SCLA PUSH

South Central Los Angeles Project to Understand the Sources and Health impacts of local pollution

Historic South Central

Harvard Park

Watts

AIR QUALITY ACADEMY

CURRICULUM BOOKLET

AIR QUALITY ACADEMY

The South Central LA Project to Understand the Sources and Health Impacts of Local Pollution (SCLA: PUSH) is a collaborative effort between organizations, residents and academic partners. It aims to build the capacity of South Central LA organizations and community residents to better understand the state of air quality and health in their community, and to engage in air monitoring and data analysis.

Residents and advocates will build their air quality knowledge and capacity to monitor through the Air Quality Academy, whose goals are threefold:

1 To build our collective capacity to identify sources of air pollution in South Central LA using monitoring technology,

2 To mobilize the South Central LA community to strengthen existing and future air quality policies, and

3 To ensure that South Central LA gets its fair share of resources and funding to improve the air.

Physicians for Social Responsibility-LA (PSR-LA) is leading the SCLA-PUSH Initiative and is an organization that advocates for policies and practices that improve public health, eliminate environmental and nuclear threats, and address health inequalities.

Strategic Concepts in Organizing and Policy Education (SCOPE) builds grassroots power to create social and economic justice for low-income, women and women identifying, immigrant, black, and brown communities in LA. To do this, SCOPE organizes communities, develops leaders, collaborates through strategic alliances, builds capacity through training programs, and educates South L.A.'s residents to have an active role in shaping policies that affect the quality of life in our region. Our core values are: justice, respect, responsibility, integrity, and voice.

Community Health Councils (CHC) is a community-based health policy and systems change organization. CHC engages all levels of stakeholders and contributes to systems change in two distinct ways: 1) through coalition building and mobilization and 2) by utilizing robust community-based participatory research.

Jill Johnston is Assistant Professor of Preventive Medicine and Director of Community Engagement in the Division of Environmental Health at the University of Southern California,. She is an expert in environmental and climate justice, and has conducted extensive research on pollution and health across Los Angeles.

Bhavna Shamasunder is Associate Professor of Urban and Environmental Policy at Occidental College. She teaches and conducts research at the intersection of environmental health & justice with a focus on inequalities faced by low-income communities and communities of color who live and work in urban and/or industrial environments.

Omar Ureta is a design technologist revealing the complexities of land use planning and development. As an urban design consultant, he advocates for architecture in support of the public realm by improving on public outreach and public process. As a civic hacker, Omar experiments with new ways to interactively communicate land-use issues through the use of open source tools and open data.

Dr Peter Sinsheimer is a professor at the University of California Los Angeles' Fielding School of Public Health, and the Executive Director of the UCLA Law and Environmental Health Sustainable Technology & Policy Program. Dr. Sinsheimer is a leading voice in the movement to establish alternatives analysis as a necessary science and policy tool to promote the innovation and diffusion of safer technologies

PROJECT LEAD

PROJECT PARTNERS

AIR QUALITY ACADEMY
OVERVIEW

The Air Quality Academy (AQA) is a 2-day training that aims to increase the capacity of South Central residents, organizers and activists to characterize the quality and scale of air pollution within their communities. This is accomplished through collaborative learning, technical training and direct air quality data collection.

The goals of this training are:

- To educate participants on fundamental air quality topics, including the history of air pollution in LA, the types and sources of pollutants, the health risks associated, and current efforts to address the problem;

- To train participants in collecting air quality data using monitoring sensors and ground truthing methodologies; and

- To prepare participants to engage in efforts to substantively transform the systems which allow poor air quality to persist in our communities.

At the completion of the AQA, all participants will:

- Have a solid understanding of air quality as a technical topic, including the history of air pollution, the types air pollutants, the sources and health impacts;

- Have cultivated the ability to assess air quality as part of a larger system of cumulative risk and burden;

- Be able to use air monitoring technology to collect, analyze, and understand air quality data;

- Become proficient in ground-truthing and identifying sources of pollution in their communities; and
Understand how poor air quality is couched in larger systems of regulatory and policy failures, and how we can mobilize to fight these structural failures.

AGENDA

THURSDAY 6/27, 5:00 - 8:00PM

Time	Activity
5:00 - 5:15	Introductions, agreements & training overview
5:15 - 5:45	Part 1: a brief history of air quality, regulation & activism
5:45 - 6:30	Part 2: breaking down air quality basics
6:30 - 6:45	Break
6:45 - 7:15	Part 3: the state of the air in South Central LA today
7:15 - 7:55	Part 4: moving towards meaningful solutions that go beyond monitoring
7:55 - 8:00	Wrap up

FRIDAY 6/28, 2:00 - 5:15PM

Time	Activity
2:00 - 2:10	Day 2 overview, ice-breaker
2:10 - 2:30	Part 1: Monitoring 101
2:30 - 3:15	Part 2: getting trained in air monitoring & ground truthing
3:15 - 3:30	Break into 3-person pods, and Practice
3:30 - 3:45	Break & head outside to monitor & ground-truth
3:45 - 4:45	Ground truthing and air monitoring
4:45 - 5:15	Wrap up, evaluations & celebration!

MODULE 1:

"GETTING GROUNDED"

A BRIEF HISTORY OF AIR QUALITY IN LOS ANGELES

LA AIR QUALITY, THEN AND NOW

Major car companies began purchasing public transit companies, effectively putting them out of business. The rapid growth of the automobile industry in the middle of the century began to drastically change Los Angeles' physical landscape.[3]

1890s

At the turn of the 19th century, the automobile arrived in Los Angeles, creating an alternative form of transportation from the common horse drawn and street cars methods of transit [1]

Early 20th Century

In the early twentieth century, discriminatory real estate practices, like redlining, cemented a pattern of exclusionary development across Los Angeles. These practices and policies allowed for White home ownership in suburban areas of Los Angeles, while concentrating industrial activity in non-White and immigrant areas, including in and around South Central LA. During this time, Los Angeles' manufacturing sector grew rapidly and several national firms established plants in South Central LA, including Goodyear, Firestone, Phelps-Dodge and U.S. Steel. [2]
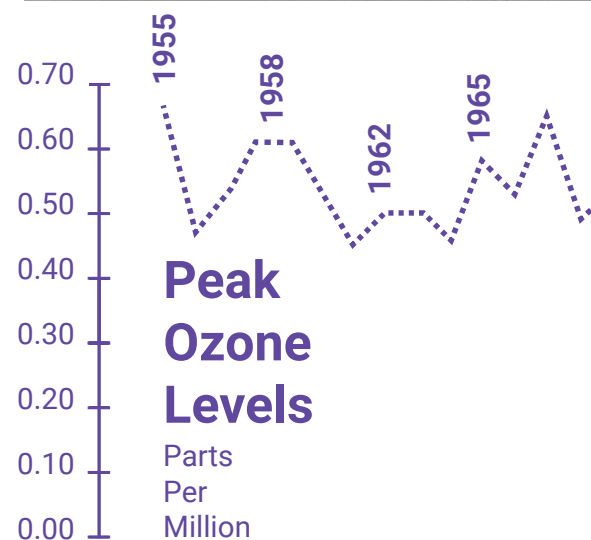
1940s   1943

In 1943, the LA Times reported that a pall of smoke and fumes descended on downtown, cutting visibility. Striking in the midst of a heat wave, the "gas attack" was nearly unbearable, gripping workers and residents with an eye-stinging, throat-scratching sensation. As a result, the city implemented the creation of an air pollution permit system, despite stiff opposition from the LA Chamber of Commerce.[4]

NOTES
What do you think about the timeline?
Are you familiar with any of these historical moments?
What do you find surprising?
Is anything missing?

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_____

_____

_____

_____

Peak Ozone Levels

Parts Per Million

0.70 — 1955
0.60 — 1958
0.50 — 1962   1965
0.40
0.30
0.20
0.10
0.00
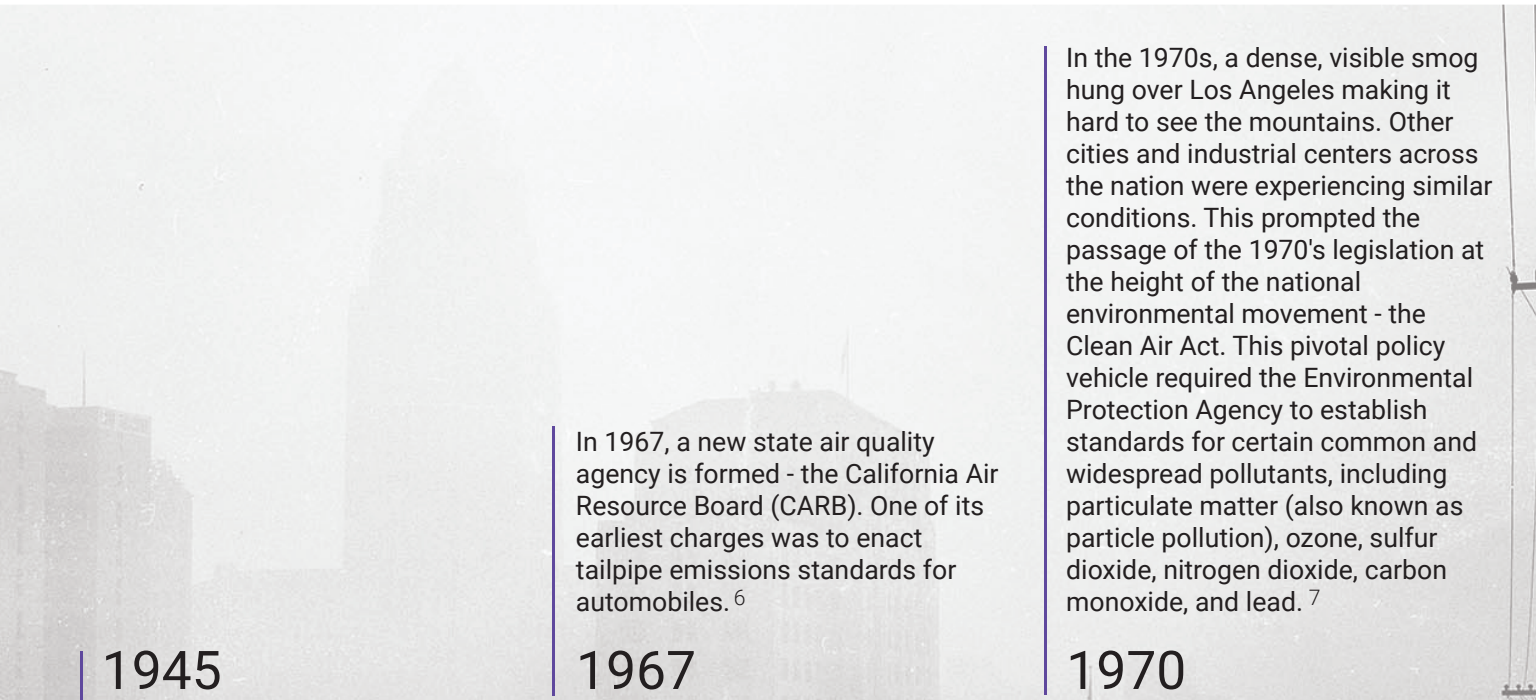
1. https://www.smithsonianmag.com/history/nobody-walks-in-la-the-rise-of-cars-and-the-monorails-that-never-were-43267593/
2. https://www.jstor.org/stable/1515377?seq=1#page_scan_tab_contents
3. https://www.smithsonianmag.com/history/nobody-walks-in-la-the-rise-of-cars-and-the-monorails-that-never-were-43267593/
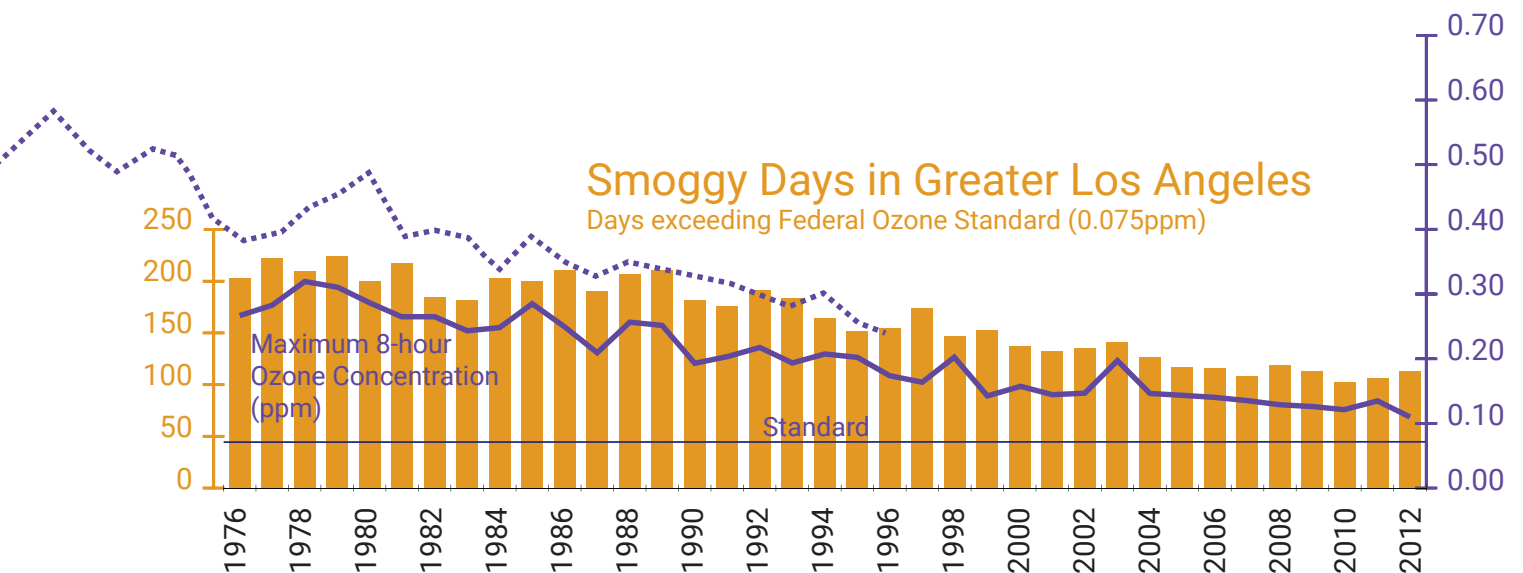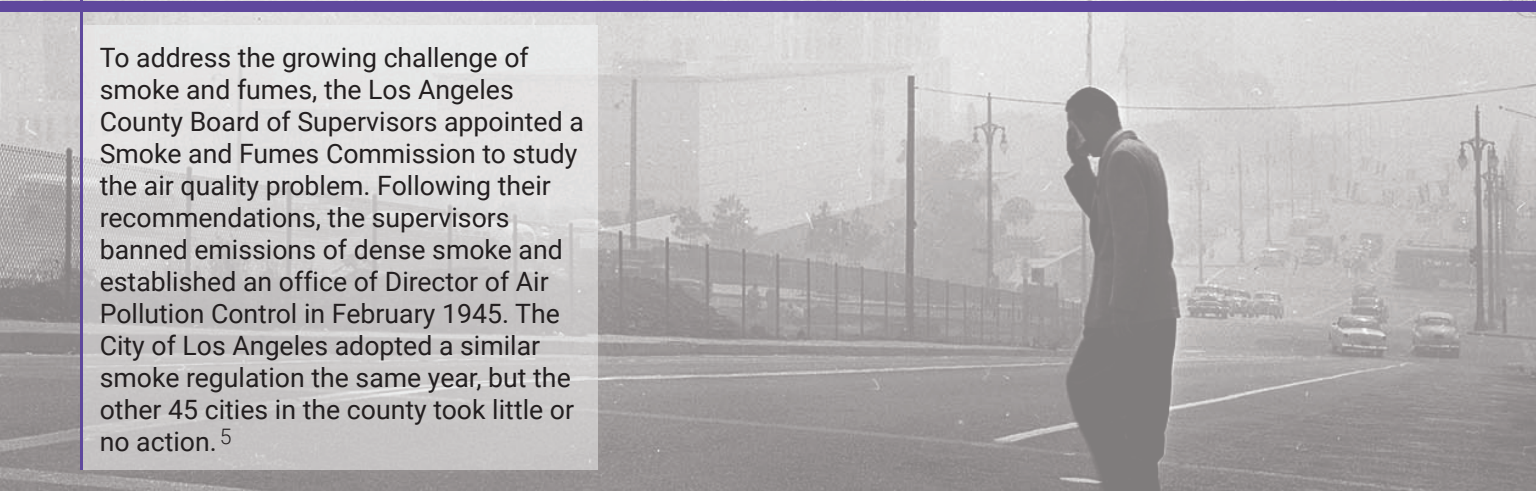4. https://www.aqmd.gov/home/research/publications/50-years-of-progress

In 1967, a new state air quality agency is formed - the California Air Resource Board (CARB). One of its earliest charges was to enact tailpipe emissions standards for automobiles. [6]

In the 1970s, a dense, visible smog hung over Los Angeles making it hard to see the mountains. Other cities and industrial centers across the nation were experiencing similar conditions. This prompted the passage of the 1970's legislation at the height of the national environmental movement - the Clean Air Act. This pivotal policy vehicle required the Environmental Protection Agency to establish standards for certain common and widespread pollutants, including particulate matter (also known as particle pollution), ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, and lead. [7]

1945

1967

1970

To address the growing challenge of smoke and fumes, the Los Angeles County Board of Supervisors appointed a Smoke and Fumes Commission to study the air quality problem. Following their recommendations, the supervisors banned emissions of dense smoke and established an office of Director of Air Pollution Control in February 1945. The City of Los Angeles adopted a similar smoke regulation the same year, but the other 45 cities in the county took little or no action. [5]

Smoggy Days in Greater Los Angeles
Days exceeding Federal Ozone Standard (0.075ppm)

Maximum 8-hour Ozone Concentration (ppm)

Standard

5. https://www.aqmd.gov/home/research/publications/50-years-of-progress
6. http://www.allgov.com/usa/ca/departments/california-environmental-protection-agency/air-resources-board?agencyid=120
7. https://www.epa.gov/clean-air-act-overview, https://www.epa.gov/criteria-air-pollutants/naaqs-table

On July 2, 1976, Governor Jerry Brown (in his first term), made good on a campaign promise by signing Assembly Bill 250, which created the South Coast Air Quality Management District (SCAQMD). After developing a consistent set of regulations for the four-county area, the SCAQMD adopted several significant emission-reductions measures, including rules to control man-made dust and reduce nitrogen oxides from power plants by 90%. [9]

The passage of AB 32, the California Global Warming Solutions Act of 2006, marked a watershed moment in California's history. By requiring in law a sharp reduction of greenhouse gas (GHG) emissions, California set the stage for its transition to a sustainable, low-carbon future. AB 32 was the first program in the country to take a comprehensive, long-term approach to addressing climate change, and does so in a way that aims to improve the environment and natural resources while maintaining a robust economy.[11]

1960-1980s 1976 1985-1987 2008

In the latter part of the 20th century, middle income white populations begin to leave the urban core - a phenomena known as "white flight". Mimicking this out-migration, industries also began leaving central city communities and relocating on the peripheries of cities, leaving behind pollution and toxic contamination.[8]

In the mid 1980s, a community group called the Concerned Citizens of South Central LA, and comprised primarily of African American women, successfully blocked the construction of a waste-to-energy incinerator (LANCER) in the heart of their neighborhood. This achievement marked a major milestone in environmental justice organizing in South Central LA. The organization is still active today. [10]

NOTES
What do you think about the timeline?
Are you familiar with any of these historical moments?
What do you find surprising?
Is anything missing?

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8. https://www.kcet.org/shows/departures/land-use-in-south-la-a-legacy-of-environmental-crime
9. https://www.aqmd.gov/home/research/publications/50-years-of-progress
10. https://www.huffpost.com/entry/los-angeles-recycling_b_2092706
11. https://ww3.arb.ca.gov/cc/ab32/ab32.htm

In recent years, the practice of urban oil drilling in South Central LA has been a growing concern among residents. In 2013, the Standing Together Against Neighborhood Drilling-LA (STAND-LA) formed with the intent to effectively end neighborhood oil drilling in the City of Los Angeles.
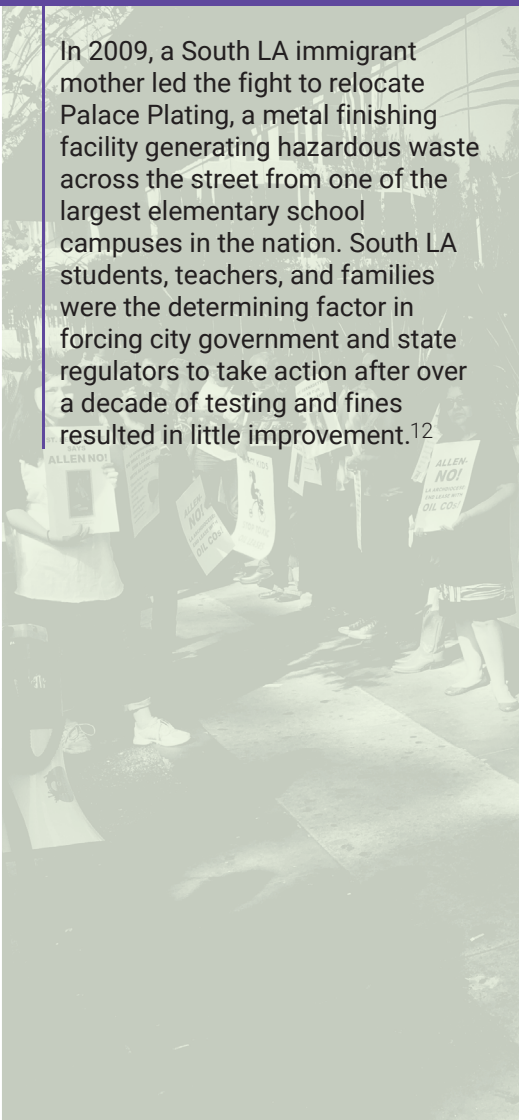
The South Central LA PUSH initiative launches!

2009   2013   2016   2019

In 2009, a South LA immigrant mother led the fight to relocate Palace Plating, a metal finishing facility generating hazardous waste across the street from one of the largest elementary school campuses in the nation. South LA students, teachers, and families were the determining factor in forcing city government and state regulators to take action after over a decade of testing and fines resulted in little improvement.[12]

At the Allenco oil drilling site in the South Central LA University Park neighborhood, nearby residents began placing "odor complaints" with the South Coast AQMD in 2010. Over the years, local residents would file hundreds of complaints, meanwhile production at the site increased by 400%. Ultimately, it took sustained community pressure, coupled with involvement from state elected officials, citation and fines imposed by the Environmental Protection Agency, as well as a lawsuit from the LA City Attorney, to shut down the Allenco site in 2016. (Source: Sadd, J., Shamasunder, B., Osborn, B., Steva, E., Martinez, A., Garcia, Y., Meszaros, A., & Prichard, M. (2015). Drilling down: the community consequences of expanded oil development in Los Angeles. [13]

12. https://www.latimes.com/archives/la-xpm-2009-dec-22-la-me-southla-metal22-2009dec22-story.html
13. https://www.libertyhill.org/sites/libertyhillfoundation/files/Drilling%20Down%20Report_1.pdf
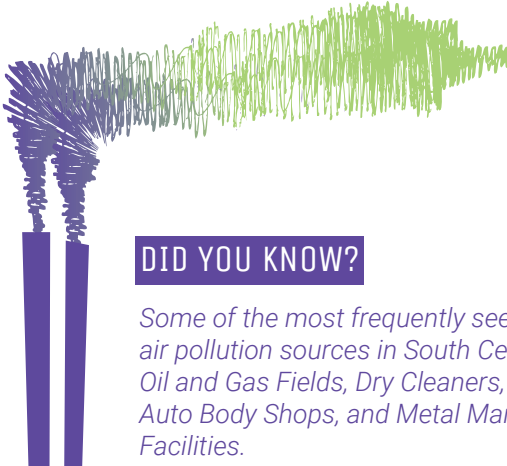
PART 2

BREAKING DOWN THE AIR QUALITY BASICS

What is air pollution and how do we break it down? In this section, we will go over the fundamentals of air quality including the types of pollutants that are in the air, where they come from (the sources) and how we classify them. We will also explore the particular types of pollutants that this project will be learning about and monitoring for using technology and ground truthing methods. Lastly, we will learn about the impacts air pollution has on the health of individuals, our communities and the planet.

As we learn about the physical landscape in South Central Los Angeles and beyond, it is clear that air pollution is a major and constant factor in impacting the livelihoods of community residents.

WHAT IS AIR POLLUTION?

Air pollution occurs when harmful or excessive quantities of gases, particles, and small molecules of toxics are introduced into the air we breathe. For example, when we drive our cars it produces exhaust, which then lives in the air around us.

NOTES
What do you think air pollution is?
Can you name an example?
Where do you see it most?

SO, WHERE DOES AIR POLLUTION COME FROM? WHAT IS THE SOURCE?

Air pollution comes from a variety of different sources, including those that we mentioned above (oil and gas, auto body shops, etc.). The sources of air pollution are categorized into two broad categories: Natural and Anthropogenic.

- **Natural**: These sources are natural like trees or the ocean. For example, did you know that trees produce Carbon Dioxide, or CO_2, which makes life possible!

- **Anthropogenic**: These are sources that are caused or influenced by humans.

ANTHROPOGENIC
These gases are formed from human activity like cars and power plants.

NATURAL
Certain atmospheric gases are created by natural sources like trees, swamps, and oceans.

Anthropogenic air pollution sources can further be broken down to 2 core sub categories: **stationary sources** and **mobile sources**.

- Stationary sources are fixed and unmoving. They include industries like auto body shops and power plants. They can be divided into point sources (very concentrated sources) and area sources (more diffuse sources) of air pollution.

- Mobile sources are sources that move. For example, cars and trucks are considered on-road sources. Planes are considered off-road sources.

POINT
Airplanes, Construction Equipment, Lawn Mowers

AREA
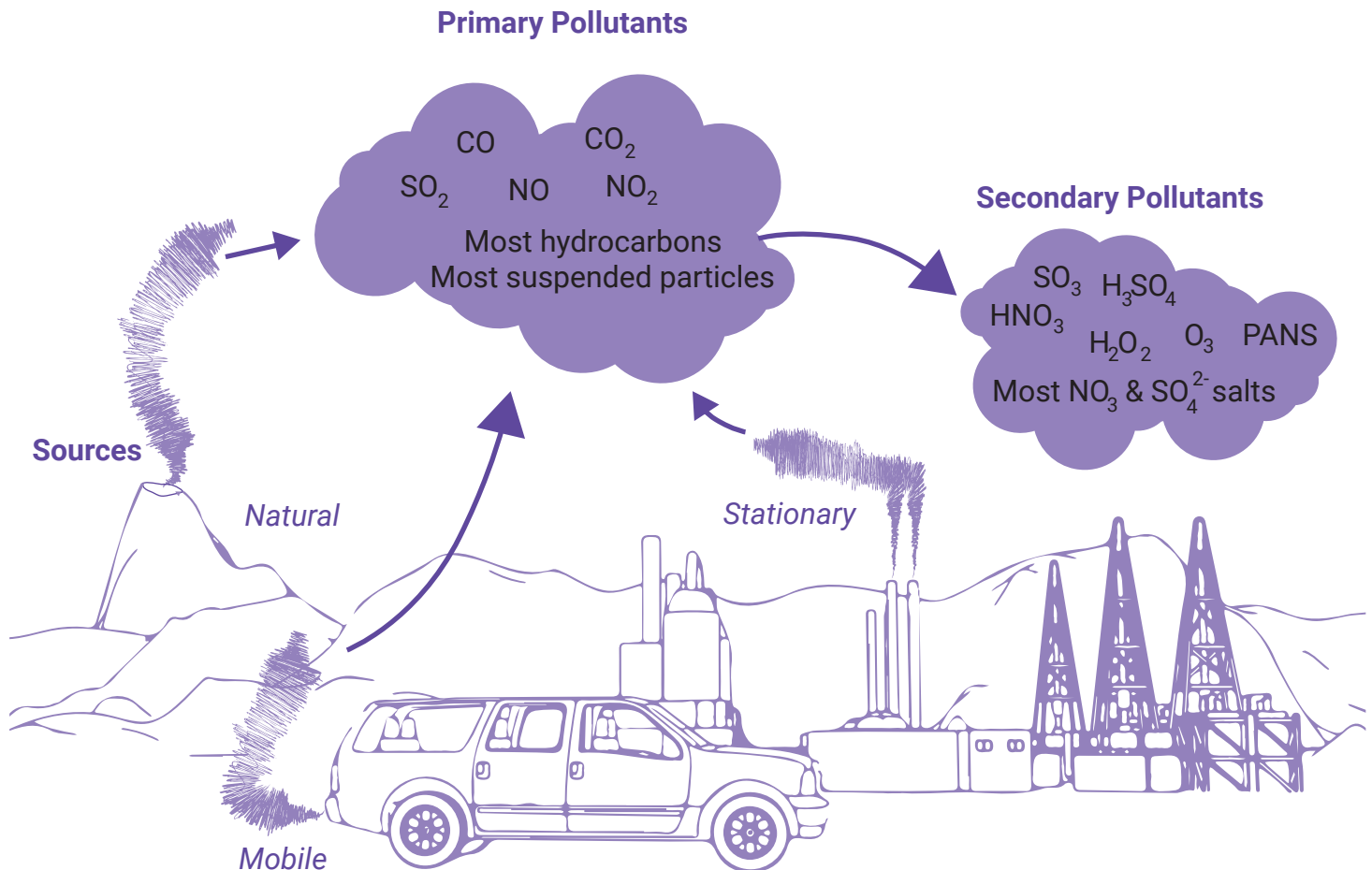Airplanes, Construction Equipment, Lawn Mowers

ON-ROAD
Cars, Trucks

OFF-ROAD
more diffuse sources of pollution. Cows, Paints, Architectural Coatings

Graphics Source: Project GO3, Lesson 1 Air Pollution Basics

CLASSIFICATION OF AIR POLLUTION

We mentioned above that air pollution is composed of harmful or excessive quantities of gases, particles, and small molecules of toxics that end up in the air. These tiny, sometimes invisible, pollutants can be classified into two main categories: **primary pollutants** and **secondary pollutants**.

Primary Pollutants

CO CO_2
SO_2 NO NO_2
Most hydrocarbons
Most suspended particles

Secondary Pollutants

SO_3 H_3SO_4
HNO_3 H_2O_2 O_3 PANS
Most NO_3 & SO_4^{2-} salts

Sources

Natural

Stationary

Mobile

A **Primary Pollutant** is any pollutant that comes directly from a source.

A **Secondary Pollutant** forms when reacting or mixing with other pollutants and heat.

> **NOTES** Do cars emit primary or secondary air pollutants?
> YES or NO? WHY?

Now that we have an understanding of air pollution, where it comes from, and how pollutants are classified, let's take a look at a tool that allow us to understand air pollution in a given area.

The **Air Quality Index (AQI)** is a broadly used tool that assesses the current status of air pollution in an area. It is calculated by the US Environmental Protection Agency. For example, when watching the weather report on your local news station, have you noticed they will sometimes mention poor air quality? It is likely they are using the AQI. So how does it work?

The AQI tells you how clean or polluted your air is, and what associated health effects might be a concern for you. It focuses on health effects you may experience within a few hours or days after breathing polluted air. The AQI is divided into colors: green represents good air quality while purple or maroon represents unhealthy levels of air pollution.

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	*..air quality conditions are:*	*...as symbolized by this color:*
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0 to 50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51 to 100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151 to 200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201 to 300	Health alert: everyone may experience more serious health effects.
Hazardous	301 to 500	Health warnings of emergency conditions. The entire population is more likely to be affected.

https://www.airnow.gov/index.cfm?action=aqibasics.aqi

13

Next, let us explore **specific air pollutants**: what they are, where they come from, and how harmful they can be. There's a lot of stuff in the air: dust, pollen, dirt, smells.... what exactly are we focusing on when we say air pollutants?

The US Environmental Protection Agency has created national air quality standards for six primary air pollutants:

- Carbon Monoxide,

- Lead,

- Nitrogen Dioxide,

- Ozone,

- Particulate Matter,

- Sulfur Dioxide.

The standards define the allowable concentrations of these substances in the air. We call these six air pollutants **criteria air pollutants**. The EPA focuses on these six in particular because of the large quantity that exists in the air, and because of the harm they cause to health.
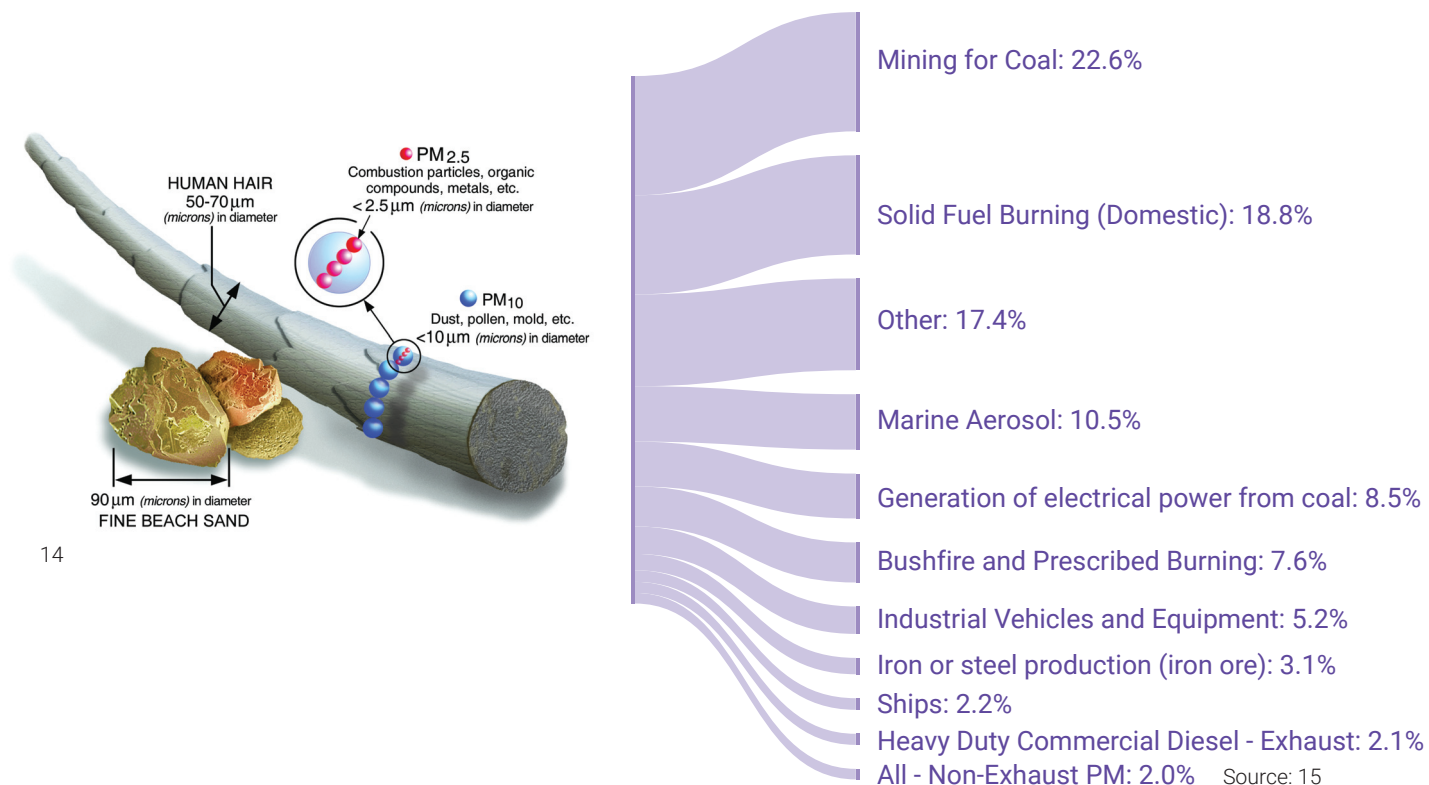
Another category of air pollutants are **non-criteria air pollutants**. Non-criteria air pollutants are the entire range of contaminants that are not part of the above mentioned criteria air pollutants. These include toxic and hazardous pollutants including industrial emissions that contain toxic chemicals like formaldehyde, chromium and benzene.

Due to the types of sources that exist in the South Central community, we will focus on the following six air pollutants for the SCLA:PUSH initiative: ultra fine particulate matter, ozone, carbon monoxide, nitrogen oxide, volatile organic compounds, and air toxics.
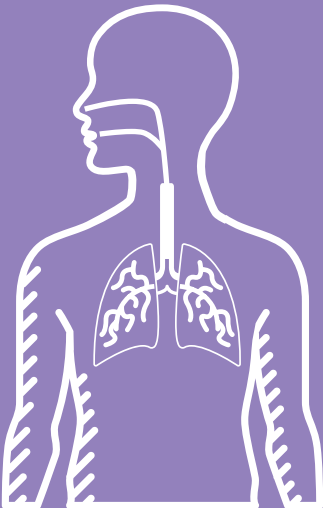
Let's get to know these air pollutants better:

PARTICULATE MATTER

Particulate matter, or PM, is a mixture of particles, such as dust, pollen, soot, smoke, and liquid particles suspended in the air that may be invisible to the eye. PM comes in different sizes. Why does this matter? Because the smaller the particle, the more harm it can cause to human health. Smaller particles can travel inside the human body and cause damage to the respiratory system. Diesel or ultra fine particulate matter, also known as soot, is an important and harmful part of PM. Black carbon particles can be extremely small. They arise from the incomplete combustion of fossil fuels, biofuels and biomass. Primary sources include diesel engines, cook stoves, wood burning and forest fires.

HUMAN HAIR
50-70 μm
(microns) in diameter

● PM$_{2.5}$
Combustion particles, organic compounds, metals, etc.
< 2.5 μm *(microns)* in diameter

● PM$_{10}$
Dust, pollen, mold, etc.
<10 μm *(microns)* in diameter

90 μm *(microns)* in diameter
FINE BEACH SAND

14

Mining for Coal: 22.6%

Solid Fuel Burning (Domestic): 18.8%

Other: 17.4%

Marine Aerosol: 10.5%

Generation of electrical power from coal: 8.5%

Bushfire and Prescribed Burning: 7.6%

Industrial Vehicles and Equipment: 5.2%

Iron or steel production (iron ore): 3.1%

Ships: 2.2%

Heavy Duty Commercial Diesel - Exhaust: 2.1%

All - Non-Exhaust PM: 2.0%   Source: 15

What are the health risks of particulate matter?

Particulate matter poses a serious health risk because it can travel into the respiratory tract. PM2.5 is especially dangerous because it can penetrate deep into the lungs and sometimes even into the bloodstream.

Health Effects

Decreased lung function	Cardiac arrhythmias (heartbeat irregularities)
Chronic bronchitis	Heat attacks
Increased respiratory symtoms	Premature death

Groups Sensitive to PM2.5

People with heart or lung disease	Children
	Pregnant women
Older Adults	

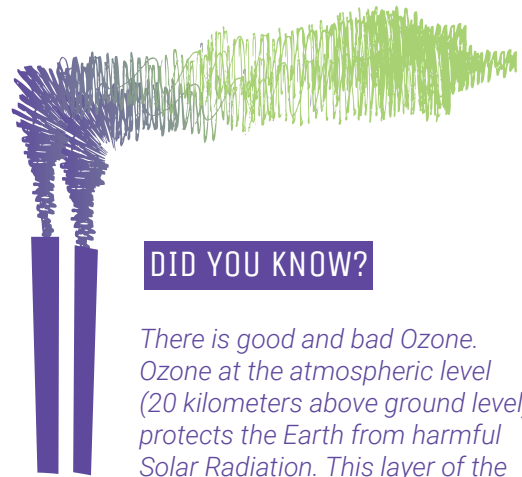Source: 16

14. https://www.airnow.gov/index.cfm?action=aqibasics.aqi
15. https://www.epa.nsw.gov.au/your-environment/air/air-nsw-overview/managing-particle-pollution, Graphic: theworksLA
16. http://archive.sltrib.com/story.php?ref=/sltrib/politics/57159228-90/utah-quality-pollution-lake.html.csp
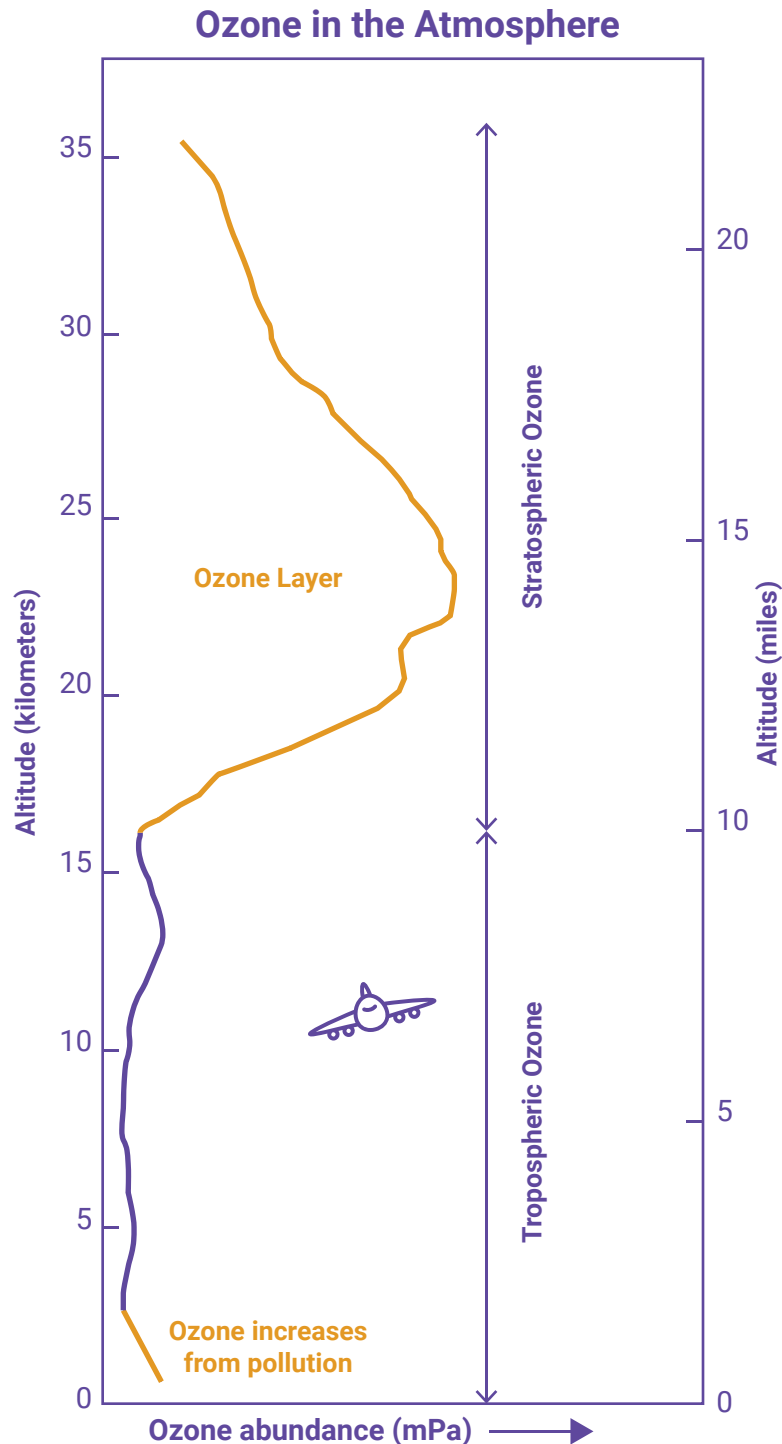
OZONE

Ozone is a secondary pollutant made up of Volatile Organic Compounds, Nitrogen Oxides, and Solar Radiation. Every major metropolitan area around the entire world likely emits enough pollution every day to have at least a moderate level of ozone formation. California, with its valleys full of stagnant air and abundant heat, dry air and sunshine, is a good place for ozone formation.
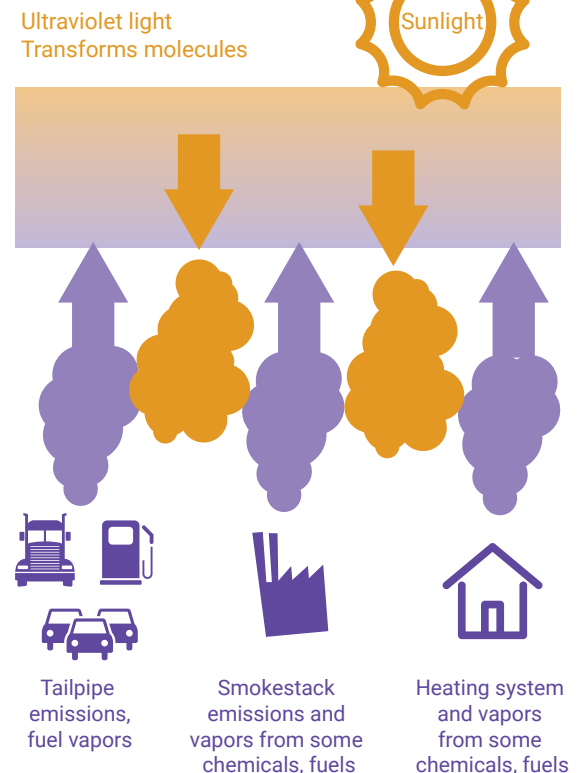
Ozone in the Atmosphere

Altitude (kilometers)

Altitude (miles)

Stratospheric Ozone

Ozone Layer

Tropospheric Ozone

Ozone increases from pollution

Ozone abundance (mPa)

There is good and bad Ozone. Ozone at the atmospheric level (20 kilometers above ground level) protects the Earth from harmful Solar Radiation. This layer of the atmosphere is known as the "Ozone Layer". With the increase of air pollutants in the atmosphere, and greenhouse gases such as Carbon Dioxide CO2, this layer is deteriorating and it is one of the main causes of global warming. This is what we call the "Good Ozone".

How ground-level ozone forms

Ultraviolet light
Transforms molecules

Sunlight

Tailpipe emissions, fuel vapors

Smokestack emissions and vapors from some chemicals, fuels

Heating system and vapors from some chemicals, fuels

17. https://www.epa.gov/ozone-layer-protection/basic-ozone-layer-science
18. https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#effects

Why smog is harmful

Ozone, the main ingredient in smog, is one of the most widespread air pollutants and among the most dangerous.

Effects on health

Headache

Burning eyes, throat; irritated mucous membranes

Shortness of breath, wheezing, coughing

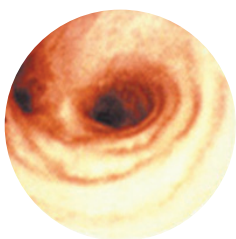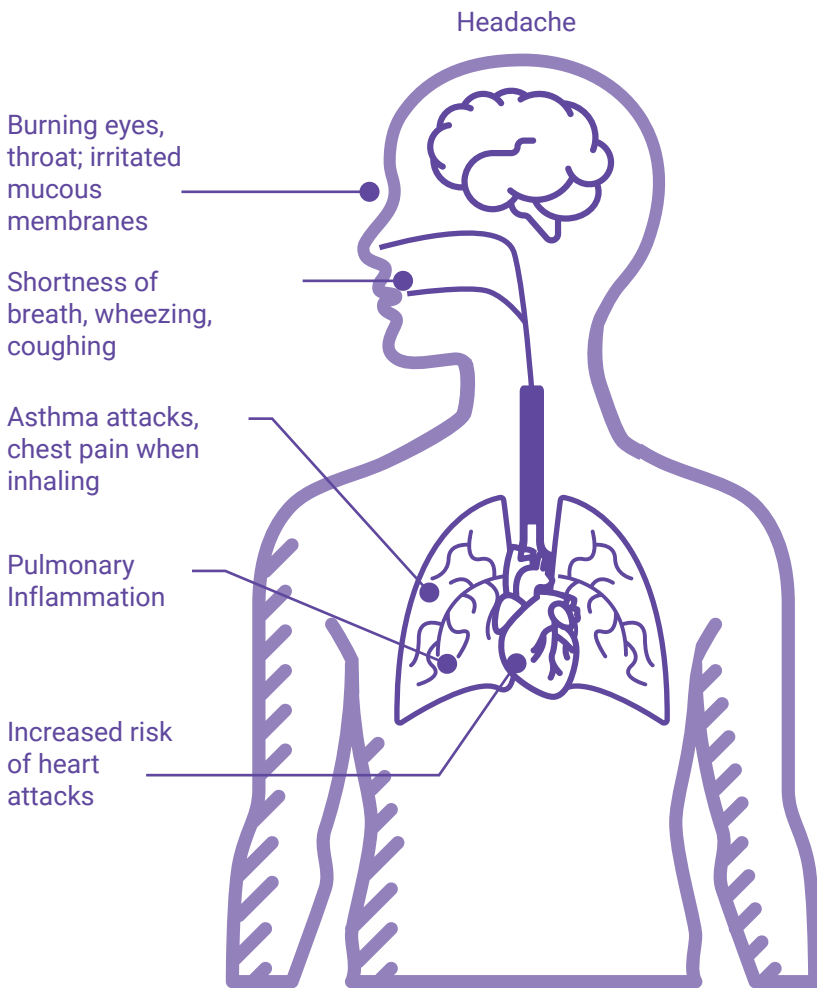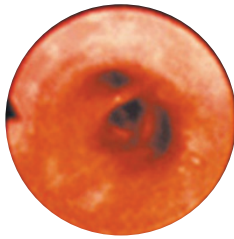Asthma attacks, chest pain when inhaling

Pulmonary Inflammation

Increased risk of heart attacks
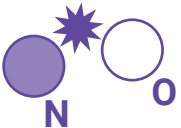
Photo of healthy lung air way

Photo of inflamed lung air way

How ozone forms

1. Oxygen in the atmosphere

O_2

2. Nitric oxide, byproduct of combustion

NO

3. Sunlight breaks up nitric oxide

N   O

4. Ozone formed by three oxygen atoms

O_3

U.S. ozone limits
In parts per billion

1997-2008   **84**

2008-present   **75**

New EPA
Proposal   **60-70**
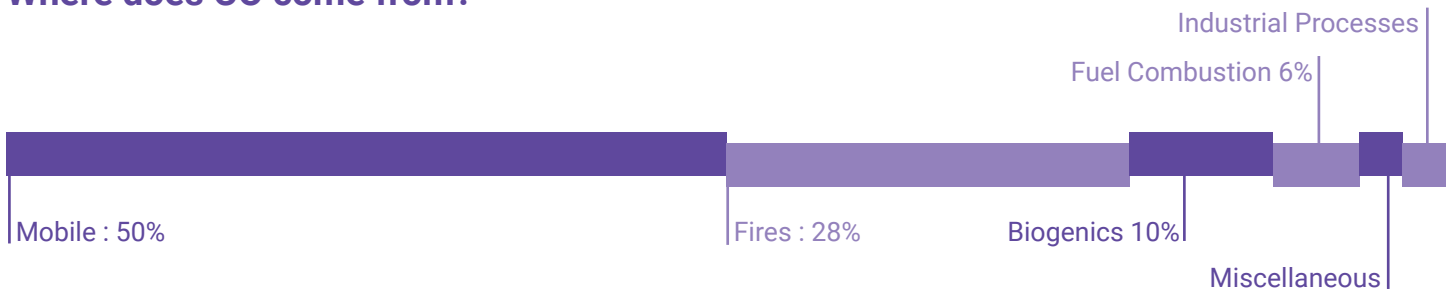
19. Source: American Lung Association, State of the Air 2008, Graphic: theworksLA
20. https://www.epa.gov/ozone-pollution-and-your-patients-health/health-effects-ozone-general-population
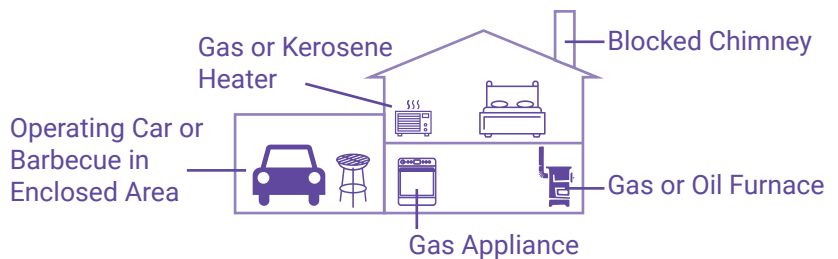
CARBON MONOXIDE

Carbon monoxide is formed by burning organic (carbon-containing) materials, in a burning process called incomplete combustion. Incomplete combustion occurs when there isn't enough oxygen or air to burn materials completely, and carbon monoxide (CO) is formed instead of carbon dioxide (CO_2). For example, carbon monoxide is formed when the following are burned to run our cars, and power our houses: gasoline, coal, wood, natural gas, charcoal, and oil.

Where does CO come from?

Industrial Processes

Fuel Combustion 6%

Mobile : 50%

Fires : 28%

Biogenics 10%

Miscellaneous

Potential Sources of Indoor CO

Gas or Kerosene Heater

Blocked Chimney

Operating Car or Barbecue in Enclosed Area

Gas or Oil Furnace

Gas Appliance

Source: https://www.cdc.gov/co/faqs.htm

Health Impacts : CO Poisoning

CO

O_2

O_2
CO
CO
O_2

O_2

Normal Oxygenation

O_2

CO

O_2

Carbon monoxide poisoning

| 1 | Oxygen (O_2) and carbon monoxide (CO) are inhaled |

| 2 | O_2 and CO enter blood |

Source: http://baromedical.ca/medical-co-poisoning.php
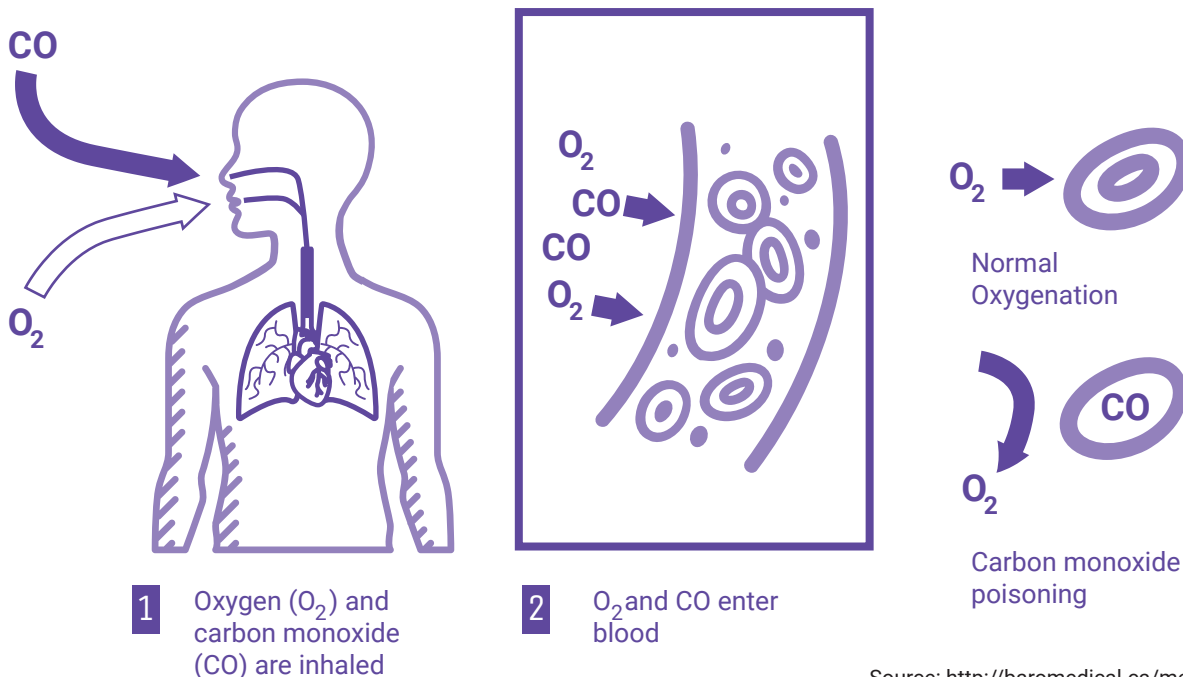
Carbon Monoxide Levels & Risks

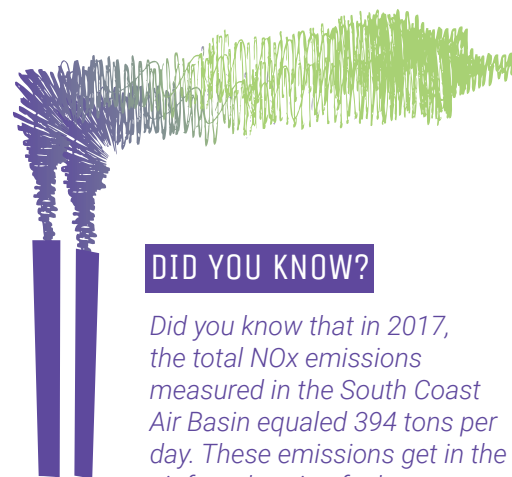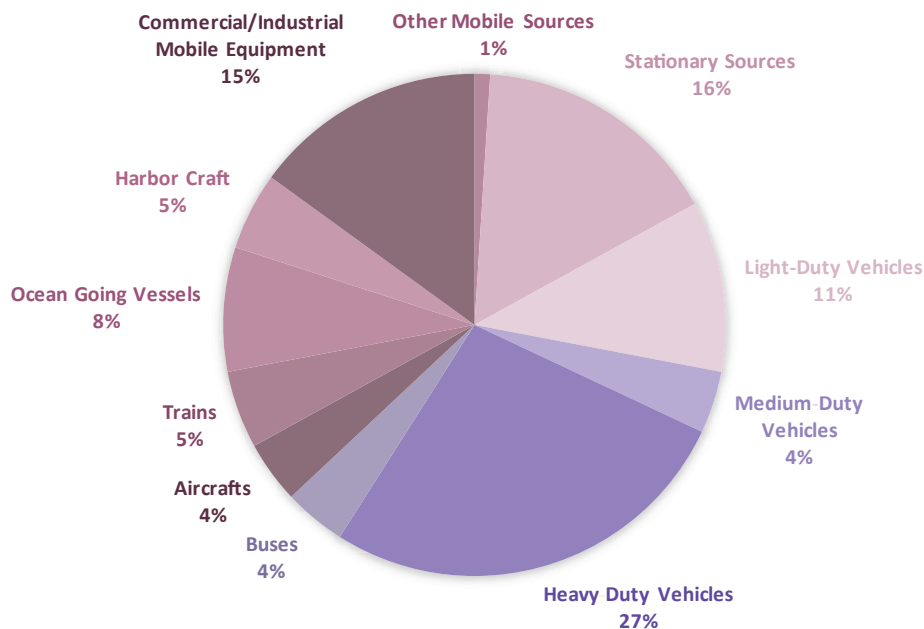| CO Level	Action
1-4ppm	Normal levels in human tissues produced by body.
3-7ppm	6% increase in the rate of admission in hospitals of non-elderly for asthma. (Sheppard-1999)
5-6ppm	Significant risk of low birth rate if exposed during last trimester (Ritz & Yu-1999)
5ppm	1st visual display on NSI 3000 Low Level CO Monitor
9ppm	ASHRAE standard for allowable spillage from vented appliances, indoors, for 8 hours exposure daily. EPA standard for outdoors for 8 hours and a maximum 3 times per year. (Clean Air Act)
10ppm	Outdoor level of CO found associated with a significant increase in heart disease deaths and hospital admissions for congestive heart failure. (JAMA, Penny) 1st ambient level occupants should be notified-NCI Protocol
15-20ppm	First level World Health Organization lists as causing impaired performance, decrease in exercise time and vigilance 1st Alarm level for NSI 3000 Low Level CO Monitor-5 minutes
25ppm	Maximum allowable in a Parking Garage (International Mechanical Code)
27ppm	21% increase in cardio respiratory complaints (Kurt-1978)
30ppm	Earliest onset of exercise induced angina (World Health Organization) 1st visual display on UL2034 approved CO Alarm-Must not alarm before 30 days
35ppm	US NIOSH recommended 8 hour maximum workplace exposure EPA standard for outdoors for 1 hour and a maximum of 1 time per year Level many fire departments wear breathing apparatus before entering 2nd ambient level occupants should be notified and space ventilated 2nd Alarm level for NSI 3000 Low Level Monitor-5 minutes

CO Level	Action
50ppm	US OSHA recommended 8 hour maximum workplace exposure Maximum NCI level for Unvented appliances
70ppm	1st Alarm level of UL2034 approved CO Alarms- 2-4 hours 3rd Alarm level for NSI 3000 - 30 seconds NSI 3000 Low Level Monitor cannot be silenced by reset button
100ppm	Maximum NCI CO level during run cycle in all vented appliances(stable) Maximum NCI CO for all oil appliances
200ppm	First listed level(established in 1930) healthy adults will have symptoms-headaches, nausea NIOSH & OSHA recommend evacuation of workplace Maximum "Air Free" CO for vented water heater and unvented heaters (ANSI Z21) UL approved alarms must sound between 30 – 60 minutes(NSI 3000 – 30 seconds)
400ppm	Healthy adults will have headaches within 1-2 hours. Life threatening after 3 hours Maximum "Air Free" CO in all vented heating appliances (ANSI Z21) Maximum EPA levels for industrial flue exhaust UL Alarms must alarm within 15 minutes (NSI 3000 – 30 seconds) Maximum recommended light-off CO for all appliances – NCI (except oil)
800ppm	Healthy adults will have nausea, dizziness, convulsions within 45 minutes. Unconscious within 2 hours then Death(established in 1930) Maximum "Air Free" CO for unvented gas ovens (ANSI Z21)
800ppm+	Death in less than one hour
2000ppm	EPA standard for new vehicle emissions
3000ppm+	Typical emissions from propane lift trucks, gasoline powered tools etc. Death in less than 30 minutes.

NCI
National Comfort Institute, Inc. ™

NITROGEN DIOXIDE

Nitrogen dioxide can often be found in or near traffic. It is also a precursor to Ozone, making it a secondary pollutant. When Nitrogen (N2) - which makes up nearly 80% of the air we breath - chemically interacts with oxygen, it produces a family of Nitrogen Oxides (NOx). They are a group of poisonous and highly reactive gases. NOx emissions come from anthropogenic (human) and biogenic (natural) sources. The chart below shows a breakdown of NOx emissions in the South Coast Air basin the summer of 2017.

Pie chart labels:
- Commercial/Industrial Mobile Equipment 15%
- Other Mobile Sources 1%
- Stationary Sources 16%
- Harbor Craft 5%
- Light-Duty Vehicles 11%
- Ocean Going Vessels 8%
- Medium-Duty Vehicles 4%
- Trains 5%
- Aircrafts 4%
- Buses 4%
- Heavy Duty Vehicles 27%

DID YOU KNOW?

Did you know that in 2017, the total NOx emissions measured in the South Coast Air Basin equaled 394 tons per day. These emissions get in the air from burning fuel. Approximately 84% of NOx emissions come from mobile sources.

Health Impacts

Inhaling high concentrations of Nitrogen Oxides can cause difficulty breathing and irritate the airways in your respiratory system. Short term exposure can cause symptoms such as coughing, wheezing, and aggravate existing respiratory conditions. Longer term exposure of NOx emissions can lead to the development of asthma, risk of respiratory infection, and can even decrease lung function.

Acute toxicity
- Irritation of respiratory tract
- Toxic oedema
- Emphysema
- Decrease compliance
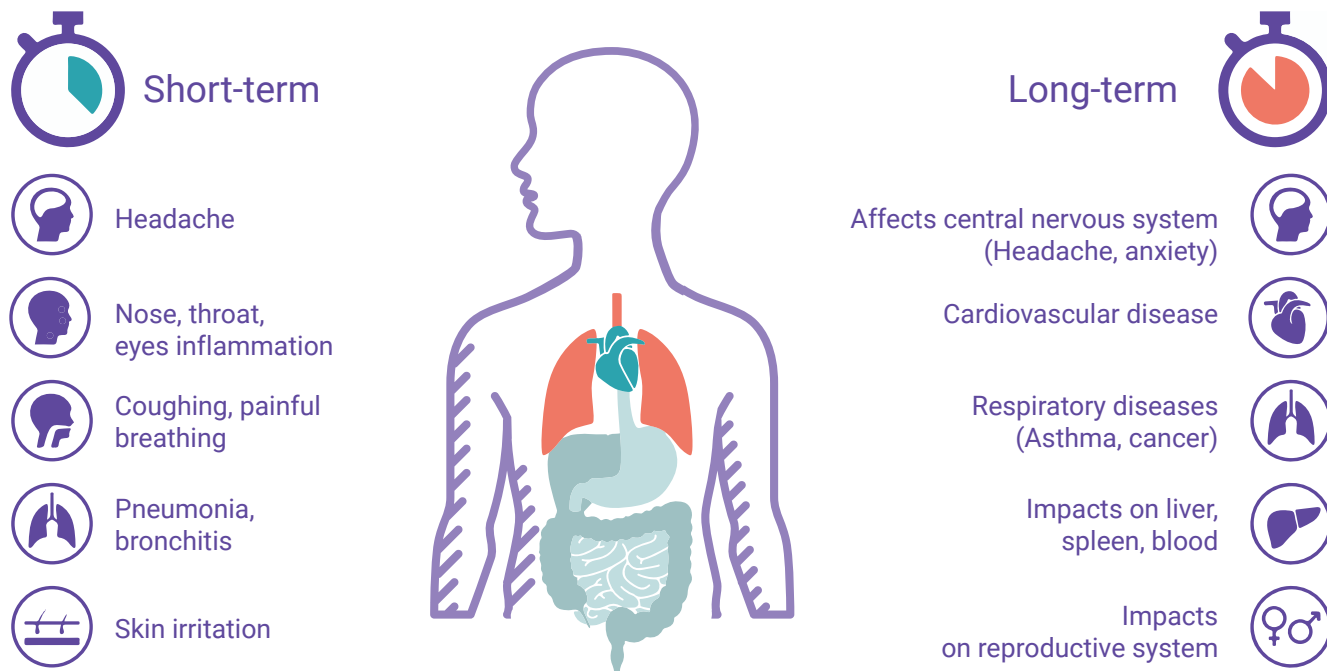- Increased breathing resistance
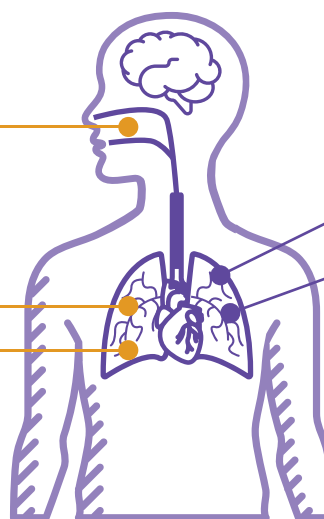
Chronic toxicity
- Fibrosis
- Secondary bacterial infections
- Damage of elastin and collagen fibers

VOLATILE ORGANIC COMPOUNDS

Volatile organic compounds, sometimes referred to as VOCs, are organic compounds that easily become vapors or gases.

Motor Vehicles

5% Consumer Solvents

45%

50%

Industrial/ Commercial Processes
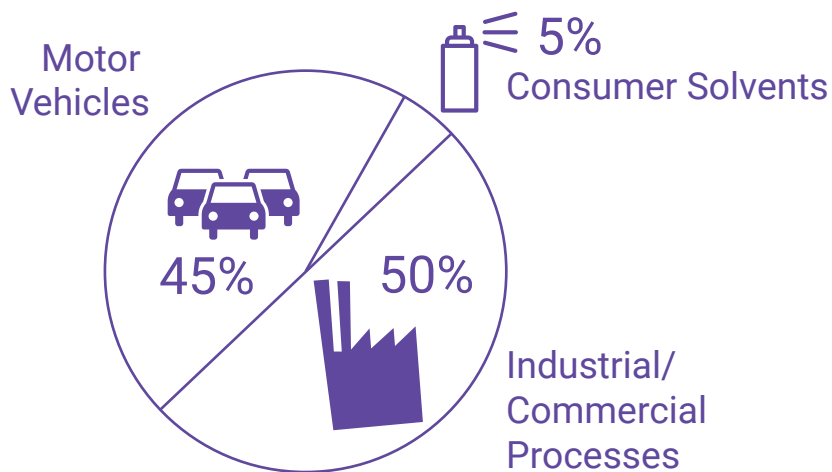
Released from burning fuel, such as gasoline, wood, coal, or natural gas and they are emitted from oil and gas fields and diesel exhaust. They are also released from solvents, paints, glues, and other products that are used and stored at home and at work.

Short-term

- Headache
- Nose, throat, eyes inflammation
- Coughing, painful breathing
- Pneumonia, bronchitis
- Skin irritation

Long-term

- Affects central nervous system (Headache, anxiety)
- Cardiovascular disease
- Respiratory diseases (Asthma, cancer)
- Impacts on liver, spleen, blood
- Impacts on reproductive system

◼ Long-term exposure can cause damage to the liver, kidneys, and central nervous system.

◼ Short-term exposure can cause eye and respiratory tract irritation, headaches, dizziness, visual disorders, fatigue, loss of coordination, allergic skin reactions, nausea, and memory impairment.

AIR TOXICS

Last but not least, air toxics, also known as toxic air pollutants or hazardous air pollutants, are pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects. They come from factories, refineries, plants, cars, cleaning solvents, amongst other sources. You can be exposed by breathing contaminated air, eating contaminated food, drinking contaminated water, and touching contaminated soil, dust, or water. Examples of of Air Toxics include acid gases, asbestos, benzene, formaldehyde, and metals like mercury, lead, arsenic, and perchloroethylene.

INTRODUCING THE AIR POLLUTANT
BAD ACTORS OF THE MAROON CARPET!

On the Maroon Carpet, the worst offenders of air pollution are given the spotlight! These bad actors make a big impact on those around them. Whether through exposure at the workplace, the home, or in your backyard, they find a way to affect the health of individuals, communities and the environment. It's time to retire these bad actors!

Ultrafine Particulate Matter: is a villain, a trained evil villain. First of all, she is deceiving. As her older siblings, Particulate Matter 2.5 and Particulate Matter 10, her is generated by combustion, mostly by on-road cars, but his tiny size makes him ultra dangerous.

Ozone: Ozone's got game. He's been using the same cheesy pick up line since the '70's. He debuted his deadly shtick as Agent Smog in LA covering the entire city with its nasty black dense color!

Carbon Monoxide: Likes to get things started with a bang! She's been typecast in action roles starring as a fuel for mobile sources and other combustion related equipment.
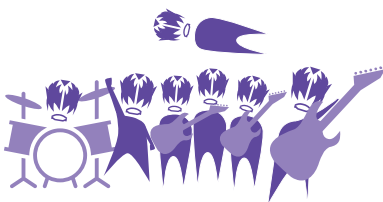
Nitrogen Oxide: Nitrogen oxides are a band of actors who never made it to Hollywood, but stayed low on the ground level.

Toluene had a starring role 30 years ago in the horror classic, "Fetal Solvent Syndrome," in which her appearances to pregnant moms was linked to brain damage and various birth malformations.

Perchloroethylene, Perc for short, is well known for keeping your clothes toxic...ahem...dry cleaned.

SO WHY DOES THIS ALL MATTER?

Now that we have broken down the air quality basics, let's understand how exposure to air pollution can impact the health of individuals, our communities, and the environment.

IMPACTS ON THE INDIVIDUAL

Does exposure
Look different
For an adult
Versus a child?

How does exposure
To air pollution
Impact the body?
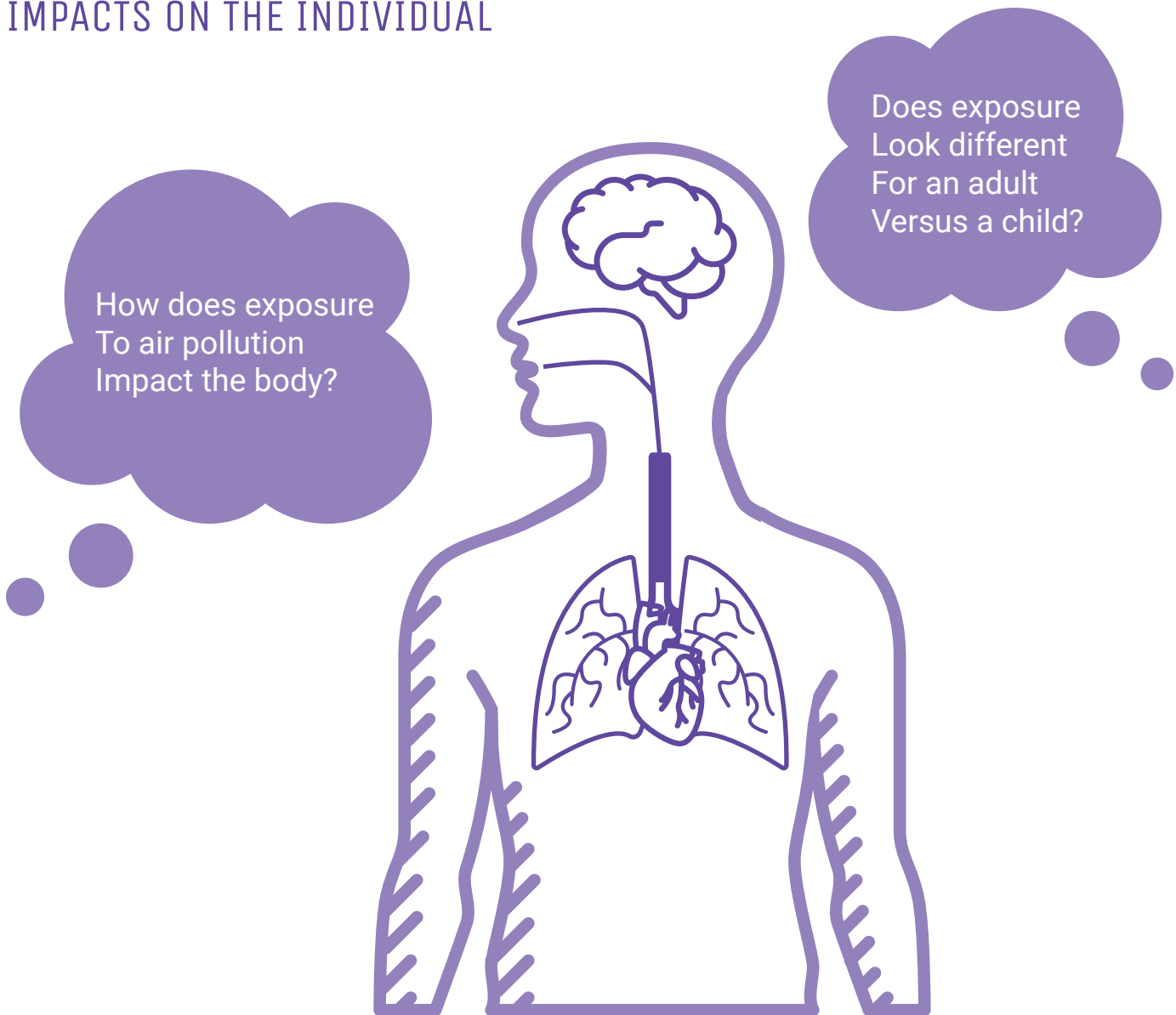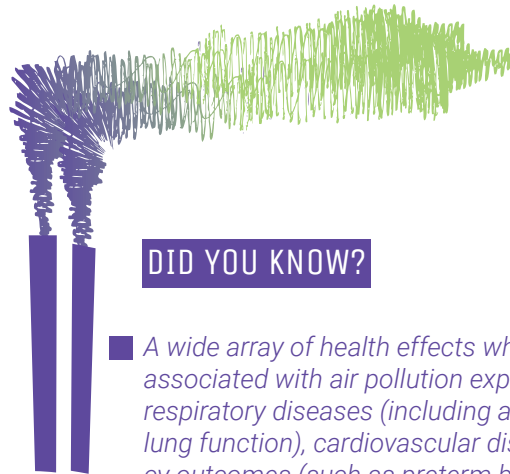
DID YOU KNOW?

A wide array of health effects which are believed to be associated with air pollution exposure. Among them are respiratory diseases (including asthma and changes in lung function), cardiovascular diseases, adverse pregnancy outcomes (such as preterm birth), and even death.

In 2013, the World Health Organization concluded that outdoor air pollution is a carcinogen to humans.

Children exposed to higher levels of particulate matter, nitrogen dioxide, have a significantly lower lung function at age 18, an age when the lungs are nearly mature and lung function deficits are unlikely to be reversed. [USC] (Link to the article - May require registration)

In the US, long-term exposure to sources of air pollution is an enduring concern for environmental justice communities and sensitive populations because of the great impacts of emissions on public health.

The American Cancer Society study (Krewski et al 2009, Jerrett et al 2009), correlated changes in annual average daily PM2.5 exposure with increased premature mortality due to cardiopulmonary disease and lung cancer. It also associated increases in the daily one-hour maximum ozone exposure with premature mortality due to chronic obstructive pulmonary disease (COPD) and exacerbation of asthma.

21. https://www.niehs.nih.gov/health/topics/conditions/asthma/index.cfm
22. https://www.niehs.nih.gov/health/topics/conditions/lung-disease/index.cfm
23. http://www.who.int/mediacentre/factsheets/fs313/en/
24. https://www.niehs.nih.gov/health/topics/conditions/cancer/index.cfm
25. http://news.usc.edu/24535/usc-study-links-smoggy-air-to-lung-damage-in-children/
26. http://content.nejm.org/cgi/content/short/351/11/1057, may require registration

How does the presence of air pollution impact the health of a community?

What are the consequences?
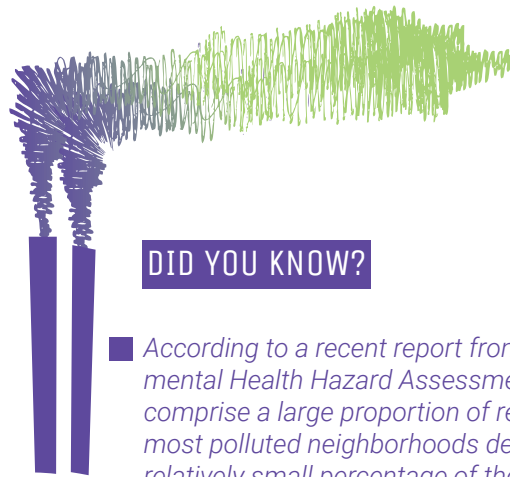
DID YOU KNOW?

According to a recent report from the Office of Environmental Health Hazard Assessment, ethnic minorities comprise a large proportion of residents in California's most polluted neighborhoods despite making up a relatively small percentage of the statewide population.

An online tool called the CalEnviroScreen depicts California's pollution levels by the state's more than 8,000 census tracts using a color scale. It shows immediate pollution levels as well as "potential vulnerability." Launched in 2012, the tool has been updated several times since. The data indicates that Latinos and African Americans are disproportionately affected.

The report finds that African Americans, who make up less than 13 percent of the statewide population, live in almost a third of the worst polluted census tract areas.

Latinos represent a majority of the top ten percent of most of the polluted areas, although only 37.6 percent of California residents are Latino.

27. http://oehha.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=1d202d7d9dc84120ba5aac97f8b39c56

IMPACTS ON THE ENVIRONMENT

How does the presence of air pollution impact the environment?

What are the consequences for our world?
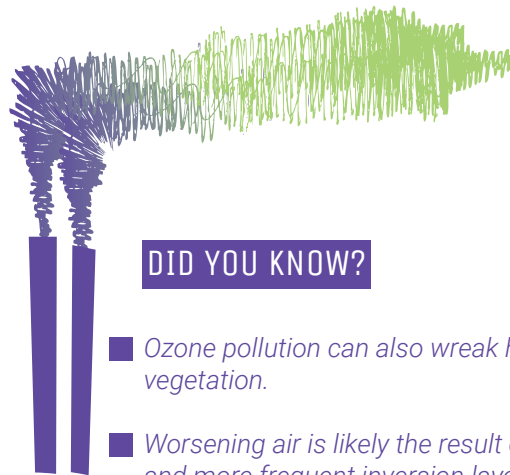
Ozone pollution can also wreak havoc on sensitive vegetation.

Worsening air is likely the result of warmer temperatures and more frequent inversion layers that hold the pollution closer to the ground.

By trapping the earth's heat in the atmosphere, greenhouse gases and air pollutants lead to warmer temperatures and all the hallmarks of climate change: rising sea levels, more extreme weather, heat-related deaths, and increasing transmission of infectious diseases. According to a 2014 EPA study, In October 2016, more than 140 countries reached an agreement to reduce the use of these chemicals—which are used in air conditioners and refrigerators—and find greener alternatives over time.

THE STATE OF THE AIR IN SOUTH CENTRAL LA

So far, we've learned about the history of air pollution, the big picture of air quality in LA today, and the how we define air pollution. So what's going on in South Central LA specifically? Next, we will explore the physical and environmental conditions that South Central LA residents experience on a daily basis. What's in the air? Where are industries located? What other factors impact the health of our community? Lastly, we will go over the regulatory structure that governs air quality policy and regulation.
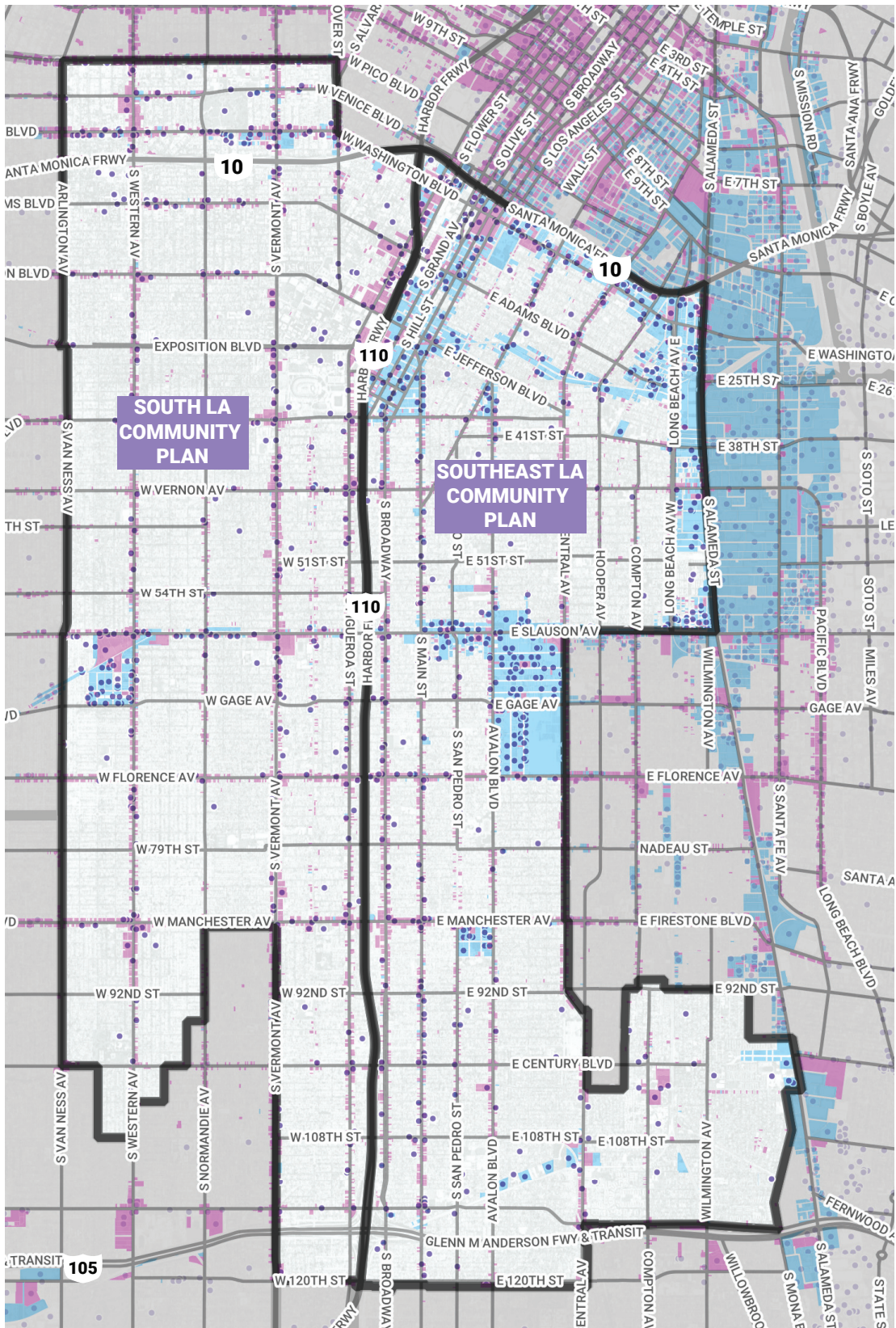
AIR QUALITY IS A SOUTH CENTRAL LA ENVIRONMENTAL JUSTICE ISSUE

Across California, communities of color are exposed to pollution and environmental hazards at a higher rate than their White counterparts. A 2018 report from California's Office of Environmental Health Hazard Assessment estimated that 1 in 3 African American residents and 1 in 3 Latinx residents live in one of the top 20% most polluted census tracts in the state, while only 1 in 14 White residents live in these areas. (source: Office of Environmental Health Hazard Assessment, California Environmental Protection Agency. (2018). Analysis of race/ethnicity, age, and CalEnviroScreen 3.0 scores.

For decades, race has played a significant role in determining the location of unwanted land uses, like power plants and landfills, and South Central LA is no exception. This pattern stems from the systemic exclusion of low-income communities of color from planning, land use, and environmental regulatory decision-making processes.

In South LA, more than 24,000 people live within 500 feet of a major truck route and are therefore constantly exposed to particulate matter from diesel exhaust. In addition, well over 21,000 residents in population-dense South LA neighborhoods live within 500 feet of: manufacturing, warehousing and distribution, oil refining, or chemical plant sites (source). In South Central LA, there are also 585 sensitive land uses (such as schools, churches, hospitals and clinics) within 500 feet of these hazardous sites. These environmental hazards contribute to poor air quality and are disproportionately sited in low-income communities of color.

In the next several pages, we present maps that paint a picture of what is happening in South Central today.

https://oehha.ca.gov/media/downloads/calenviroscreen/document-calenviroscreen/raceageces3analysis.pdf

http://500ft.psr-la.org/

This map depicts the South and Southeast LA Community Plans (our project area).
In it, you will see stationary sources of pollution in purple and blue.

Key

● Industry
■ Industrial Land Use
■ Commercial Land Use

In this map, you see all the major mobile thoroughfare that criss cross South Central LA.

These series of maps show what we know about air pollution in South Central LA.
The three types represented are ozone, diesel and particular matter.

The darker the color, the higher the concentration of air pollution.
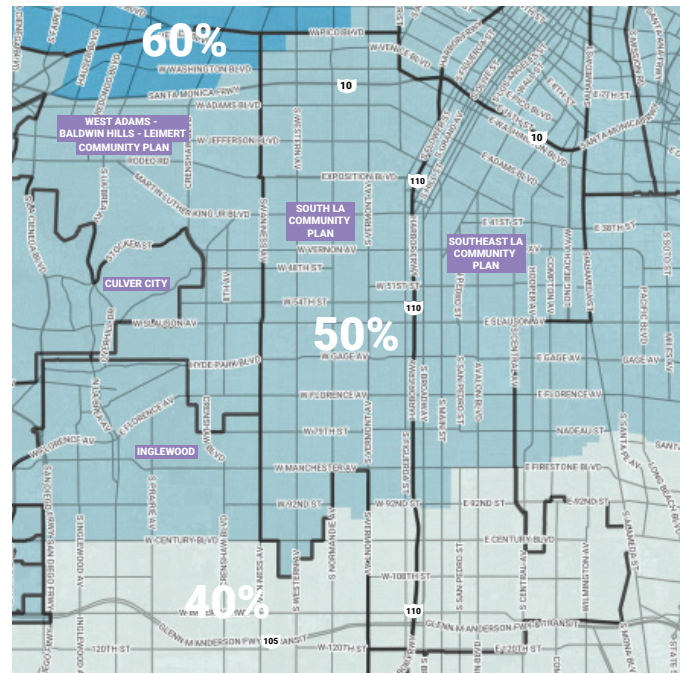
OZONE Concentration
CalEnvironScreen 3.0
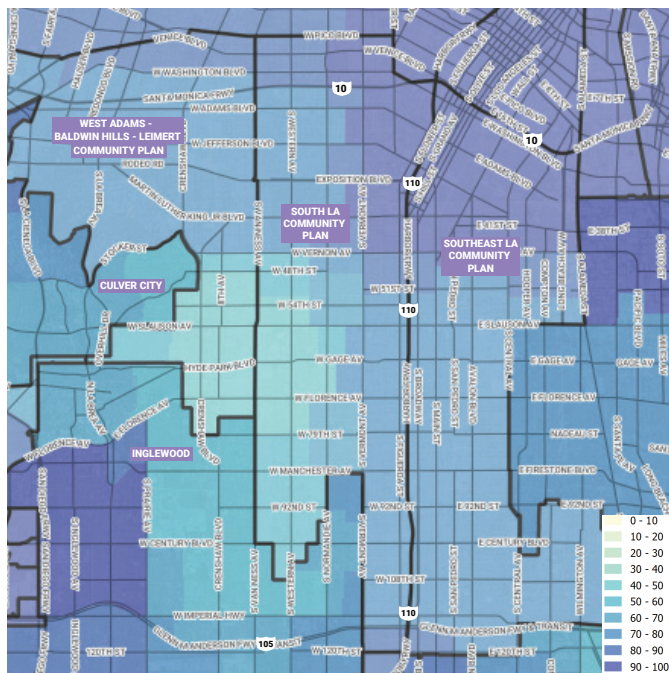
DIESEL Particulate Matter
CalEnvironScreen 3.0

Legend:
- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
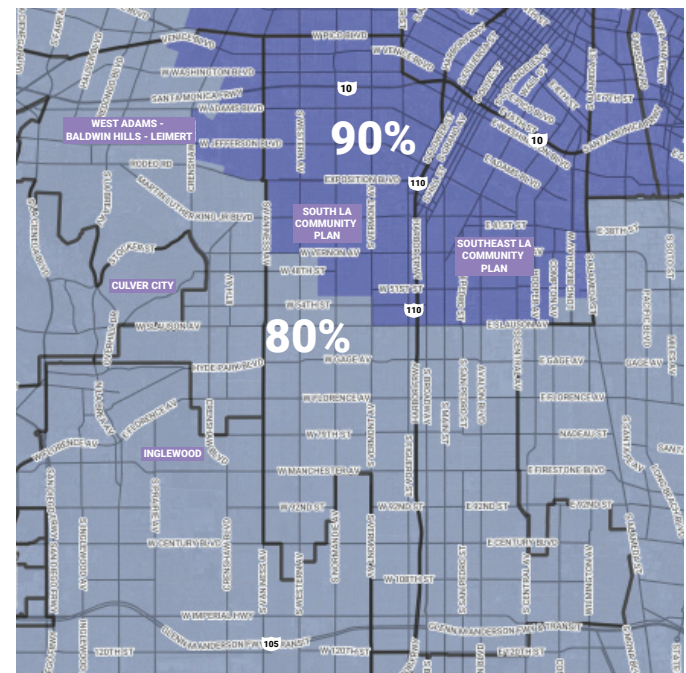
PM 2.5 Concentration
CalEnvironScreen 3.0

Health and Mental Services
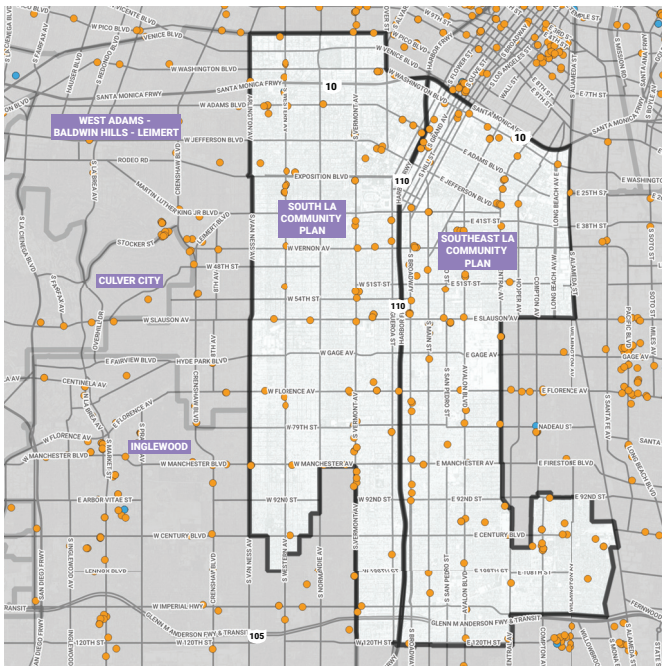
This map displays hospitals in South Central LA (in blue) and health clinics (in orange). Although health clinics are important assets (treasures) in communities, hospitals provide urgent care in case of emergencies (like asthma attacks or respiratory issues).
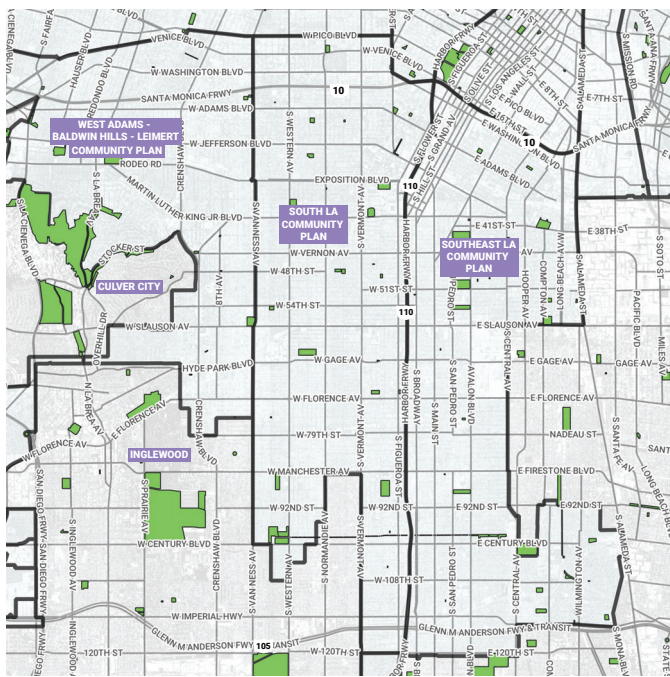
Parks / Open Space

This map shows where green and open space is located in South Central LA. South Central LA is considered park poor, meaning residents have access to less than one acre of parkland per thousand residents. Compare that with the 19 park acres per thousand residents enjoyed by residents Hollywood, the 26 acres enjoyed by residents of Bel Air, or the jaw dropping 198 acres enjoyed by residents of Brentwood residents.

What story do these maps tell?
Is something missing from these maps?
How have you experienced the conditions shown in the maps?
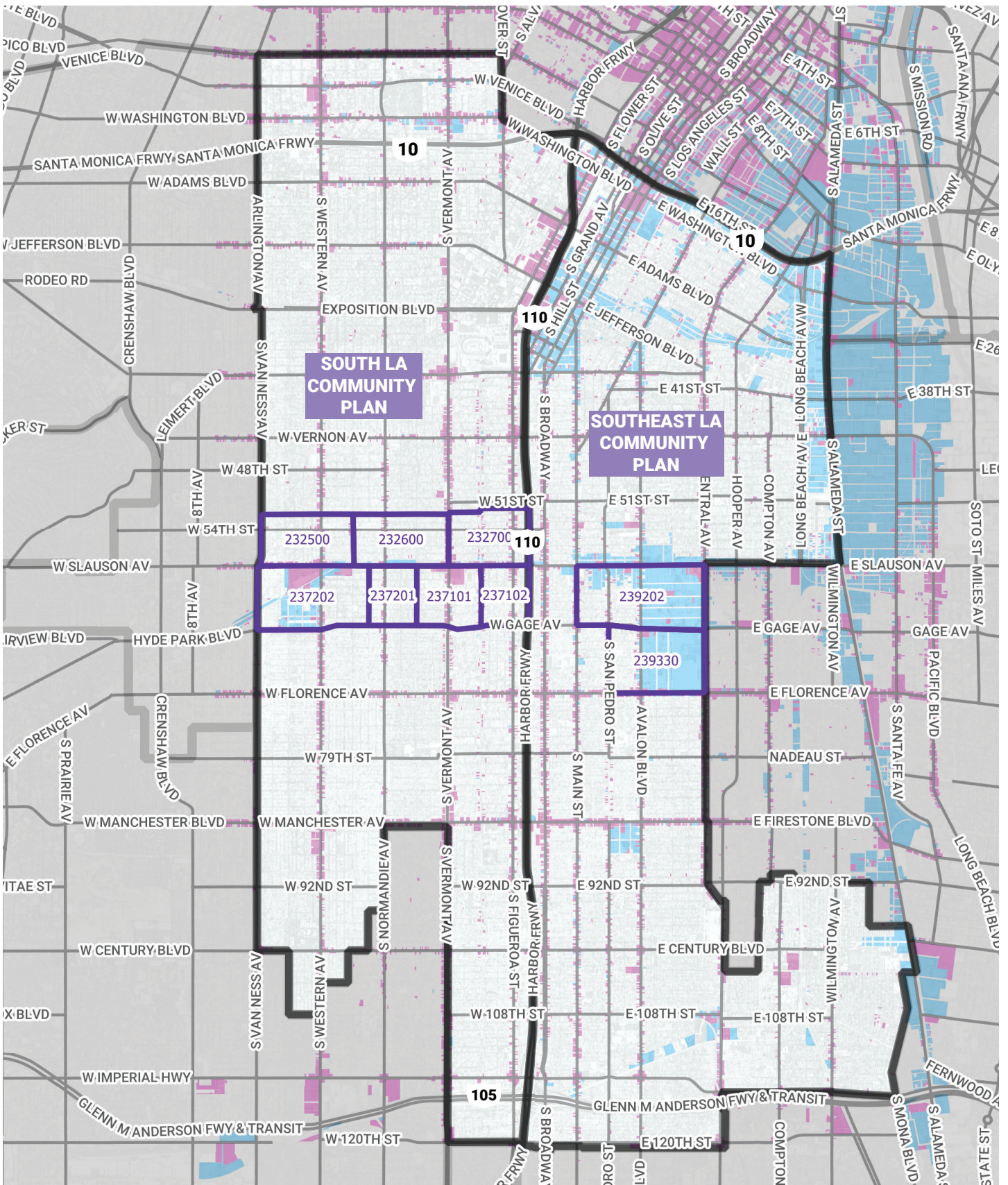
This map displays the areas that the SCLA:PUSH project will explore more and gather data. Based on input gathered from you (the residents!) we narrowed down our focus to a few select census tracts.

THE REGULATORY LANDSCAPE: HOW AIR POLLUTION IS REGULATED.

Air pollution is regulated on three levels: federal, state and regional. Each level has an agency responsible for developing policy and enacting regulation for air pollution. However, sometimes each agency's regulation looks slightly different. For example, California's regulatory agencies are known for their more robust and strict regulation around air pollution. Listed below are the primary regulatory agencies for each level.

The **U.S. Environmental Protection Agency** (EPA) is the federal agency responsible for overseeing environmental protection on a national scale. It was established in 1970 by President Nixon. It has regional offices in each of the agency's ten regions, as well as 27 laboratories. The mission of EPA is to protect human health and the environment.

The **California Air Resources Board** (CARB) is the primary air agency in the state of California. It was established in 1967 when then-governor Ronald Reagan signed the Mulford-Carrell Act. The agency is charged with protecting the public from the harmful effects of air pollution and developing programs and actions to fight climate change.

The **South Coast Air Quality Management District** (SCAQMD) is the regional air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. This area of 10,743 square miles is home to over 16.8 million people. The SCAQMD is primarily responsible for controlling emissions from stationary sources of air pollution

PART 4

MOVING TOWARDS MEANINGFUL SOLUTIONS THAT GO BEYOND MONITORING

For the last and final section of module 1, we will explore how to identify real solutions versus false solutions to community challenges. We will also learn how to determine what solutions are politically feasible to move forward. The ability to analyze conditions and hone in on both real and politically feasibly solutions is essential for creating strategies that lead to transformative change is our communities.

HOW DO WE BEGIN TO IDENTIFY REAL, POLITICALLY FEASIBLE AND FALSE SOLUTIONS?

The Three Circles Strategy tool (created by Movement Generation) is a guide to help us draw out our visions and align our strategies. This tool can help us identify what we believe is materially and culturally necessary (left circle), assess what is currently politically realistic (middle circle), and identify the false solutions that are being put forth by forces with an interest in maintaining the current system (right circle). The arrows indicate strategies for impacting the state of affairs – winning space to advance our agenda, and pushing false solutions off the table.

We can use this tool to help guide strategic conversations in a variety of issue areas. In this booklet we'll share how we can use this tool to identify air quality solutions and strategies to advance the values and changes we want to see in our community.

FALSE PROMISES:
What we know won't work

POLITICALLY REALISTIC

REAL SOLUTIONS:
What we know we really need.

EXPOSE

CODIFY

GOVERN

CODIFY

CREATE

3 CIRCLES STRATEGY TOOL

USING THE THREE CIRCLES STRATEGY TOOL:

STEP 1: IDENTIFYING REAL SOLUTIONS

Let's vision real solutions to address air quality and pollution in South LA. Imagine you are walking down a street in South LA in 2040. This is a street where you live, eat, play, work, or worship. What has changed? What does it feel like, smell like, sound like, look like? What do you see? What do you not see? How does your body feel? How do your heart and mind feel? Who is with you?

Using the chart, first fill in the left circle with the "Real Solutions" that we see in our vision and address our current state of air quality and pollution. Real solutions are what we really need, or what is materially and culturally necessary to survive and thrive. If we never talk about the world we really want and don't start building it, it will never become reality! Real solutions uplift and address all of our values. This means we can't achieve real environmental justice solutions without economic and racial justice.

DISCUSSION QUESTIONS

What is materially necessary? This is what is needed to keep our bodies alive and healthy, for example: clean air, our health, healthy homes.

_____

_____

_____

What is culturally necessary? This is what keeps our souls, spirits, relationships and communities alive, for example: respect for and acceptance of our traditions.

_____

_____

_____

Why are these real solutions? What values do these solutions uplift?

_____

_____

_____

STEP 2: IDENTIFYING FALSE SOLUTIONS

Now, let's think again about current conditions in South LA. What kinds of solutions, laws and practices do we see in our community? How do they impact air quality? How do they impact our rights and values? Using the chart, fill in the right circle with "False Solutions" that we often see in our community and make problems worse. False solutions are so-called solutions that actually move us away from the future we want to see. False solutions do not advance justice for us because it creates or worsens existing environmental, economic, racial, or social inequities. Another form of a false solution is one that solves a fake or made-up problem.

The false solutions and what we need NEVER overlap. Why? Because we seek to push the false solutions out and completely overlap real solutions and what is politically possible.

DISCUSSION QUESTIONS

Why are these false solutions? What inequities, injustices, or unintended consequences are being created or exacerbated?

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STEP 3: IDENTIFYING WHAT IS CURRENTLY POLITICALLY REALISTIC

Now let's consider what kinds of solutions are actually getting made into law and common practice. Using a dotted line, draw the bounds of what in your assessment, is currently politically realistic in the South LA context. Politically realistic solutions are the types of change that can be achieved at this moment in time, which can be either good or bad for our communities. What is politically realistic at any given time is constantly changing and depends on many factors, including:

Current political conditions, such as who is in power at the local level

Large-scale events or moments, such as the 1992 LA Uprising

The context of the problems and solutions we're discussing, such as moving policy at the local or national level

DISCUSSION QUESTIONS

How do we know the bounds of what is politically possible?
Do the boundaries currently encompass more real solutions or false solutions?

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STEP 4: GROUP REFLECTION AND DISCUSSION QUESTIONS

DISCUSSION QUESTIONS

What opportunities do we have to create our real solutions?

What is an example of a real solution that has been codified, or made into a law?
What strategies were used to push the boundaries of what is politically realistic?

Where do you see opportunities or threats on the boundaries of what is politically realistic?
Are there opportunities for us to govern to help shape what is politically realistic?

What false solutions do we need to expose as a threat?
What false solutions that are currently politically possible do we need to oppose?

Where are we spending most of our time organizing?
What strategies are we using? What have been the outcomes?

LET'S TRY USING THIS TOOL IN A
REAL-LIFE CASE STUDY: DRY CLEANERS IN LA

THE PROBLEM:

The California Air Resources Board passed a regulation to phase out Perchlorethylene by 2020, a chemical contaminant vastly used in Los Angeles as a solvent in Dry Cleaners. Perchlorethylene is a source of significant groundwater contamination and listed by the US Federal Clean Air Act as a hazardous air pollutant. As Perchlorethylene is being phased out, dry cleaners are being pushed to use other alternatives. The remaining dry cleaners are using hydrocarbons as a transition, which in addition to being combustible, was also a source of air and water pollution.

In South Central Los Angeles, there is a cumulative over concentration of these hazardous facilities, dry cleaners using PERC, that are contributing to the development of chronic diseases in sensitive populations including communities of color, children, pregnant women, and seniors.

Dry Cleaners currently using Perchloroethylene are exposing their workers, communitinites nearby, and consumers to a variety of health impacts. Short-term: Breathing high levels of perchloroethylene for a short time can cause: dizziness, drowsiness, headache, nausea and vomiting, lack of coordination, irritation of the eyes and respiratory tract. Additionally, Long-term health impacts may include: cancer.

The hydrocarbon dry cleaning alternative has not been classified as a non-toxic alternative. While hydrocarbons are toxic and explosive, GreenEarth continues to advertise this product as environmental or eco-friendly. This practice of false advertisement is called "GreenWashing." Many small dry cleaners owned by mostly immigrants and people of color have been falsely advertised to use hydrocarbons and have switched to it.

THE SOLUTION:

CARB classified professional wet cleaning and CO2 dry cleaning as meeting the criteria as non-toxic and non-smog forming alternatives based on their relatively benign human health, environmental, physical property hazard profile.

Professional Wet Cleaning uses water based detergentes and is recognized as "an environmentally-preferred technology that can effectively clean garments". By using a non-toxic, more energy efficient cleaning technology, Professional Wet Cleaning Methodology is ensuring the protection of customers, their families, and workers from the health risks associated with exposure to toxic dry cleaning solvents.

Through the implementation and enforcement of the Environmentally Preferable Product Ordinance in Los Angeles, green washed marketed and deceptive false non-chemically free alternatives, such as hydrocarbons, will not be used for dry cleaning. Garment workers and family business that own Dry Cleaners will have the opportunity to truly switch to a safer chemically free alternative that will reduce negative health impacts from exposure to chemicals and benefit the communities surrounding them. Business not switching to regrettable substitutions, but real environmentally preferred alternatives such as Professional Wet Cleaning, can lessen the exposure to dangerous air toxics and help produce positive health outcomes and clean the air to truly address the cumulative burden in frontline communities.

SOLUTION NOTES

Solution #1: Professional cleaners replace perc with hydrocarbons.
Is this is a real or false solution? Why?

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Solution #2: All dry cleaners shut down.
Is this is a real or false solution? Why?

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Solution #3: Professional cleaners transition to wet cleaning technology.
Is this is a real or false solution? Why?

_____

_____

_____

_____

_____

_____

APPENDIX

MODULE 1

Want to explore the topics brought up in Module 1? Check out these resources to learn more:

Section 1 Resources:
- 50 Year of Progress Towards Clean Air, by the South Coast AQMD: https://www.aqmd.gov/home/research/publications/50-years-of-progress
- Overview of the Clean Air Act: https://www.epa.gov/clean-air-act-overview
- AB 32, the Global Warming Solutions Act: https://ww3.arb.ca.gov/cc/ab32/ab32.htm

Section 2 Resources:
- EPA Criteria Air Pollutants: https://www.epa.gov/criteria-air-pollutants
- Want to learn more about toxic pollutants? Check out the Toxies! http://www.toxies.com/

Section 3 Resources:
- The Los Angeles Health Atlas: http://healthyplan.la/the-health-atlas/
- U.S. Environmental Protection Agency: https://www.epa.gov/
- California Air Resources Board: https://ww2.arb.ca.gov/
- South Coast Air Quality Management District: http://www.aqmd.gov/

Section 4 Resources:
- Movement Generation: https://movementgeneration.org/
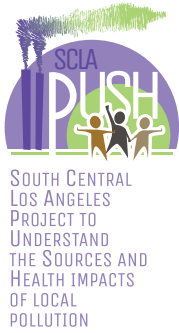
SCLA PUSH

South Central Los Angeles Project to Understand the Sources and Health impacts of local pollution

AIR QUALITY ACADEMY

CURRICULUM BOOKLET

MODULE 2

The South Central LA Project to Understand the Sources and Health Impacts of Local Pollution (SCLA: PUSH) is a collaborative effort between organizations, residents and academic partners. It aims to build the capacity of South Central LA organizations and community residents to better understand the state of air quality and health in their community, and to engage in air monitoring and data analysis.

Residents and advocates will build their air quality knowledge and capacity to monitor through the Air Quality Academy, whose goals are threefold:

1. To build our collective capacity to identify sources of air pollution in South Central LA using monitoring technology,

2. To mobilize the South Central LA community to strengthen existing and future air quality policies, and

3. To ensure that South Central LA gets its fair share of resources and funding to improve the air.

Physicians for Social Responsibility-LA (PSR-LA) is leading the SCLA-PUSH Initiative and is an organization that advocates for policies and practices that improve public health, eliminate environmental and nuclear threats, and address health inequalities.

Strategic Concepts in Organizing and Policy Education (SCOPE) builds grassroots power to create social and economic justice for low-income, women and women identifying, immigrant, black, and brown communities in LA. To do this, SCOPE organizes communities, develops leaders, collaborates through strategic alliances, builds capacity through training programs, and educates South L.A.'s residents to have an active role in shaping policies that affect the quality of life in our region. Our core values are: justice, respect, responsibility, integrity, and voice.

Community Health Councils (CHC) is a community-based health policy and systems change organization. CHC engages all levels of stakeholders and contributes to systems change in two distinct ways: 1) through coalition building and mobilization and 2) by utilizing robust community-based participatory research.

Jill Johnston is Assistant Professor of Preventive Medicine and Director of Community Engagement in the Division of Environmental Health at the University of Southern California,. She is an expert in environmental and climate justice, and has conducted extensive research on pollution and health across Los Angeles.

Bhavna Shamasunder is Associate Professor of Urban and Environmental Policy at Occidental College. She teaches and conducts research at the intersection of environmental health & justice with a focus on inequalities faced by low-income communities and communities of color who live and work in urban and/or industrial environments.

Omar Ureta is a design technologist revealing the complexities of land use planning and development. As an urban design consultant, he advocates for architecture in support of the public realm by improving on public outreach and public process. As a civic hacker, Omar experiments with new ways to interactively communicate land-use issues through the use of open source tools and open data.

Dr Peter Sinsheimer is a professor at the University of California Los Angeles' Fielding School of Public Health, and the Executive Director of the UCLA Law and Environmental Health Sustainable Technology & Policy Program. Dr. Sinsheimer is a leading voice in the movement to establish alternatives analysis as a necessary science and policy tool to promote the innovation and diffusion of safer technologies

PROJECT LEAD

PROJECT PARTNERS

AIR QUALITY ACADEMY
OVERVIEW

The Air Quality Academy (AQA) is a 2-day training that aims to increase the capacity of South Central residents, organizers and activists to characterize the quality and scale of air pollution within their communities. This is accomplished through collaborative learning, technical training and direct air quality data collection.

The goals of this training are:

- To educate participants on fundamental air quality topics, including the history of air pollution in LA, the types and sources of pollutants, the health risks associated, and current efforts to address the problem;

- To train participants in collecting air quality data using monitoring sensors and ground truthing methodologies; and

- To prepare participants to engage in efforts to substantively transform the systems which allow poor air quality to persist in our communities.

At the completion of the AQA, all participants will:

- Have a solid understanding of air quality as a technical topic, including the history of air pollution, the types air pollutants, the sources and health impacts;

- Have cultivated the ability to assess air quality as part of a larger system of cumulative risk and burden;

- Be able to use air monitoring technology to collect, analyze, and understand air quality data;

- Become proficient in ground-truthing and identifying sources of pollution in their communities; and
Understand how poor air quality is couched in larger systems of regulatory and policy failures, and how we can mobilize to fight these structural failures.

AGENDA

THURSDAY 6/27, 5:00 – 8:00PM

Time	Activity
5:00 - 5:15	Introductions, agreements & training overview
5:15 - 5:45	Part 1: a brief history of air quality, regulation & activism
5:45 - 6:30	Part 2: breaking down air quality basics
6:30 - 6:45	Break
6:45 - 7:15	Part 3: the state of the air in South Central LA today
7:15 - 7:55	Part 4: moving towards meaningful solutions that go beyond monitoring
7:55 - 8:00	Wrap up

FRIDAY 6/28, 2:00 – 5:15PM

Time	Activity
2:00 - 2:10	Day 2 overview, ice-breaker
2:10 - 2:30	Part 1: Monitoring 101
2:30 - 3:15	Part 2: getting trained in air monitoring & ground truthing
3:15 - 3:30	Break into 3-person pods, and Practice
3:30 - 3:45	Break & head outside to monitor & ground-truth
3:45 - 4:45	Ground truthing and air monitoring
4:45 - 5:15	Wrap up, evaluations & celebration!

MODULE 2:

While the goal of Module 1 was to get us grounded in the fundamentals of air quality, Module 2 focuses on how we collect data. There are two primary ways data is collected through the South Central LA PUSH initiative: air monitoring (using monitoring equipment) and ground truthing. At the end of this Module, participants will be trained in using both methods to collect data on stationary sources of pollution, mobile sources of pollution, and other environmental factors that impact air quality and health.

PART 1

AIR MONITORING 101

What is air monitoring? Does monitoring look different when led by communities? What kind of data can be collected using air monitoring devices? These are core questions we will explore in this section.

WHAT IS AIR MONITORING?

Air monitoring is the process of collecting samples of air in order to determine the concentration of contaminants in the air. The EPA defines Ambient Air Monitoring as "the systematic, long-term assessment of pollutant levels by measuring the quantity and types of certain pollutants in the surrounding, outdoor air". Monitoring is conducted by agencies, academics and communities, and for a variety of reasons (as demonstrated by the diagram below). For our project, we are monitoring for air pollutants emitted by particular industries (for ex: auto body shops), as well as vehicles that pass through our community.


https://www.epa.gov/air-quality-management-process/managing-air-quality-ambient-air-monitoring
https://www.epa.gov/air-quality-management-process/managing-air-quality-ambient-air-monitoring
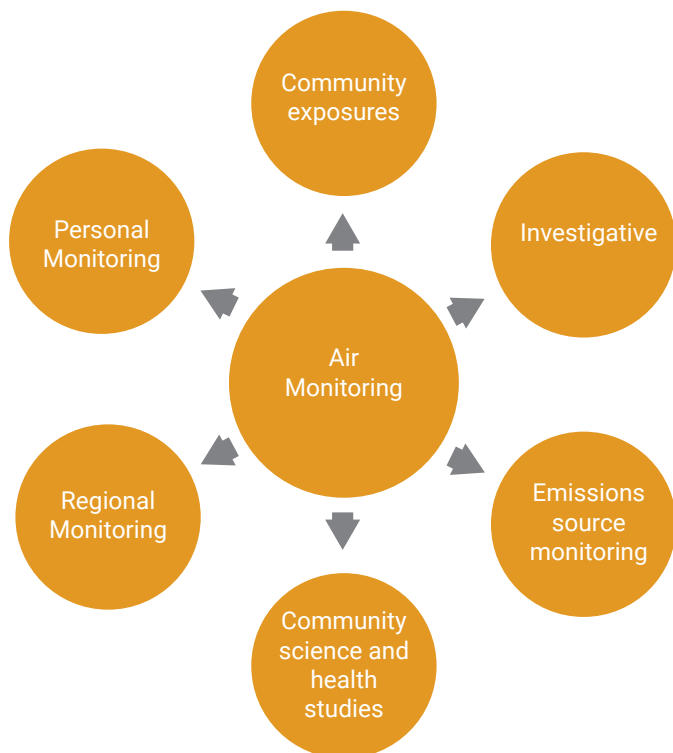
REGULATORY AIR MONITORING

In Module 1, we learned about the three regulatory agencies that operate at three levels of government: the Environmental Protection Agency, or EPA (federal level), the California Air Resources Board, or CARB (state level), and the South Coast Air Quality Management District, or SCAQMD (regional level). Each plays a role in conducting air monitoring and analyzing the data generated. Next, we explore the role of each agency and how they set standards on air pollution emissions.

The Environmental Protection Agency (EPA) conducts annual air monitoring at the federal level. The EPA Air Monitoring Network has been developed to monitor the criteria air pollutants determined by the Clean Air Act and the National Ambient Air Quality Standards (NAAQS). National air monitors are monitoring the six criteria air pollutants annually

Criteria Air Pollutants	1960s
Toxic Pollutants	1980s
Greenhouse Gases	2006
Community Air Monitoring	Recent
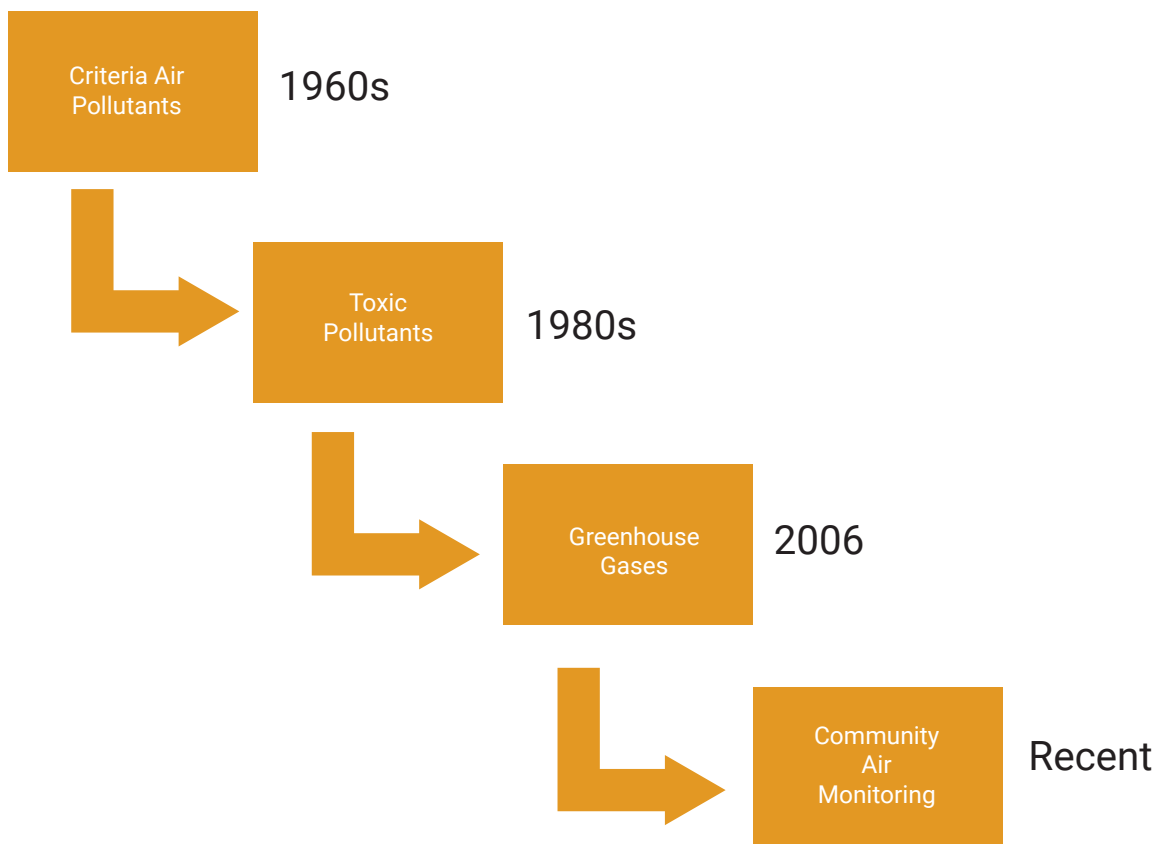
WHAT IS THE GOAL OF FEDERAL AIR MONITORING?

To assess the attainment status of the United States with the limitations set for each of the criteria air pollutants.

BUT, IS IT ENOUGH?

The EPA monitors to ensure that states are meeting the minimum criteria of air quality standards.

Next, let's take a look at how California monitors for air quality and the California standards for criteria air pollutants.

At the state level, the California Air Resources Board gathers data from each air monitoring station including maps, GPS coordinates, photos, pollutants monitored, and surveys. The California Air Monitoring Network's surveys list in-depth monitoring information such as traffic descriptions. The CARB's air monitoring network consists of more than 40 air monitoring stations located throughout California.

REMINDER

Remember, the Clean Air Act mandates states to put limitations on how much of the criteria air pollutants industries are allowed to put into the air.
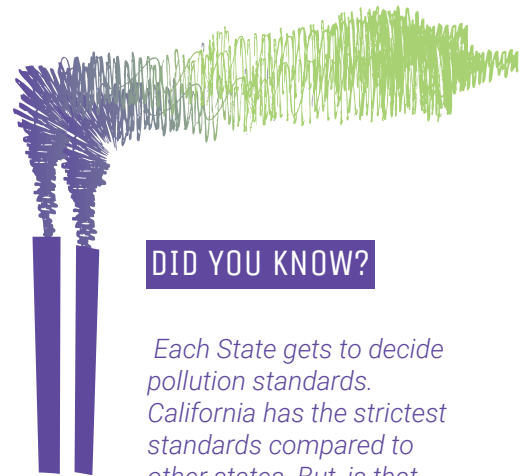
DID YOU KNOW?

Each State gets to decide pollution standards. California has the strictest standards compared to other states. But, is that enough? Is there a safe level of air pollution that Californians can breathe?

The State and Local Air Monitoring Network Plan provides the results of the annual review of the air monitoring stations in California operated by the Air Resources Board (ARB), the local Air Pollution Control Districts (APCD) or Air Quality Management Districts (AQMD), private contractors, and by the National Park Service (NPS). This network plan includes the location of the monitoring stations and the type of ambient air monitoring performed at each station.

Station information can be found here: https://ww3.arb.ca.gov/qaweb/sitelist_create.php

SO, WHAT ARE THE CALIFORNIA STANDARDS FOR CRITERIA AIR POLLUTANTS AND HOW DO THEY COMPARE TO THE NATIONAL STANDARDS?

PM2.5	Air Quality	Who is at risk
0 – 12.5	Good	Air quality is considered satisfactory, and air pollution poses little or no risk.
12.5 - 35	Moderate	Air quality is acceptable; however, a moderate health concern for people unusually sensitive to air pollution.
35 - 70	Unhealthy for sensitive groups	Members of sensitive groups may experience health effects.
>70	Unhealthy	Everyone may begin to experience health effects;

Area	Expected Concentration
A clean place such as by the beach	5,000 pt/cc
An indoor office with no open windows	15,000 pt/cc
The average over 10 minutes by a busy road	41,000 pt/cc
The spike of a diesel truck passing	288,000 pt/cc

These Ambient standards are based on how each pollutant is formed and how long they stay in the atmosphere. For example, Ozone can last at least an hour in the air we breathe. As you can see, for California standards Ozone can not exceed a limit of 0.070 PPM in an 8 hour period and the same limitations system applies for other pollutants only with different time periods.

When were California ambient air quality standards last updated?

In June of 2002, the Air Resources Board adopted revisions to the PM10 standard and established a new PM2.5 annual standard. The new standards became effective in June 2003

HOW DOES AIR POLLUTION LOOK LIKE IN CALIFORNIA?

Counts of monitors in California
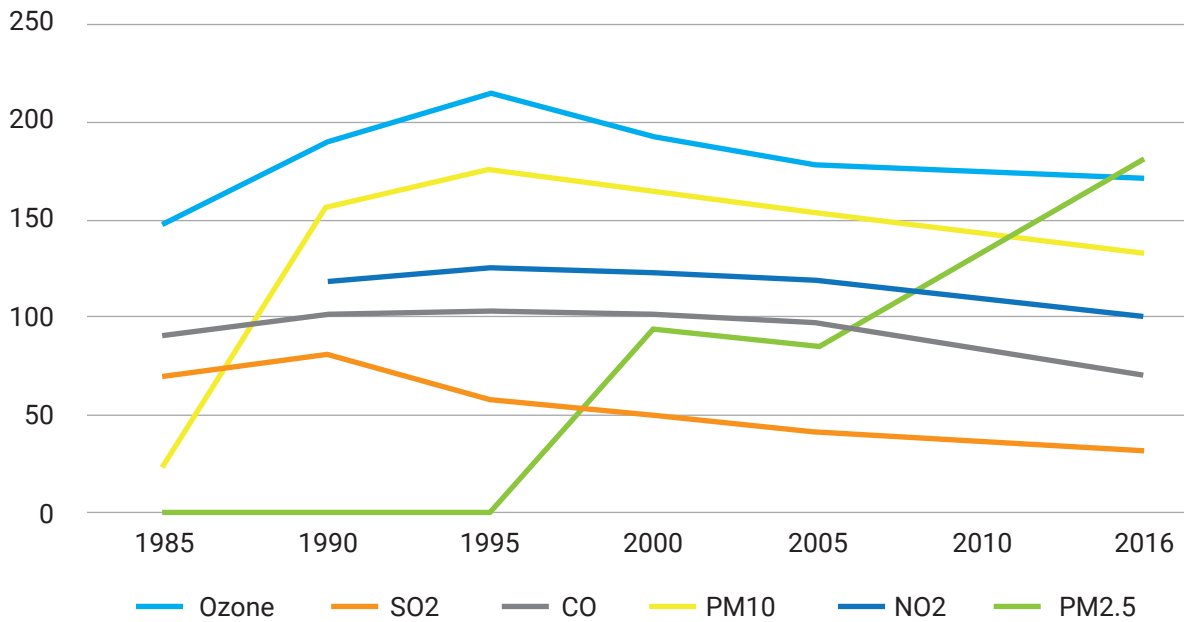
Lastly, at the regional level, the South Coast Air Quality Management District established the Annual Air Quality Monitoring Network Plan, which describes the network of ambient air quality monitors located within the South Coast AQMD's four-county jurisdiction [View map]. The Plan includes a reviews and outlines plans for action in the year ahead.

Regulatory Air Monitors in Los Angeles
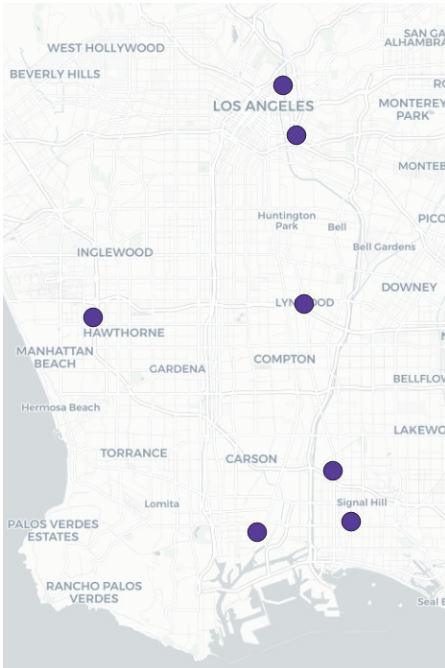
Regulatory Air Monitoring for Air Toxics
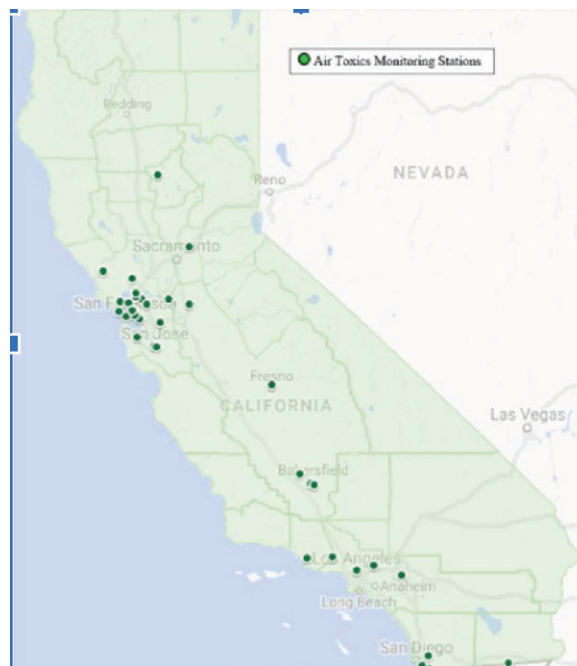
COMMUNITY DRIVEN AIR MONITORING

Air pollution across Los Angeles does not affect communities equally. The presence of freeways and industry can influence concentrations of particulate matter (PM).

In response to the gaps in information that exists in regulatory air monitoring, communities have organized to better understand and document air quality information in cumulatively burdened communities by air pollution. Environmental justice organizations in the Los Angeles area have historically collaborated with community residents to decentralize and democratize air quality measurements and ensure air quality data accurately represents air pollution and local knowledge.

The Approach: Community and local knowledge driving community science based on air pollution concerns and research questions. Residents collect, visualize, and contextualize air pollution data using portable low cost air pollution sensors to characterize and map air quality indicators at the individual- and neighborhood- scale.

COMMUNITY AIR MONITORING SUCCESS STORIES

Community Bucket Brigades, Louisiana

California Imperial County
Community Air Monitoring Network

Now that we have a better understanding of air monitoring. Let's dive into the different technologies, we will be utilizing to construct our South Central Los Angeles Community Air Monitoring Network.

These are the Air Monitoring Devices we will be using to collect initial data on air quality in South Central Los Angeles.

PURPLE AIR MONITORS

Using a new generation of laser particle counters to provide real time measurement of PM1.0, PM2.5, and PM10. PurpleAir sensors are easy to install, requiring a power outlet and WiFi. These sensors use WiFi to report in real time to the PurpleAir Map.

Purple Air Sensor
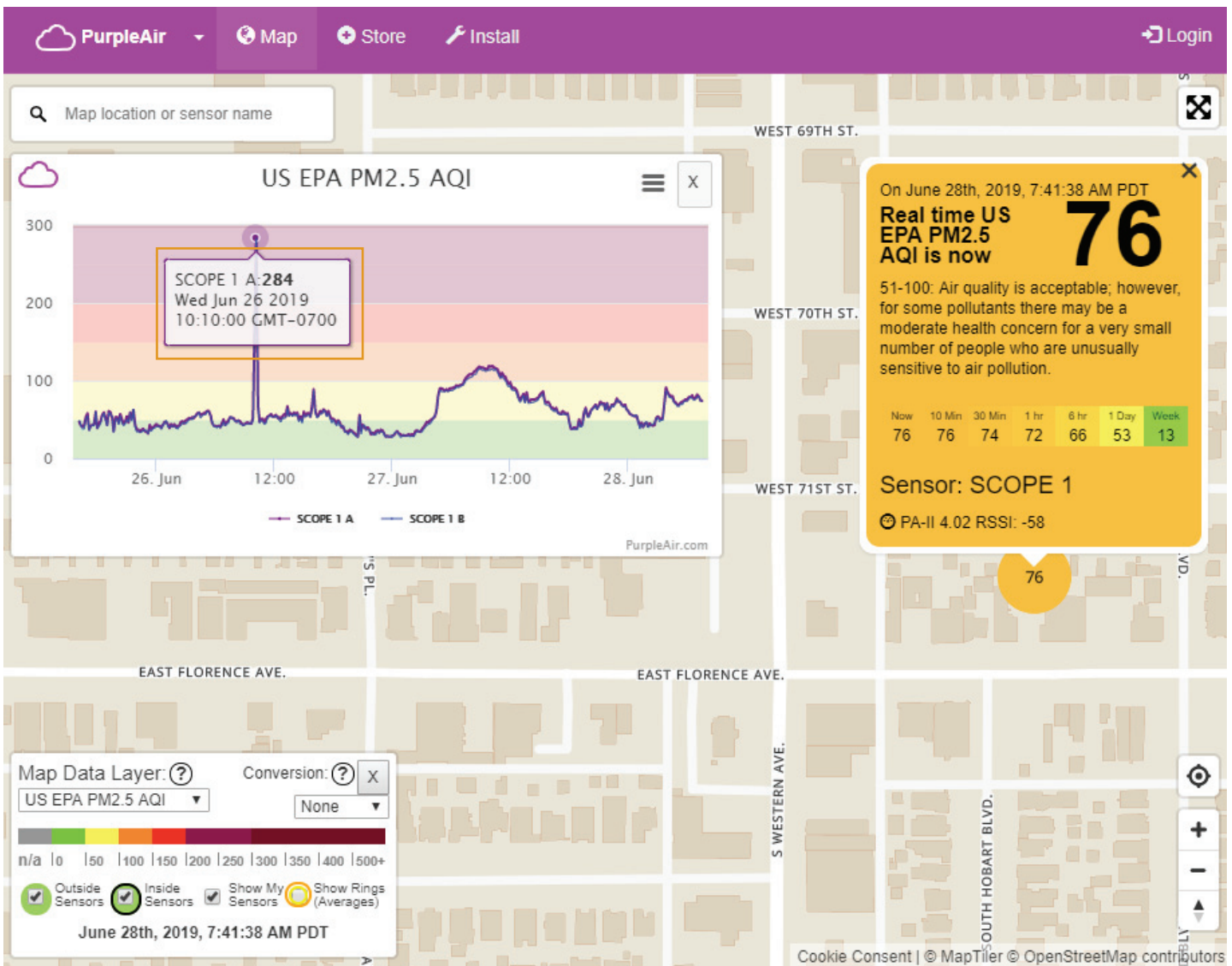
Purple Air Monitor Map: Air Monitor Located at SCOPE picked up high levels of Particulate Matter on June 26th, 2019 after a nearby fire occurred (Peak level of 283 PPM making the air unhealthy) https://www.purpleair.com/map?#12.52/33.95105/-118.33916

AIR BEAMS

The AirCasting platform was built as an open-source, end-to-end solution for collecting, displaying, and sharing health and environmental data using your smartphone. The platform consists of wearable sensors that detect changes in your environment, including a palm-sized air quality monitor called the AirBeam2, the AirCasting Android app and the AirCasting crowdmapping website. By documenting and leveraging health and environmental data to inform personal decision-making and public policy, the AirCasting platform empowers citizen scientists and changemakers like you and me to take matters into our own hands.

P-TRAKS

https://play.google.com/store/apps/details?id=pl.llp.aircasting&hl=en
http://aircasting.org/
http://aircasting.org/
https://envhealthcenters.usc.edu/2014/07/youth-pollution-monitoring-activities-across-the-southland.html

PART 2

GROUND TRUTHING

Whereas air monitoring uses technology to collect data directly from the environment around us, ground truthing is a method that relies on our experiences and community expertise to capture data in our community. It relies on the power of local knowledge to guide the process of data collection. The Liberty Hill Foundation describe ground truthing as follows: "Community-based participatory research methods incorporate community knowledge into research design. Direct engagement in data collection and interpretation ensures that rigorous analysis is directly linked to policy outcomes and regulatory action."

WHAT IS LOCAL KNOWLEDGE?

Local knowledge is the knowledge that people in a given community have developed over time, and continue to develop. It is:

- Based on experience;

- Adapted to the local culture and environment;

- Embedded in community practices, institutions, relationships and rituals;

- Held by individuals or communities; and

- Dynamic and changing

Let's take a look at a case study where ground truthing was used to collect local data.

500 FEET: A PROJECT TO FIND HAZARDOUS USES OF LAND MISSED BY REGULATORY AGENCIES

In 2017, Physicians for Social Responsibility-LA launched a project to explore how the South Central community was impacted by the challenge of incompatible land uses. This is when sensitive land uses (like schools, childcare centers, or recreation centers) reside in close proximity to hazardous uses of land (like auto body shops, dry cleaners, or metal facilities). Official data sources from the EPA and California agencies painted a picture of some low-level emitters residing close to a few sensitive land uses. However, the data was imperfect.

Verify

Revise

Add
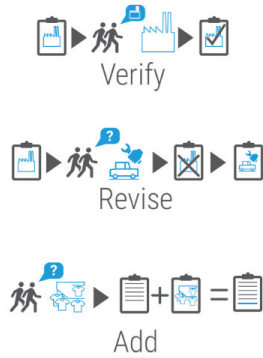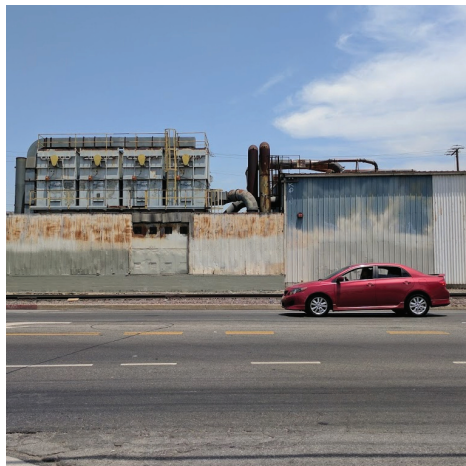
Let's learn the Groundtruthing basics
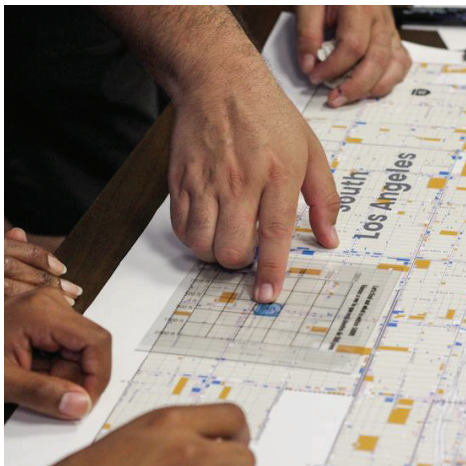
PSR-LA decided to work with South Central community based organizations and their members to find out if the picture painted by agencies was accurate. A process of ground truthing census tract began. Residents were trained in identifying industries in their communities based on their local knowledge and powers of observation. What resulted was a drastically different picture from what the official data sets told. Some local businesses were not being captured by agencies. In other cases, the information captured was incorrect. This would not have been apparent, without residents ground truthing their communities.

Liberty Hill Report: Hidden Hazards. https://www.libertyhill.org/sites/libertyhillfoundation/files/hidden-hazards-low-res-version.pdf
http://www.fao.org/3/y5610e/y5610e01.htm

APPENDIX

MODULE 2

Want to explore the topics brought up in Module 2? Check out these resources to learn more:

Section 1 Resources:
- U.S. EPA Air Monitoring Programs: https://www.epa.gov/measurements-modeling/monitoring-programs
- CARB Ambient Air Quality Monitoring: https://ww3.arb.ca.gov/aaqm/aaqm.htm
- SCAQMD Air Quality Portal: https://www.aqmd.gov/home/air-quality
- Air Quality Index: https://www.epa.gov/measurements-modeling/monitoring-programs

Section 2 Resources:
- The 500 Feet Project: http://500ft.psr-la.org/
- Hidden Hazards Report: (includes content on ground truthing) https://www.libertyhill.org/sites/libertyhillfoundation/files/hidden-hazards-low-res-version.pdf