Sonoma Technology, Inc.

South Coast AQMD

UCLA

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

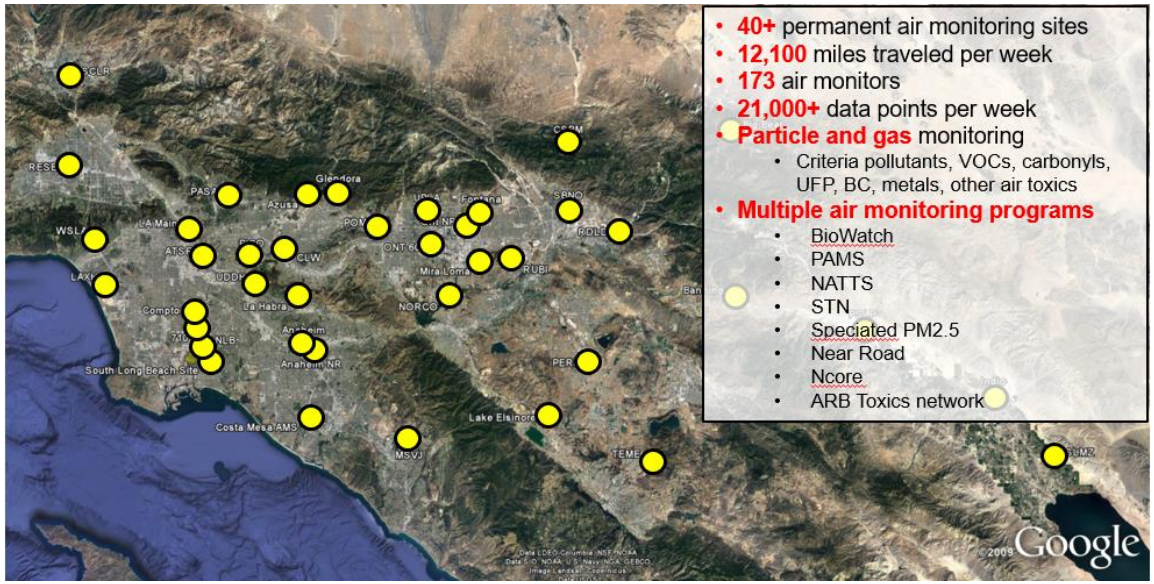

**Pre-Deployment Workshop**

(Conducted October 2017 – May 2018)

# Background

- SCAQMD is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties.

- Monitoring and analysis division
  - 40+ monitoring stations (criteria pollutants and air toxics)
  - State-of-the-art laboratory

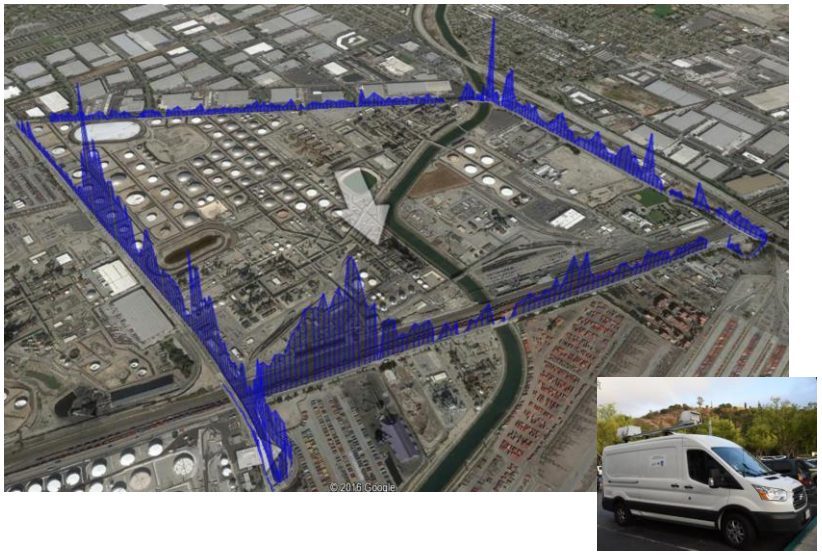


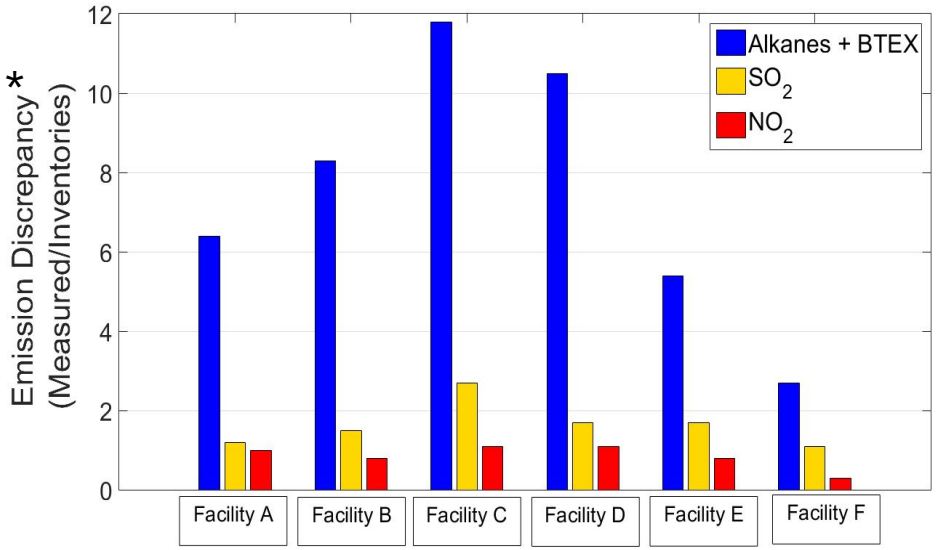
# Background

- Working with Environmental Justice (EJ) communities is one of the most important parts of our mission

- **Example 1**: measure air toxic emissions from refineries, small sources and nearby communities

***Refineries***






*September 2015

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- **Example 1**: measure air toxic emissions from refineries, small sources and nearby communities

***Oil treatment facility***



*MATES IV Basin annual average: 0.4 ppb

# Background

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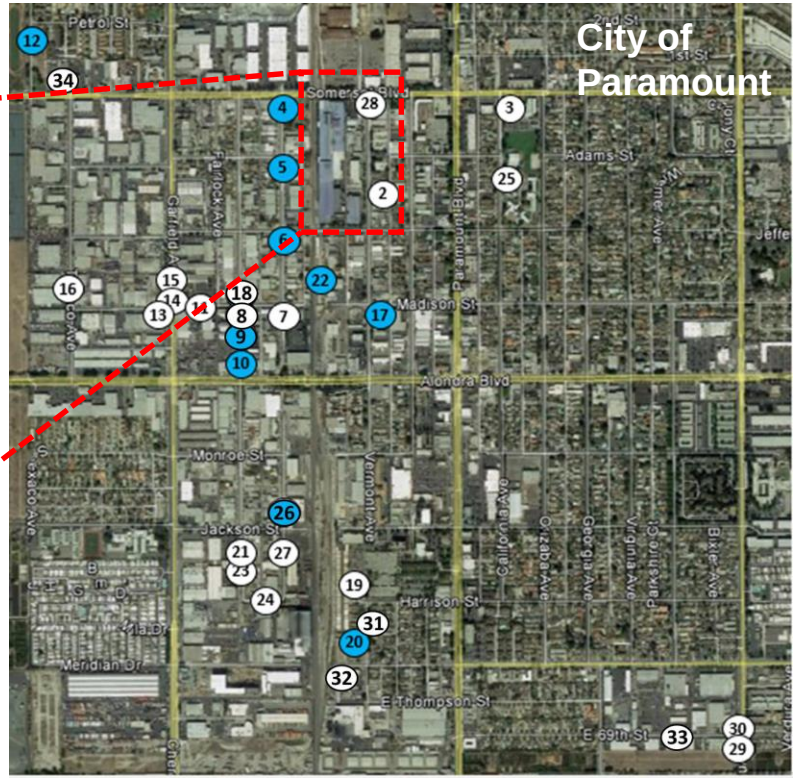
- **Example 2**: monitor Cr6+ and other air toxic emissions from metal processing facilities

# Background

## Problem Identification

- Odor complaints
- High readings at monitoring stations
- Inspection results
- Visual cues (e.g., flares)
- Catastrophic events (e.g., explosion!)
- Other

- Community participation: YES

## Action

- Increased inspections
- Increased monitoring
- Use / development of new technologies

- Community participation: NOT ALWAYS

## Result

- Development of new regulations
- Examples:
  - Rule 1180: Refinery fenceline and community monitoring (SCAQMD)
  - Flaring rule (SCAQMD)
  - AB617 (State)
  - Many more….

- Community participation: NOT DIRECTLY

How can community members take action to help address local air quality problems?

# “Low-cost” Sensors

Pros:

- Rapidly proliferating
- Tremendous potential
  - Low-cost
  - Ease of use
- Multiple potential applications
  - Spatial/Temporal air quality info
  - Fence-line applications
  - Regulatory/Academic/Citizen scientist

Cons:

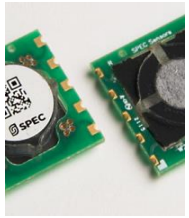
- Issues with accuracy, durability, calibration, and overall performance











# EPA STAR Grant

- SCAQMD is interested in working with California communities to address local air quality issues
- EPA STAR Grant: Prestigious Research Grant. 99 applicants Nationwide; only 6 recipients (mostly Universities)

# Main Objective

- Provide communities across California with the knowledge necessary to <u>appropriately</u> select, use, and maintain “low-cost” sensors and to correctly interpret the collected data

# Specific Aims

**Aim 1:** Develop new methods to engage, educate, and empower local communities on the use and applications of “low-cost” sensors

**Aim 2:** Conduct field and laboratory testing to characterize the performance of commercially available “low-cost” sensors and to identify candidates for field deployment

**Aim 3:** Deploy the selected sensors in multiple California communities, and perform a thorough validation and interpretation of the collected data

**Aim 4:** Communicate the lessons learned to the public and organize outreach activities

# Community Selection

- Recommendations by Community Groups
- Local air quality problem(s) (e.g., proximity to freeways, refineries, other sources)
- Existing air monitoring related work
- Commitment to work with the SCAQMD until the end of this study

# Sensor Selection

- Community needs (e.g., $PM_{2.5}$ monitoring in inland communities)
- Good sensor performance as demonstrated by AQ-SPEC (www.aqmd.gov/aq-spec)
- Power requirements (solar panel, battery, AC)
- Weatherproof
- Data Storage (internal vs cloud)
- Data analytics, visualization and mapping (website and/or cellphone app);
- Cost effectiveness (e.g., low-cost PM monitor vs expensive VOC sensing device)

# Key Questions…and Answers

Q: How many sensors will be deployed during this study?
A: We have already purchased over 400 PM sensors to be deployed throughout California communities. We are also working with University of Auckland and Aeroqual (New Zealand) to deploy 100 of their multi-pollutant sensor devices.

Q: Where will the sensors be deployed?
A: Outdoors, at a location suitable to collect representative air quality data.

Q: What is going to happen with the sensors after the project ends?
A: The PM sensor is yours to keep and the sensor data will be posted online even after the end of the study.

Q: How are residents/project participants going to access the data?
A: Via a dedicated website.

Q: Is the data going to be presented in a way that is easy to interpret?
A: Yes. One of the main goals of this study is to communicate air quality data in a way that is easy to interpret by the general public.

# Key Questions…and Answers

Q: Other than providing access to WiFi and access to a power outlet, what other commitments are required from project participants?

A: Commitment to participate in meetings/workshops before, during and after the sensors have been deployed.

Q: Can schools participate in the project? If so, can they use the sensors as an educational tool?

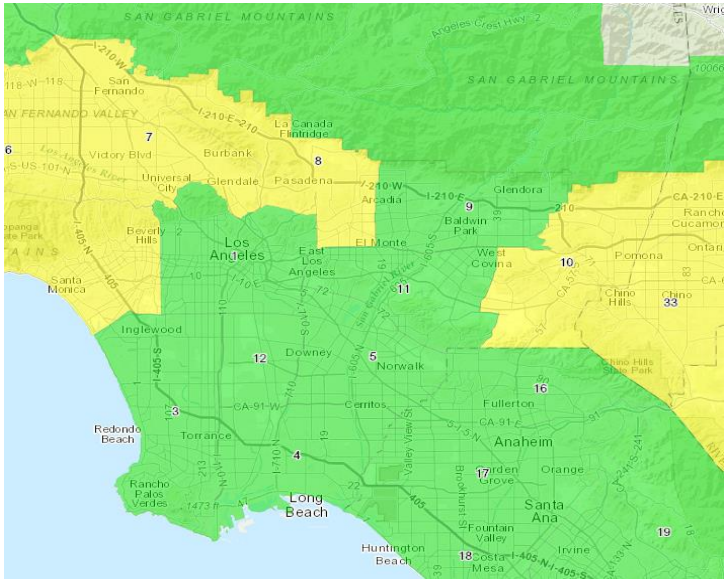
A: Yes. We will work with a few schools in different parts of California, deploy sensors at students' and teachers' homes, and educate them in the use and operation of air quality sensors.

Q: Will local air quality agencies be invited to participate in this study?

A: Yes. Local air quality agencies will be asked to share resources and contribute to the project.

# Thanks!

From

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