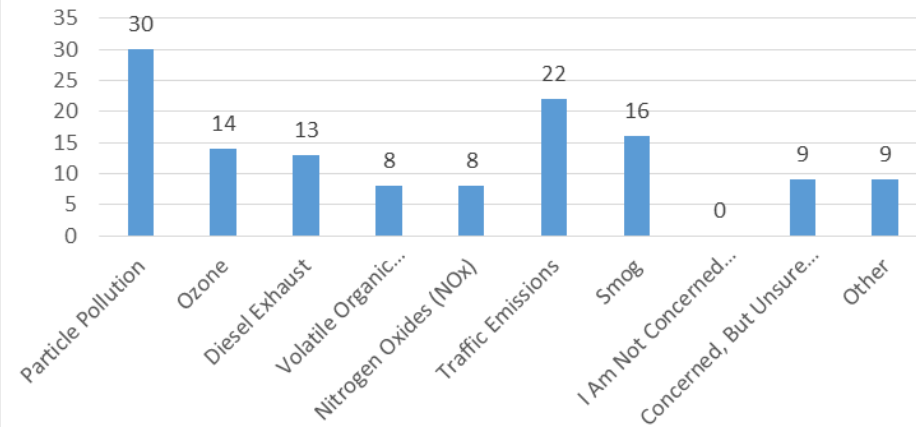
## How Concerned Are You About Air Quality?



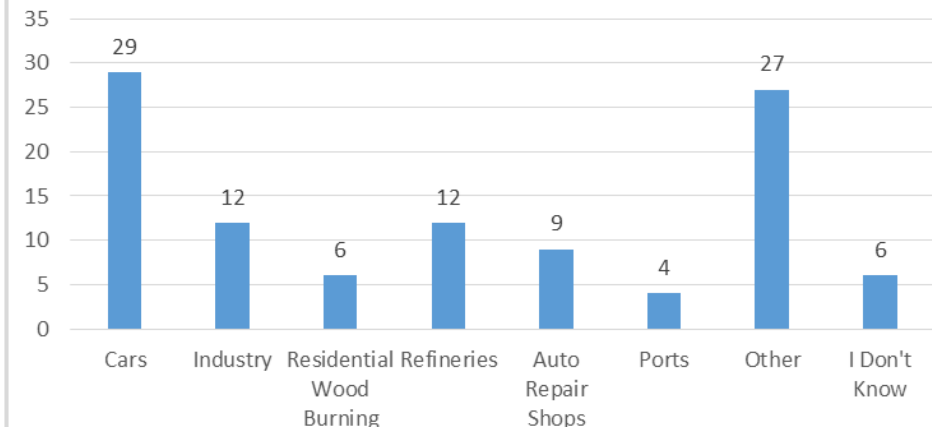
## How Often Does Air Quality Affect You And/OR Your Family?



## What Air Pollutants Are You Concerned About In Your Area?



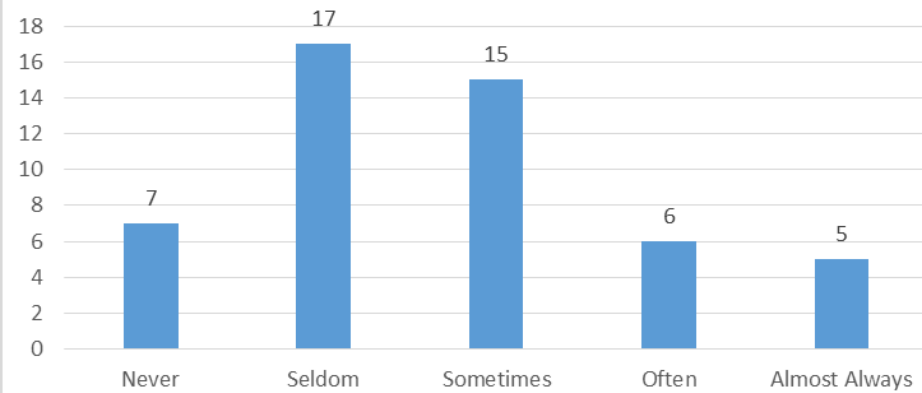
## What Are The Biggest Causes Of Air Quality Problems Where You Live?



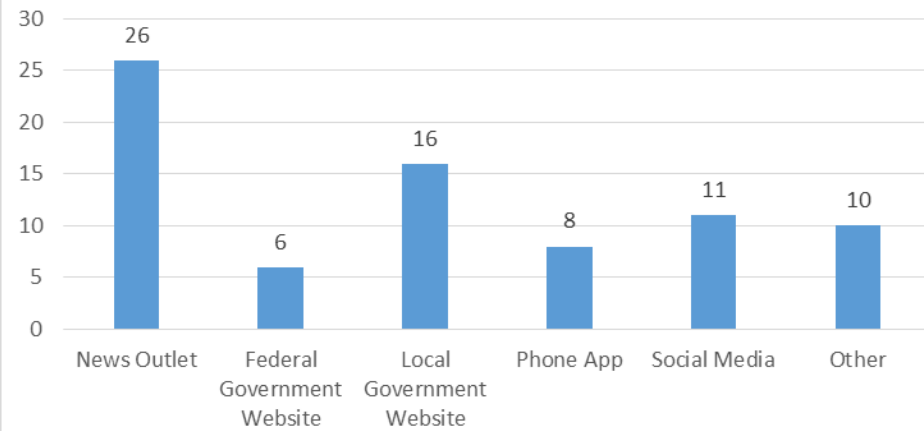


# COMMUNITY SURVEYS: AIR QUALITY INFORMATION

How Often Do You Check Local Air Quality Information Before Outdoor Activities And Other Behaviors?

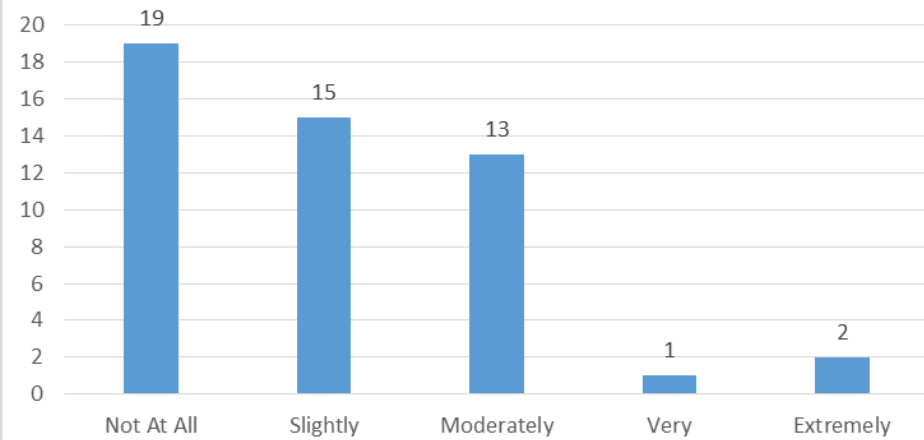


How Do You Typically Get Information About Air Quality In Your Community?

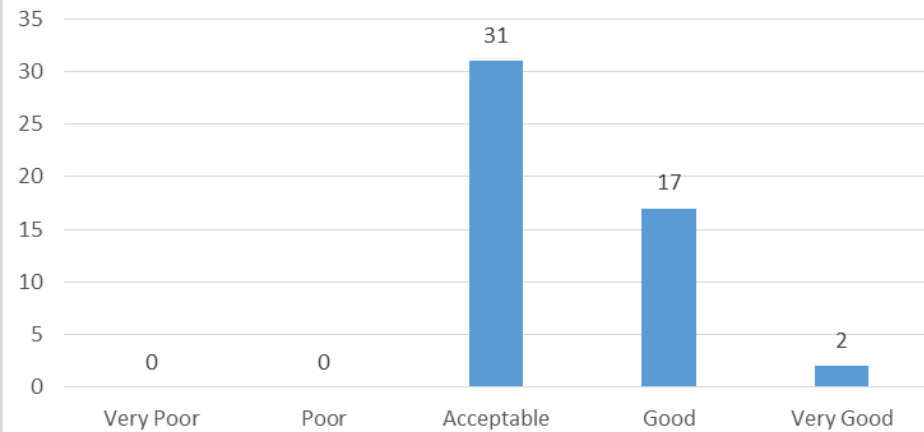


# COMMUNITY SURVEYS: SENSORS

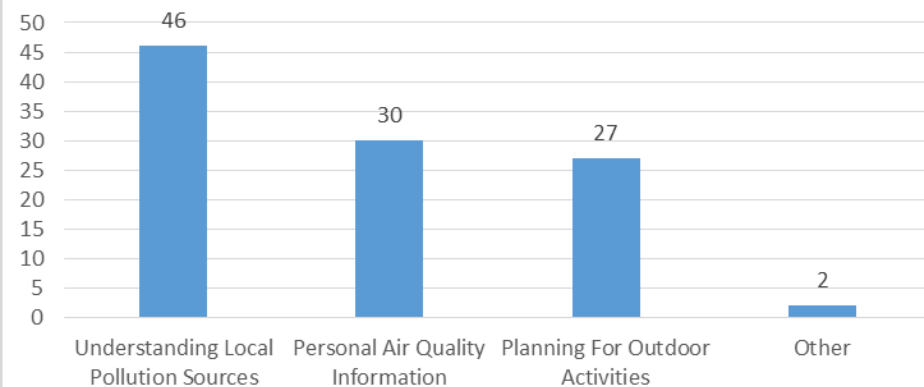
## How Familiar Are You With Low-Cost Air Quality Sensors?



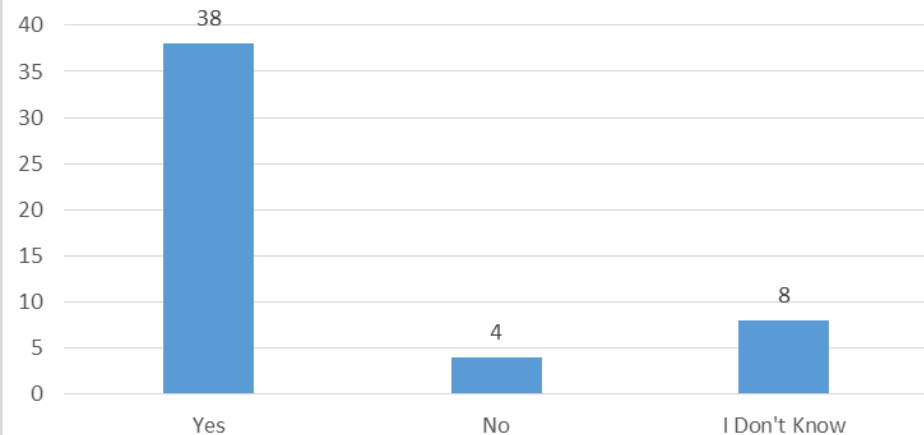
## How Credible Are Data From Low-Cost Air Quality Sensors?



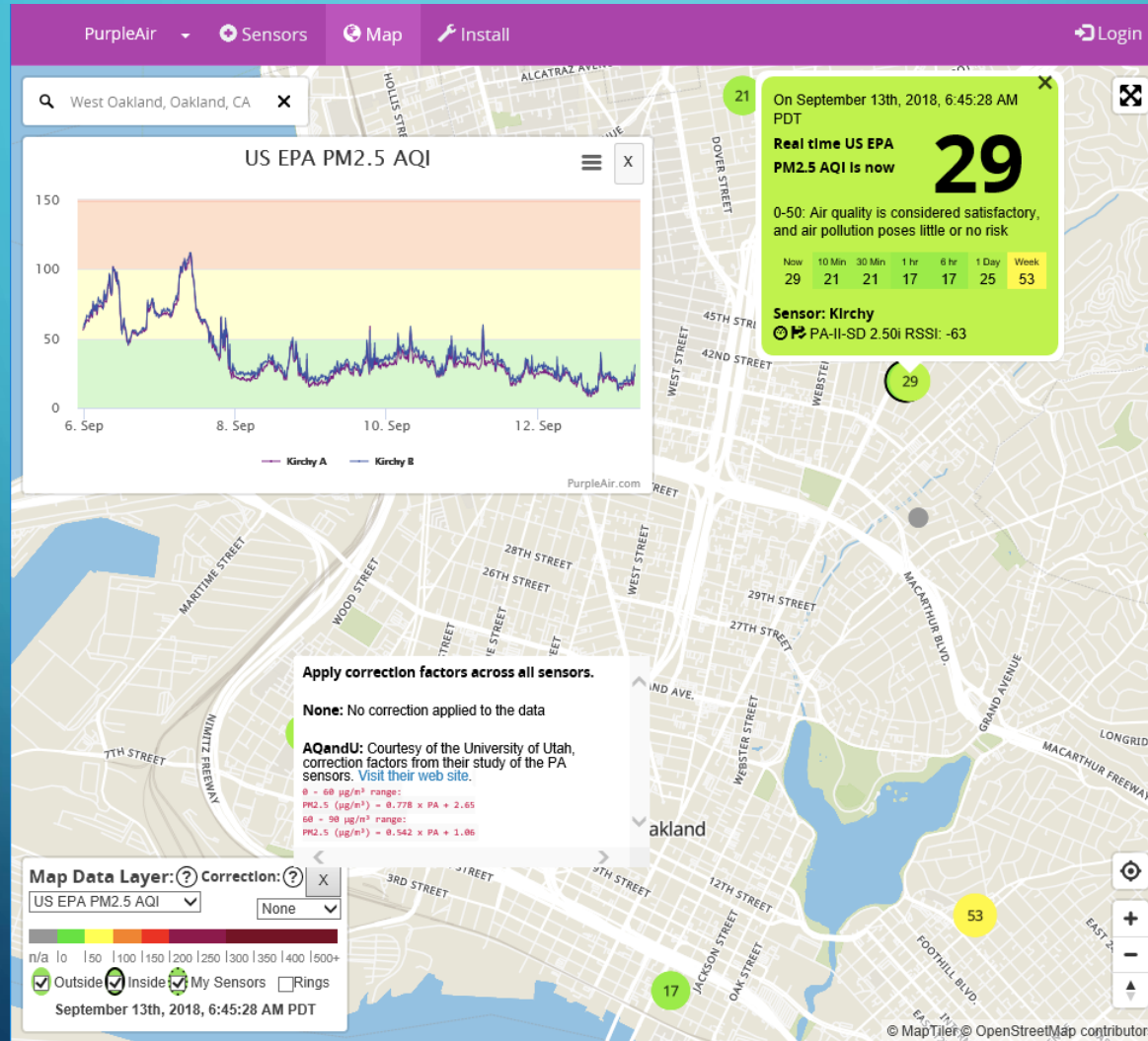
## What Types Of Applications Do You Think Low-Cost Air Quality Sensors Could Be Useful To You/Your Community?



## Do You Think You Would Change Your Behavior Based On Air Quality Sensor Data?



# EXPLORING DATA VISUALIZATION



# Concluding Thoughts and Next Steps

- ▶ Sensor and community diversity a challenge
  - ▶ Connect sensors to specific objectives
  - ▶ Reduce barriers to entry
- ▶ Assessing and communicating sensor capability information
- ▶ Collaborative approach: Communication toolboxes are evolving and improving
- ▶ Phase II: Further data presentation and visualization improvements and follow up feedback from community