ADB Clean Air Knowledge Series
Managing and Monitoring Air Quality in Ortigas

General concepts of air pollution and its management

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Clean Air Asia

Clean Air Asia: leading the regional mission for improved air quality in Asian cities

AIR QUALITY AND CLIMATE CHANGE PROGRAM

- Ambient Air Quality and Emission Standards
- Emission Inventories and AQ Modeling
- Air Quality Communication
- Clean Air Action Plans
- Stationary Sources

SUSTAINABLE TRANSPORT PROGRAM

- Clean Fuels and Vehicles
- Green Freight and Logistics
- Low Emissions Urban Development

CAPACITY BUILDING

Training & Workshops
Hands-on Work

INFORMING FOR ACTION

Data gathering & analysis
Knowledge products
Awareness raising

POLICY GUIDANCE

Science-based

www.cleanairasia.org

Clean Air Asia work with Cities

Mongolia

- National Action Program on Reducing Air Pollution
- National Emissions Inventory for Mongolia
- Capacity building for CAAP development in 22 cities/provinces/aimags including Ulaanbaatar, Bayankhongor, Erdenet

India

- AQM capacity assessment in 30 cities
- Capacity building for CAAP development in Indian Cities

Viet Nam

- National emissions inventory guideline for industries
- Clean Air Action Plan for Can Tho
- Policy guidance and capacity building in Hanoi

China

- Regional knowledge sharing platforms for AQM
- Capacity building for CAAP components in over 100 Chinese cities

Philippines

- **Clean Air Action Plan for Iloilo, Cagayan de Oro, Marikina**
- **Clean Air Action Plan for Manila, Santa Rosa, La Trinidad (ongoing), and Baguio City and Bataan (planned)**
- **Emission inventory and dispersion modeling for NCR**
- **Emission inventory for Santa Rosa**
- **Emission inventory and air quality modeling for La Trinidad, Limay**
- **AQ Monitoring and Roadmap for Clean Air Action Plan (or AQMP) for Quezon City**
- **Sustainable transport solutions for Pasig City**

Indonesia

- Clean Air Action Plan for Bogor

Why should we care about the quality of air that we breathe?

Basic Needs to Survive

3 weeks without food

3 days without water

3 hours without shelter

3 minutes without air

Adapted from: Environmental and Experiential Learning Program funded by the UPS Foundation

What is air pollution?

Air Pollution is the introduction of substances in the atmosphere that can have negative effects:

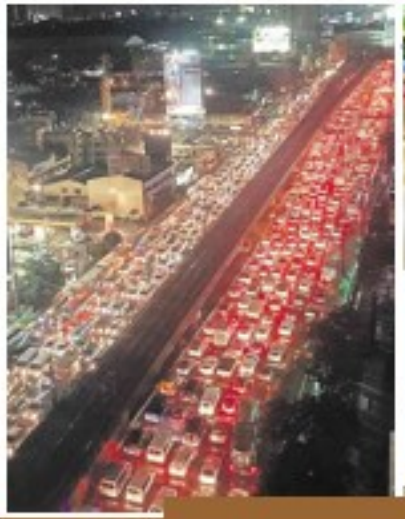
harm public health, safety and welfare

We, therefore, cannot utilize air resources for its intended use.

Adapted from: Environmental and Experiential Learning Program funded by the UPS Foundation

Sources of Air Pollution

STATIONARY



MOBILE

AREA

Adapted from: Environmental and Experiential Learning Program funded by the UPS Foundation

Sources of Air Pollution

BIOGENIC
(Natural)

ANTHROPOGENIC
(Man-made)

Adapted from: Environmental and Experiential Learning Program funded by the UPS Foundation

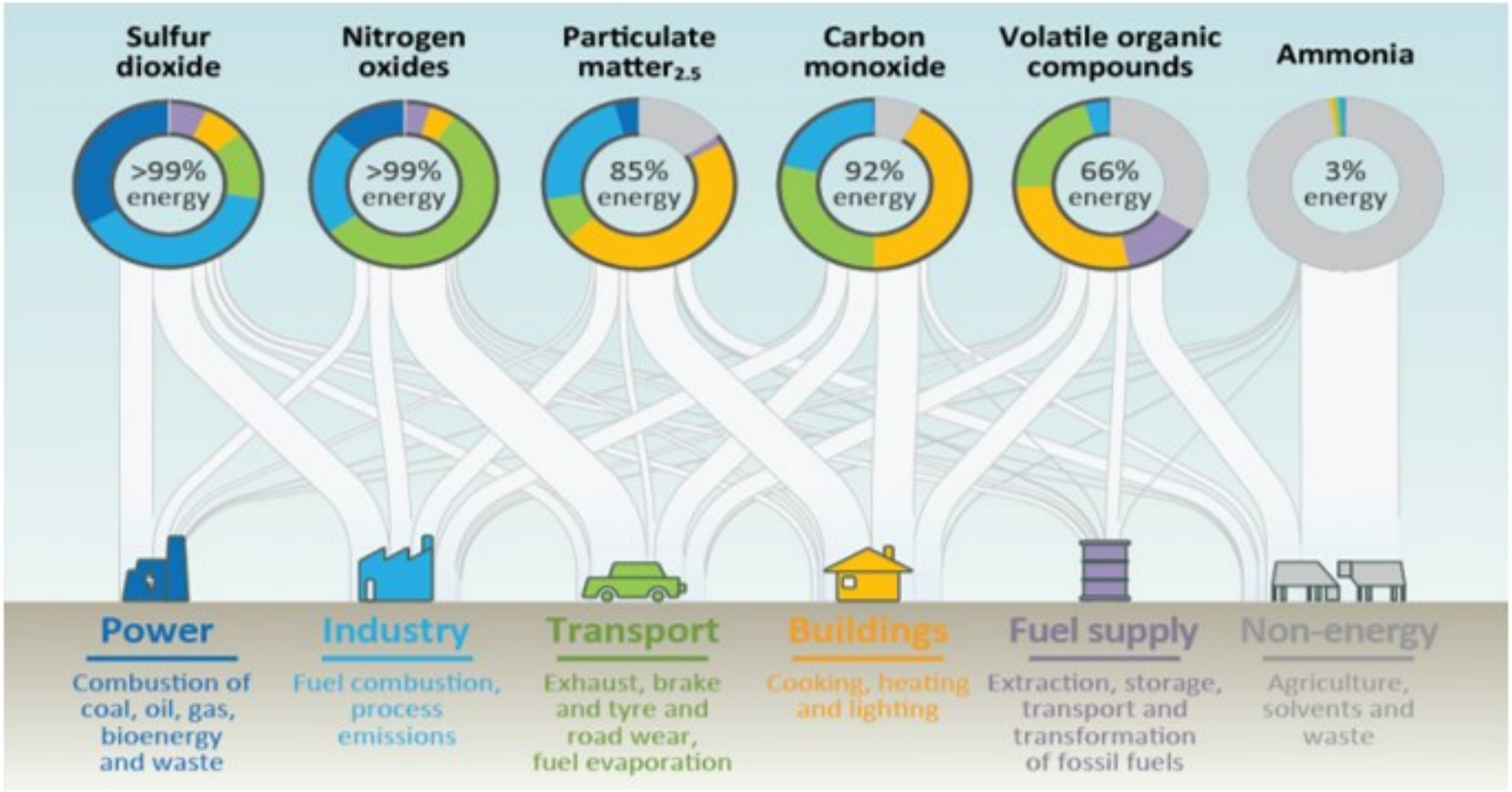
Types of Air Pollution

INDOOR

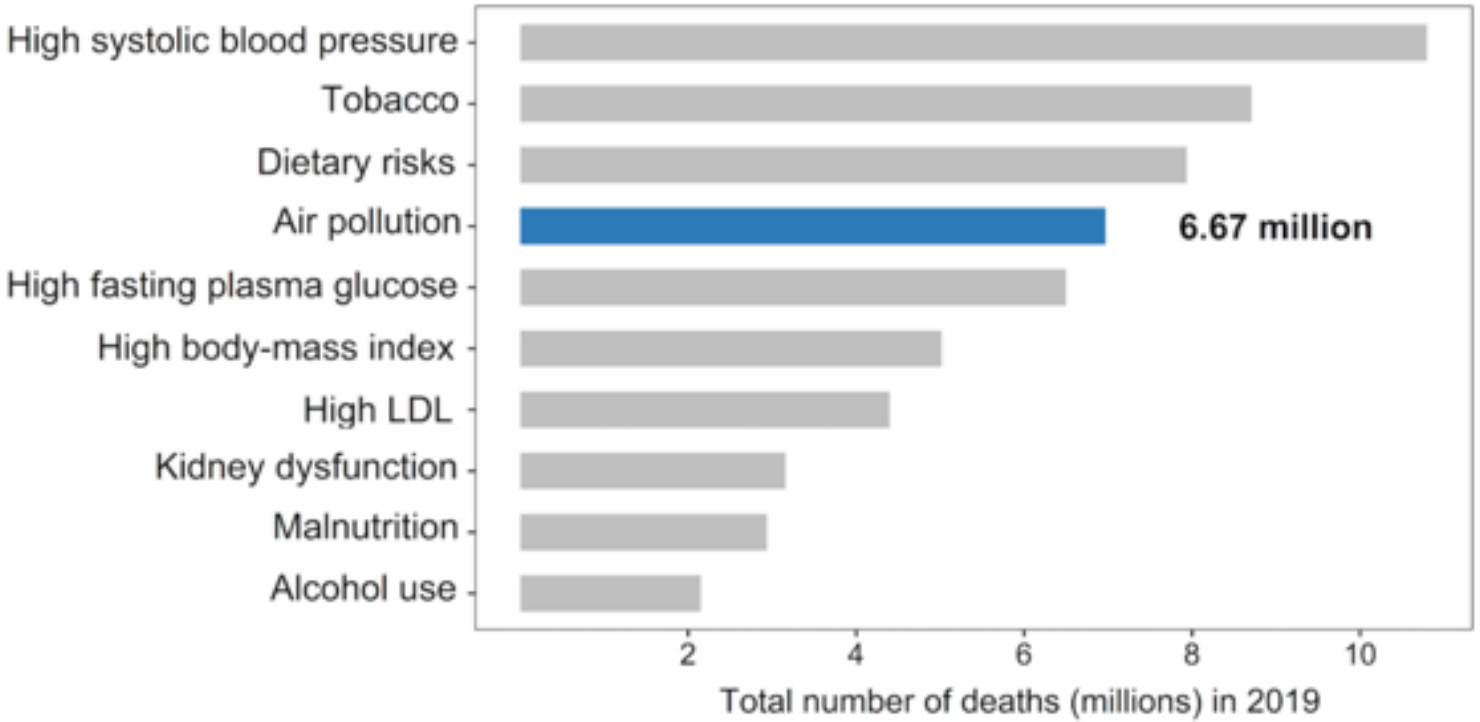
OUTDOOR

Adapted from: Environmental and Experiential Learning Program funded by the UPS Foundation

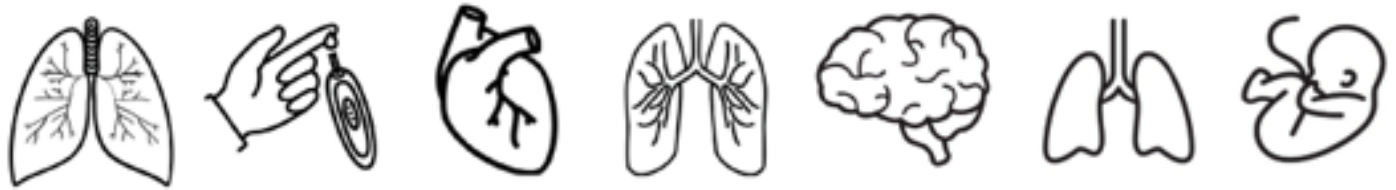
Major Sources of Urban Air Pollution



Air pollution is the 4th leading global risk factor for early deaths globally



Percentage of Global Deaths (by Cause) Attributed to Air Pollution in 2019



40 percent of COPD deaths

20 percent of diabetes deaths

20 percent of ischemic heart disease deaths

19 percent of lung cancer deaths

26 percent of stroke deaths

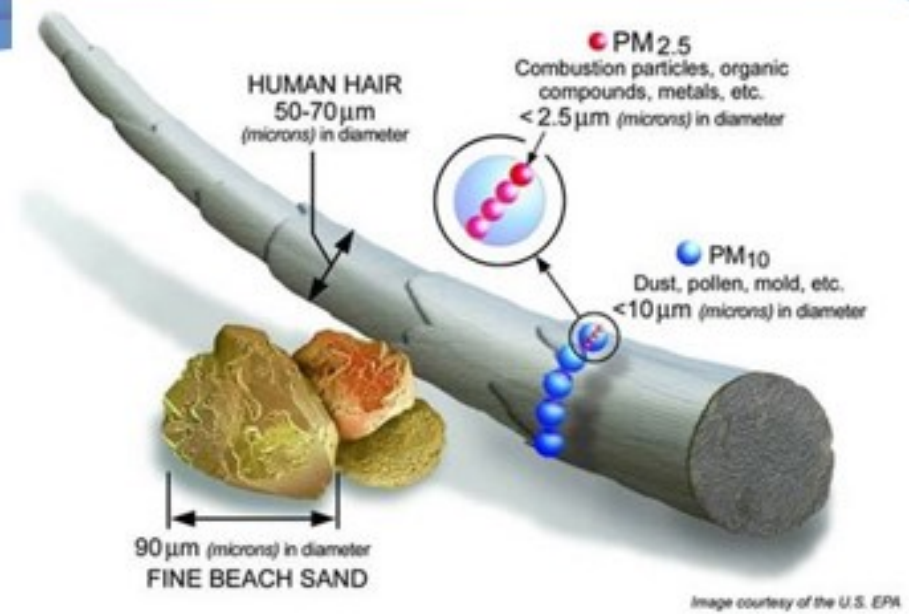
30 percent of lower-respiratory infection deaths

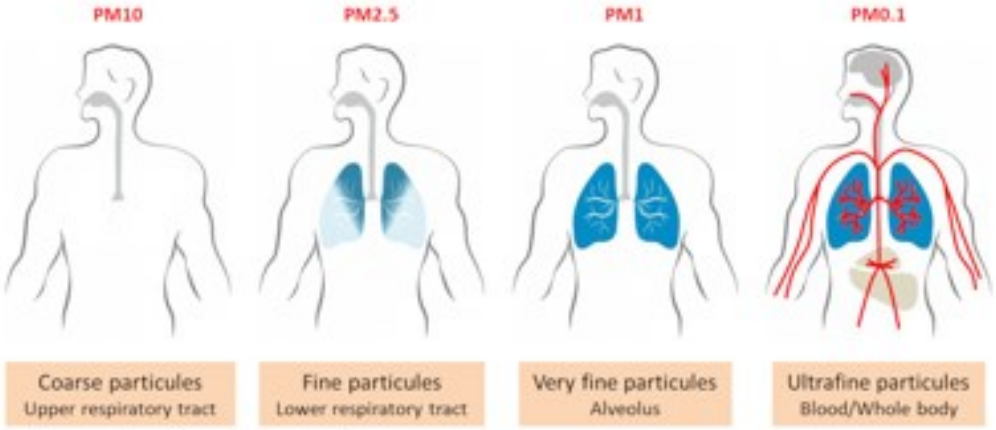
20 percent of neonatal deaths

- Breathing polluted air increases chances of developing heart disease, chronic respiratory diseases, lung infections, and cancer
- Global air pollution is associated with nearly **6.7 million deaths** and 213 million years of healthy life lost
- Air pollution thus contributed **1 in every 9 deaths** in 2019; and **reduces life expectancy by 20 months**
- Burden of impact is mostly in Asia

Health Effects Institute. 2020. State of Global Air.

Impacts of Air Pollution



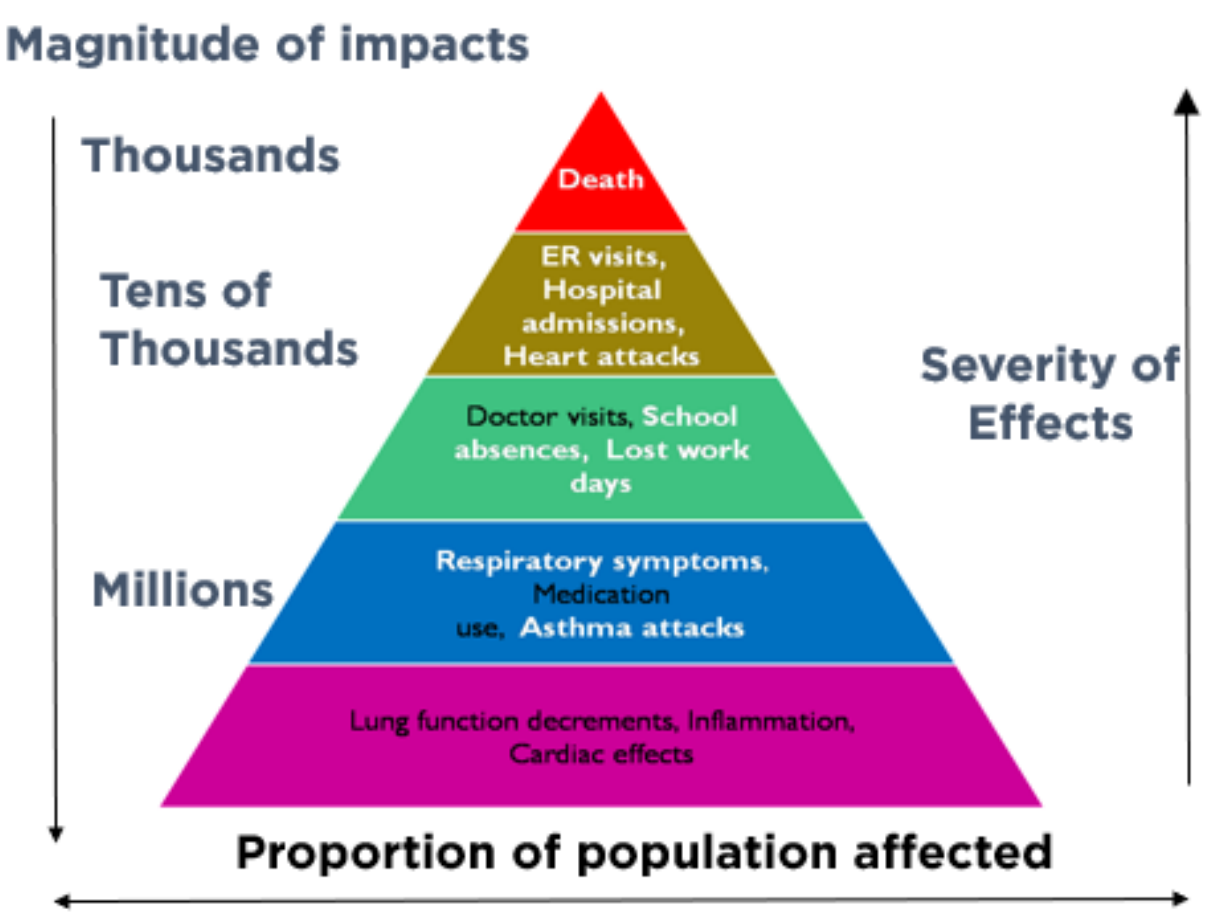


Source: encyclopedie-environnement.org

	MAJOR SOURCES	HEALTH EFFECTS	ENVIRONMENTAL EFFECTS
SO_2	Industry	Respiratory and cardiovascular illness	Precursor to acid rain, which damages lakes, rivers, and trees; damage to cultural relics
NO_x	Vehicles; industry	Respiratory and cardiovascular illness	Nitrogen deposition leading to over-fertilization and eutrophication
PM	Vehicles; industry	Particles penetrate deep into lungs and can enter bloodstream	Visibility
CO	Vehicles	Headaches and fatigue, especially in people with weak cardiovascular health	
Lead	Vehicles (burning leaded gasoline)	Accumulates in bloodstream over time; damages nervous system	Fish/animal kills
Ozone	Formed from reaction of NO_x and VOCs	Respiratory illness	Reduced crop production and forest growth; smog precursor
VOCs	Vehicles; industrial processes	Eye and skin irritation; nausea; headaches; carcinogenic	Smog precursor

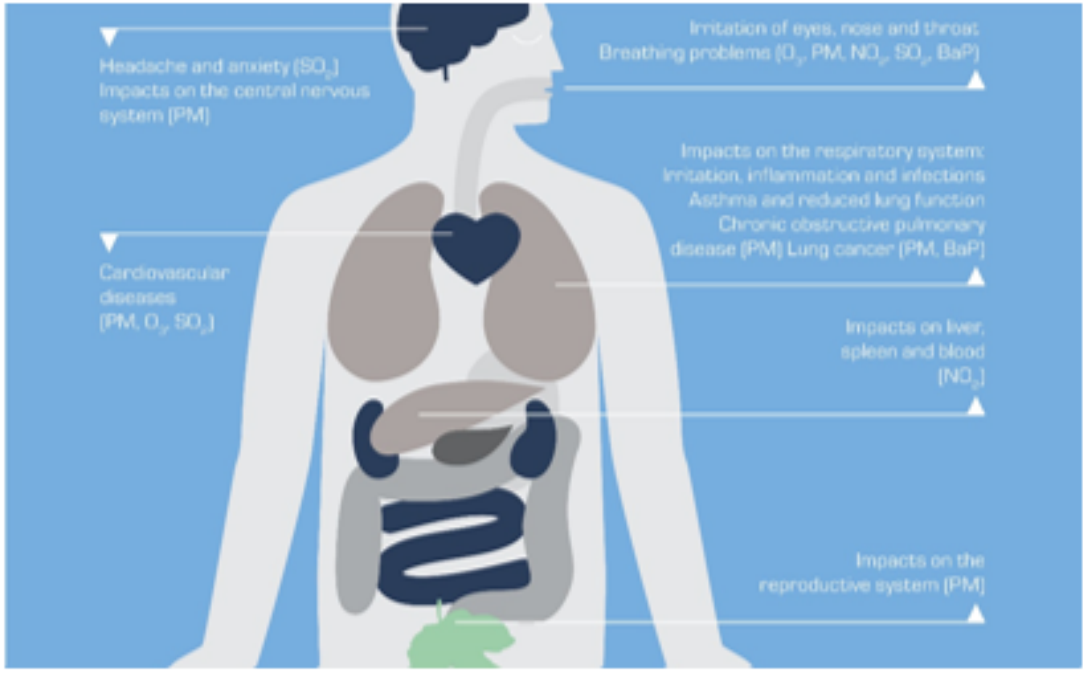
Source: nsessaywqbf.ameriquote.us

Impacts of Air Pollution



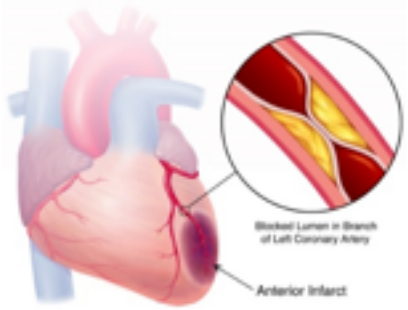
(Source: BenMAP Trainings)

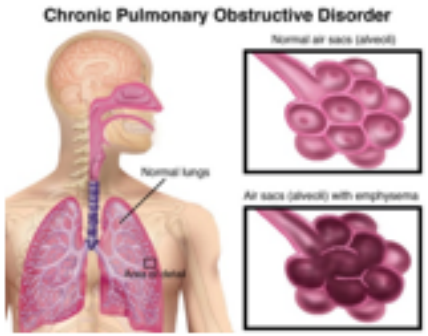
Top 10 Leading Causes of Death in the Philippines in 2016 (PSA)	Total
All causes of death	*582,183*
Ischaemic heart diseases	74,134
Neoplasms (Cancers)	60,470
Pneumonia	57,809
Cerebrovascular diseases	56,938
Hypertensive diseases	33,452
Diabetes Mellitus	33,295
Other heart diseases	28,641
Respiratory tuberculosis	24,462
Chronic lower respiratory infections	24,365
Remainder of diseases of the genitourinary system	19,759
Other causes of death	*168,858*



Source: EEA (2013)

Benefits of improved Air Quality

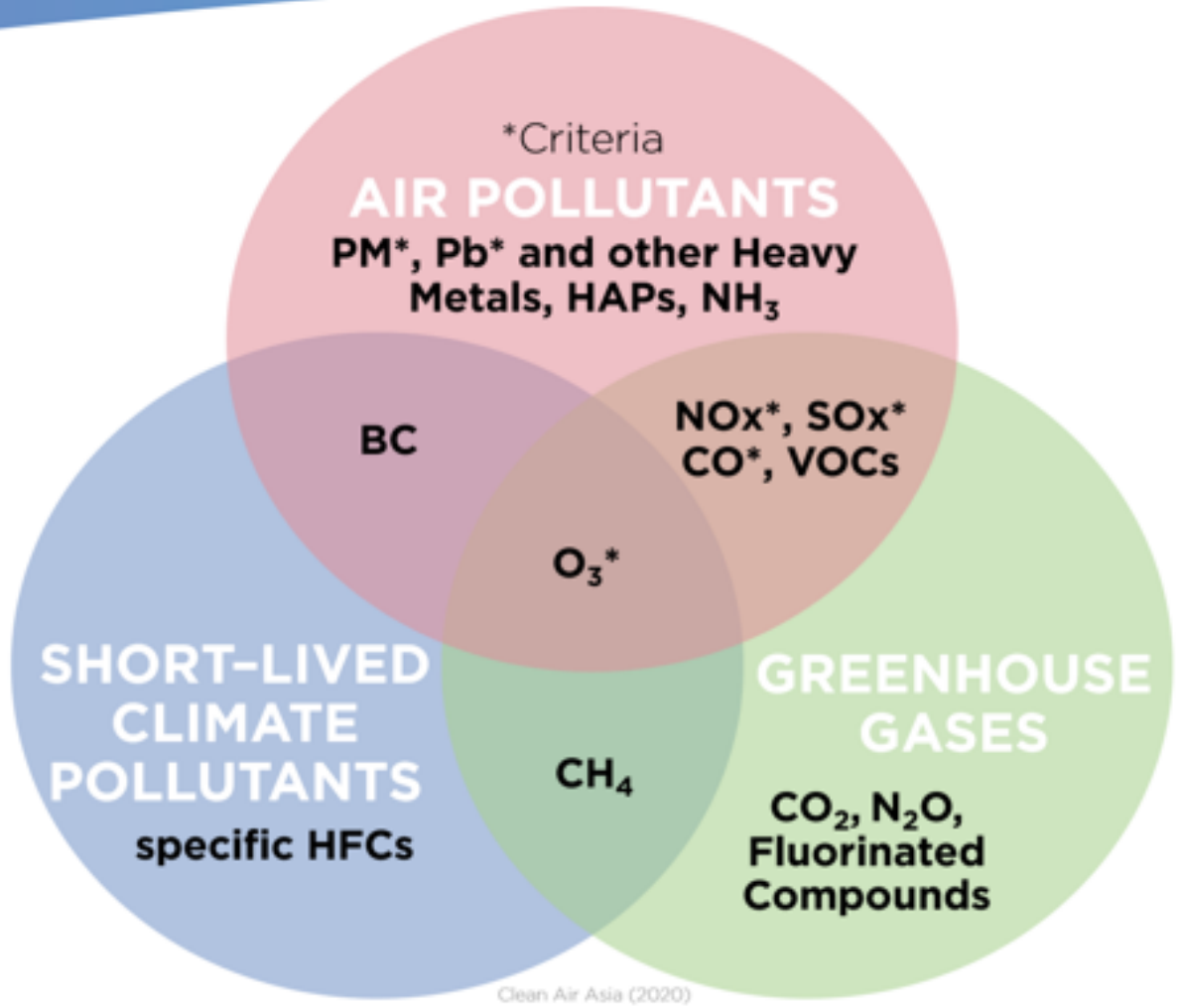




HEALTH	ENVIRONMENT
Reduces the risk of • Early death • Chronic disease • Heart attacks • Asthma attacks • Hospital admissions • Bronchitis • School absences • Missed work	Improved: • Visibility • Forest and crop yields • Water quality • Habitat Reduces: • Acid deposition • Leaf damage

Source: US EPA BenMAP Training (2018) in Hanoi, Viet Nam.

Air pollutants, GHGs, SLCPs



Pollutant	Average time	WHO Guideline 2005 (µg/m³)	Philippine National Ambient Air Quality Guideline Value (µg/Nm³)
$PM_{2.5}$	1 year 24 hrs	10 25	25 50

World Health Organization Interim Targets and AQG

Annual mean level	$PM_{2.5}$ (µg/m³)	Basis for the selected level
Interim target-1 (IT-1)	35	Levels associated with about 15% higher long-term mortality than at AQG
Interim target-2 (IT-2)	25	Risk of premature mortality decreased by approximately 6% compared to IT1
Interim target-3 (IT-3)	15	Mortality risk reduced by approximately 6% compared to IT2 levels.
Air quality guideline (AQG)	10	Lowest levels at which total, CP and LCA mortality have been shown to increase (Pope et al., 2002). The use of $PM_{2.5}$ guideline is preferred.

Co-benefits of air pollution and climate change mitigation

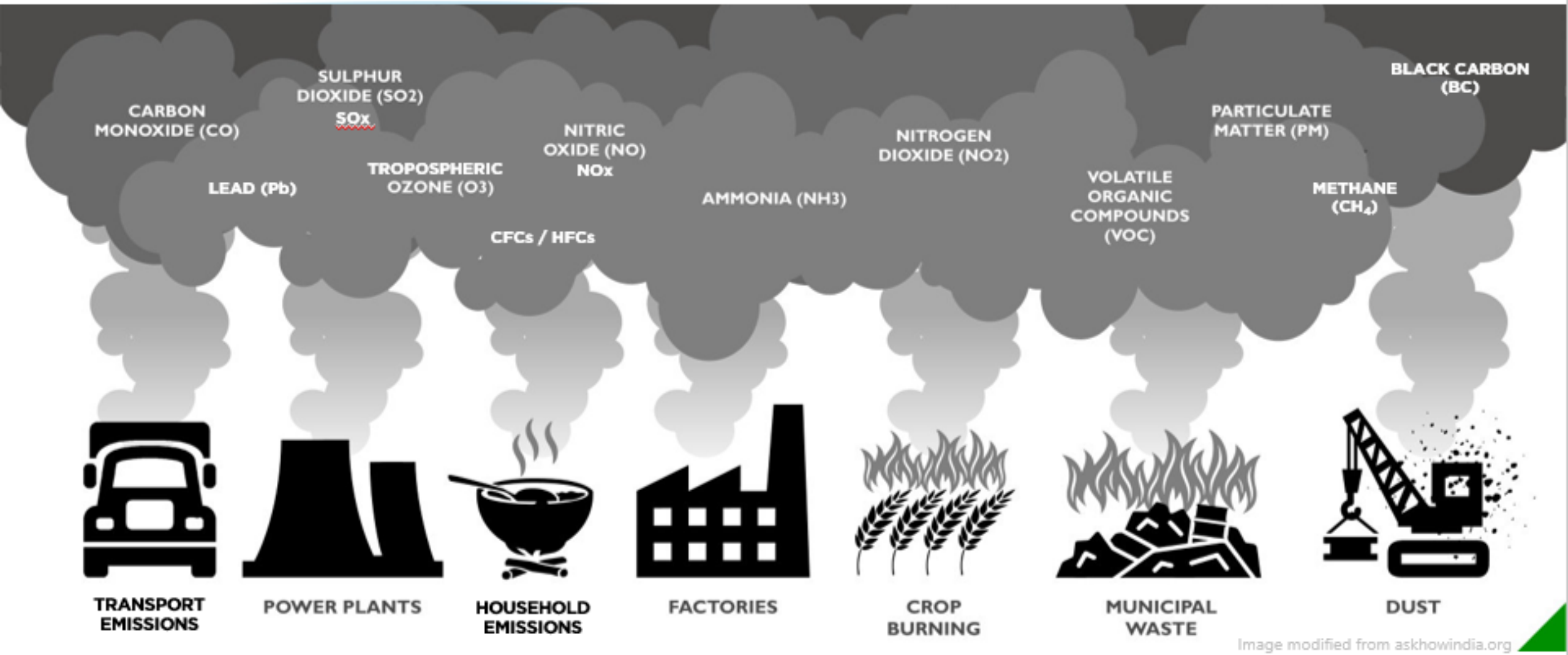


Image modified from askhowindia.org

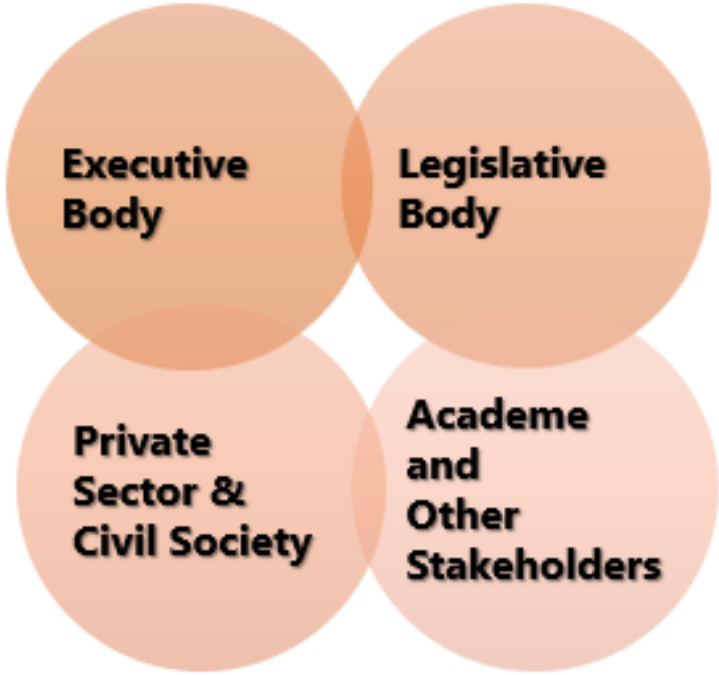
Criteria air pollutants and climate pollutants basically come from SIMILAR SOURCES!

Air Quality Management (AQM)

Refers to all activities implemented by **stakeholders** to protect human health and the environment from the harmful effects of air pollution. These activities include:

- Informing the public about air quality
- Monitoring of air quality data across areas
- Ancillary data collection
- Assessment of exposure of air pollution on health, vegetation, infrastructure
- Implementation and M&E of measures

Who's Involved?



Roadmap for improving the city's air quality management system

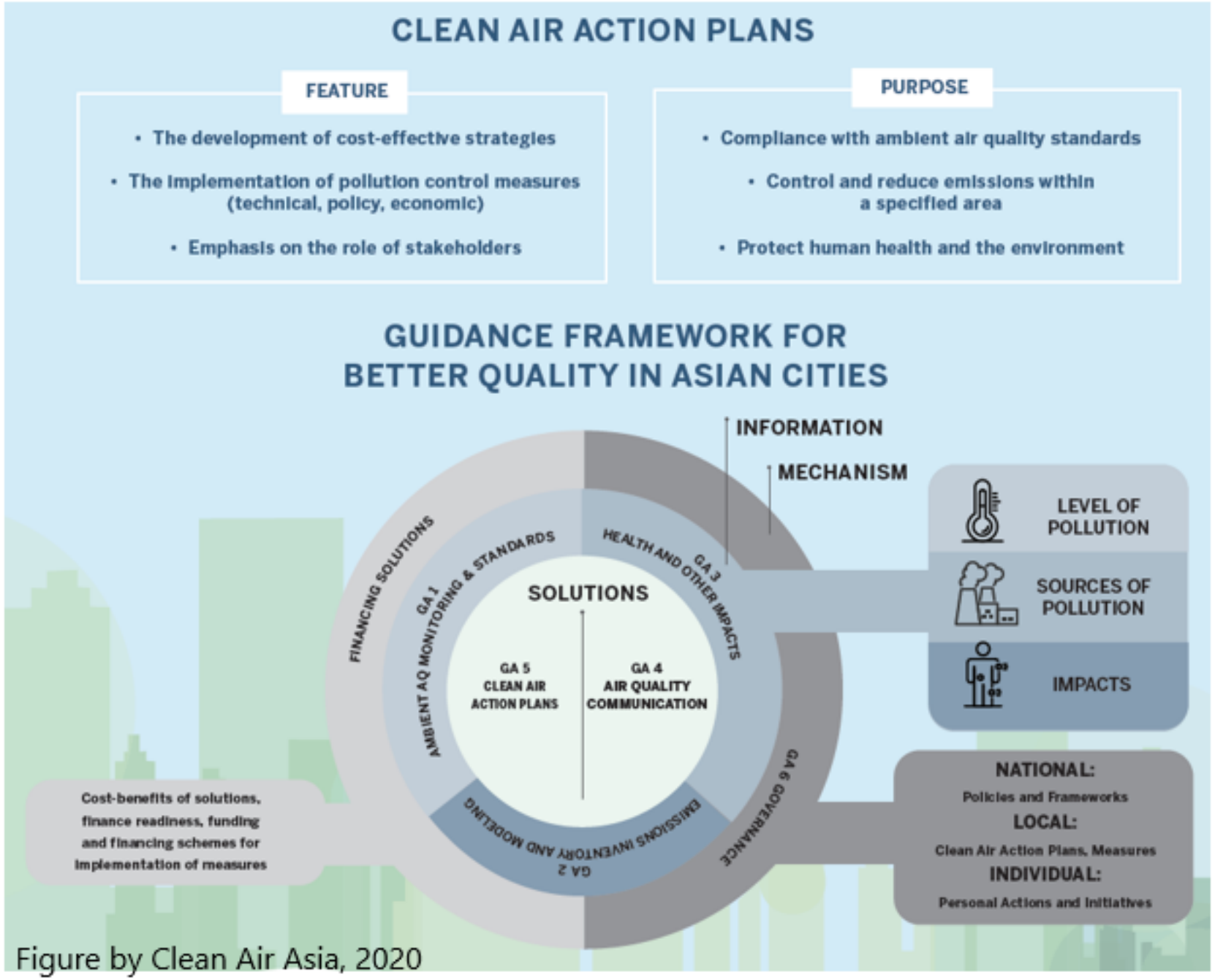
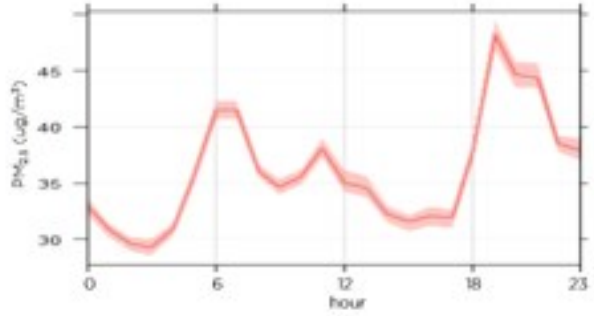
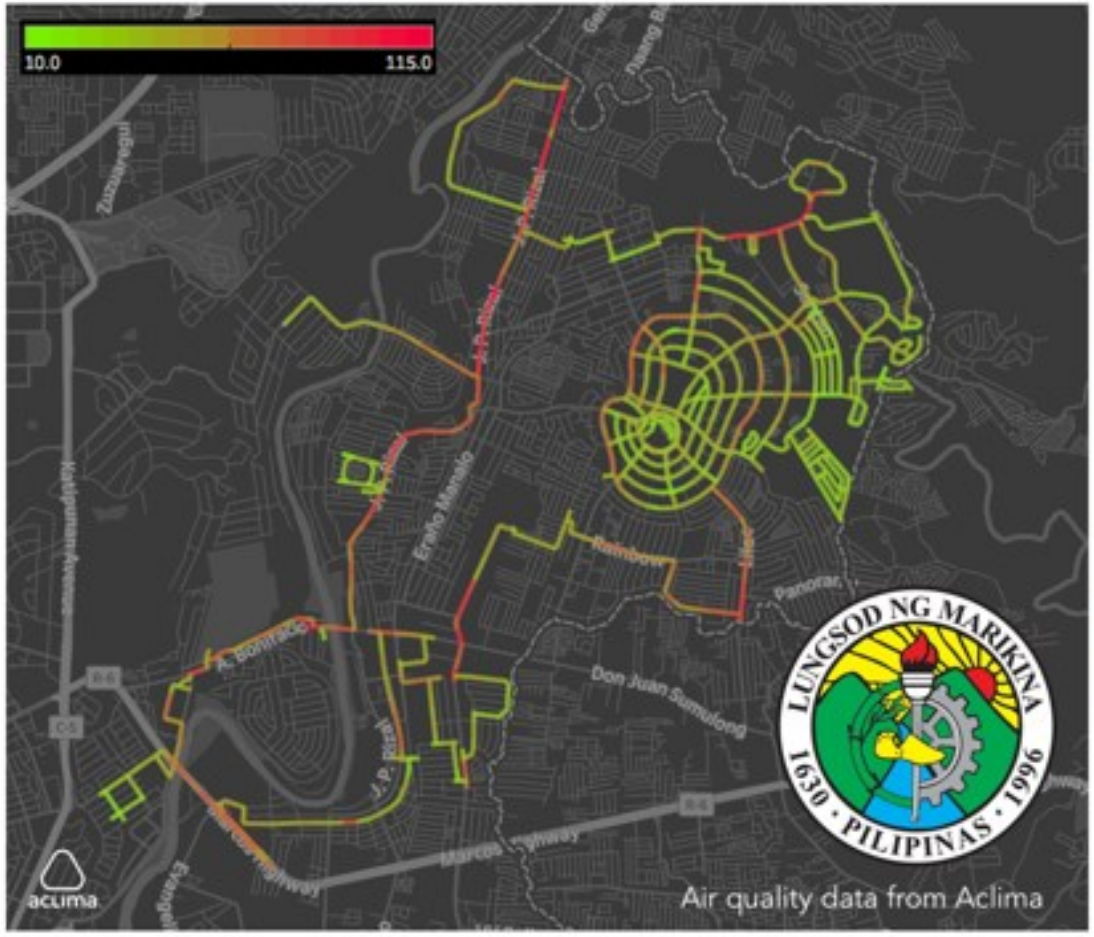


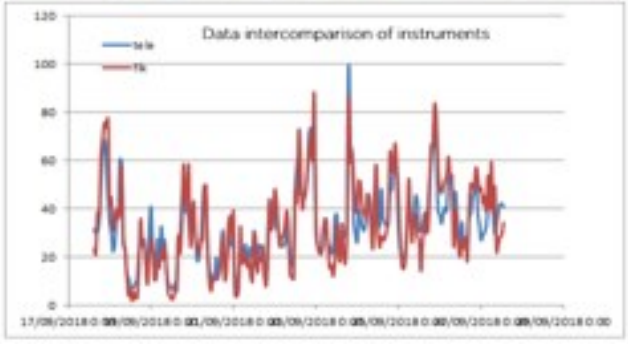
Figure by Clean Air Asia, 2020

Clean Air Action Plan Development in Marikina City, Philippines

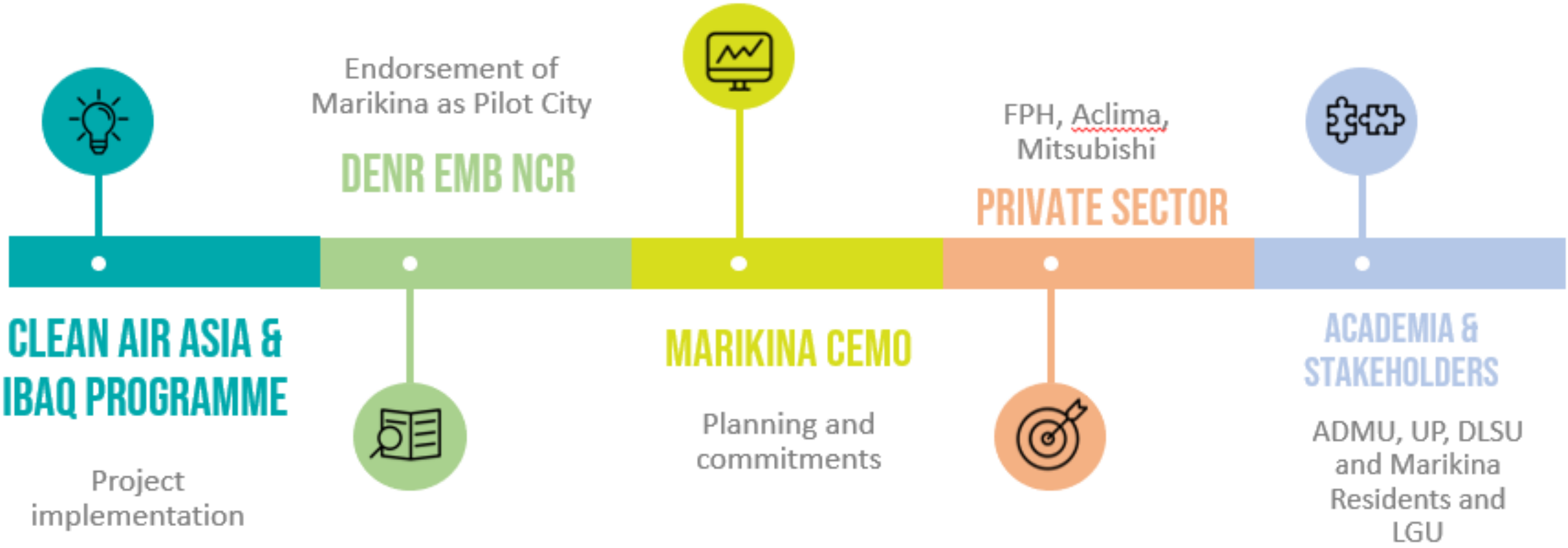
Emission Inventory | **Air Quality Monitoring (Stationary and Mobile)** | **Health Impacts Assessment** | **Stakeholder Consultation**



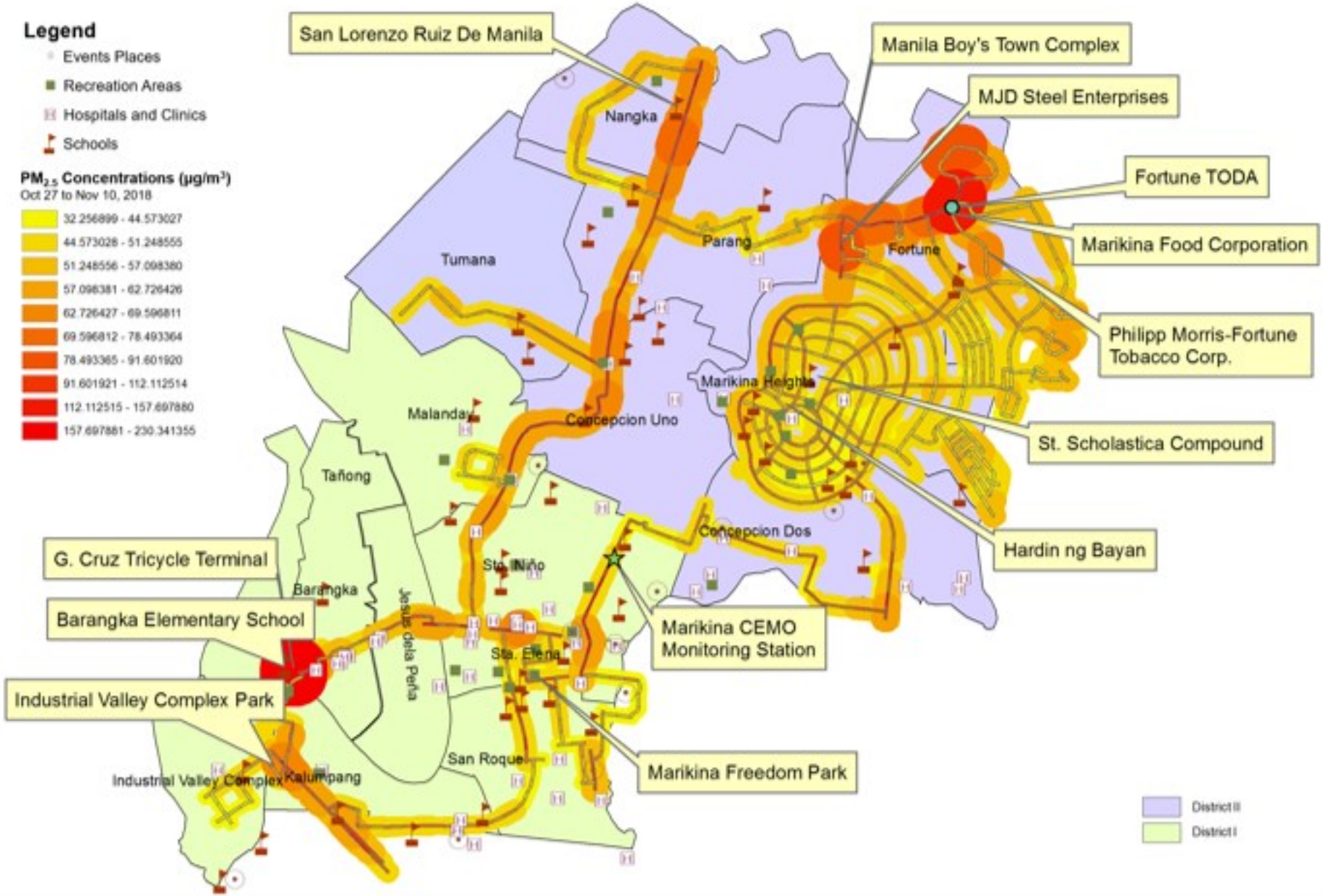


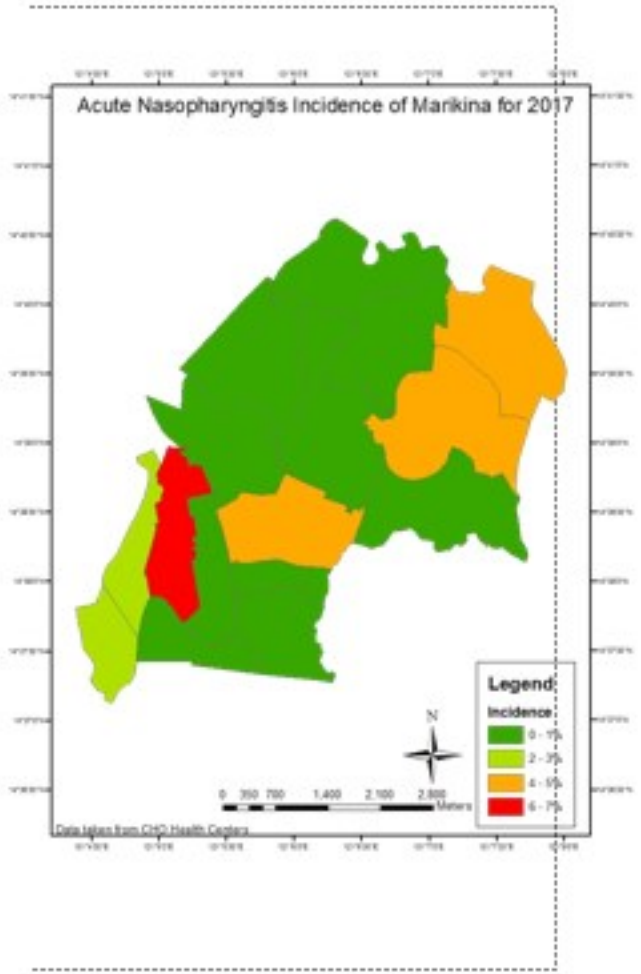


Marikina: Clean Air Action Plan Development and Partners



Air Quality Baselining in Marikina





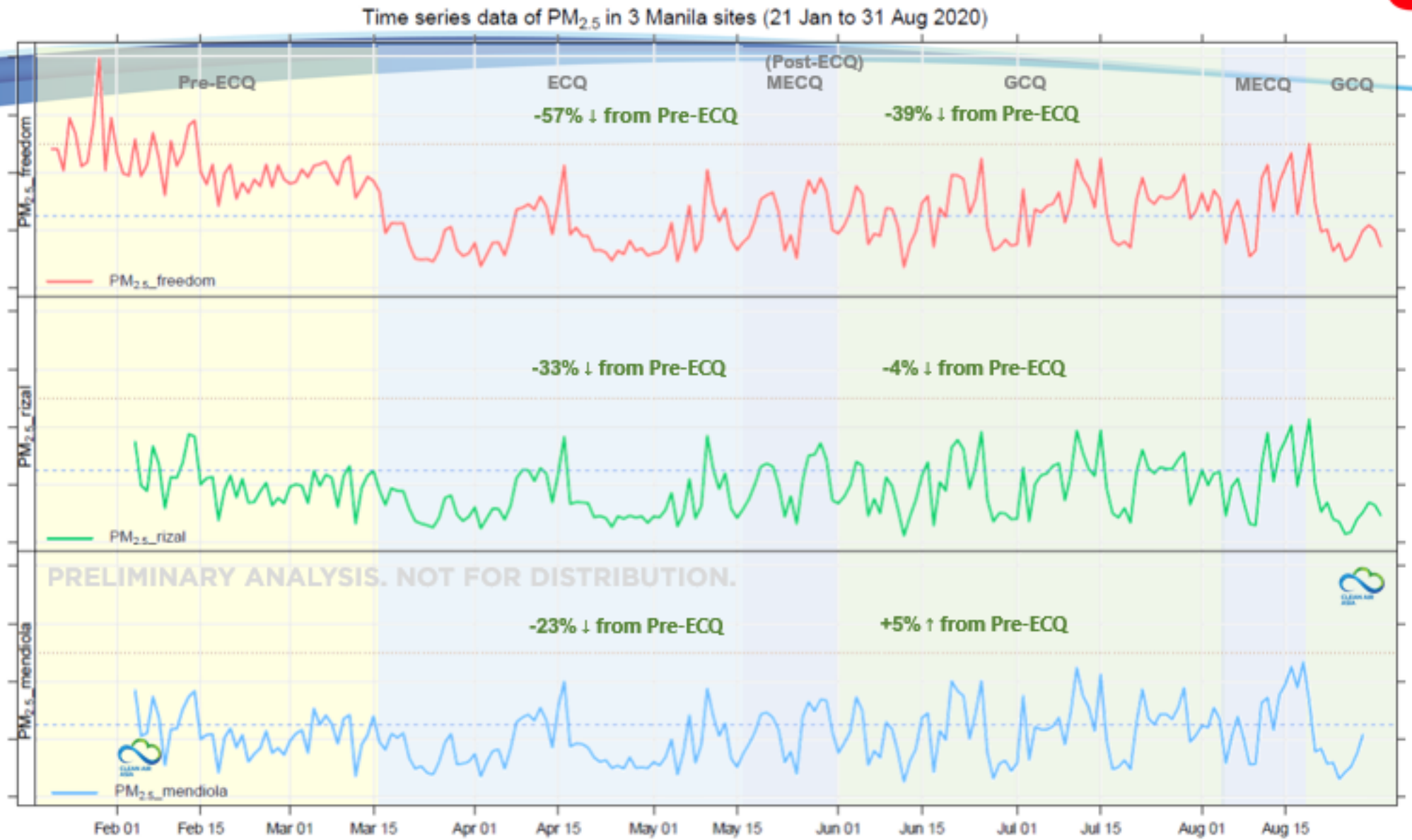
Asia Blue Skies Program

Photo from Rappler (2020)

Improve air quality and make the City of Manila a healthier, more livable city

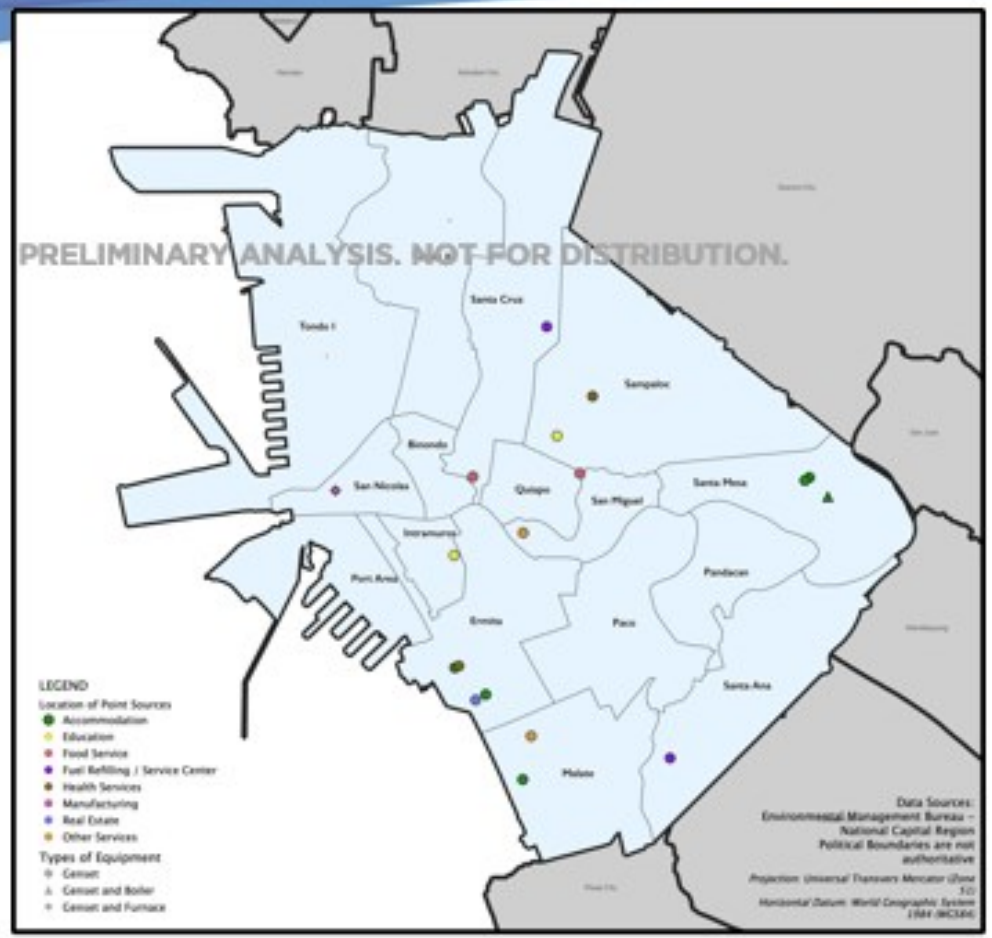
Clean Air Action Plan development and implementation for Manila City

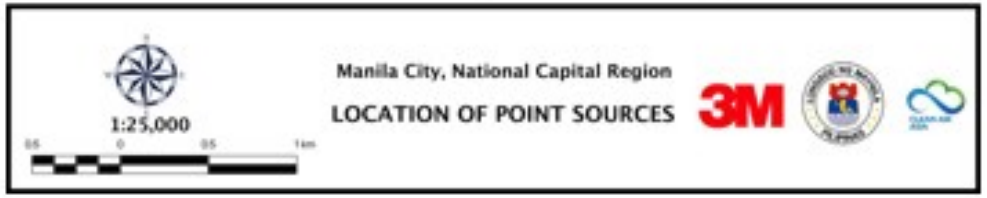
Air quality monitoring



- **Lockdown $PM_{2.5}$ levels are significantly lower than pre-ECQ in Freedom Triangle** (roadside)
- **Freedom Triangle values during the lockdown are still far from Pre-ECQ levels but for Rizal and Mendiola, values started to return to Pre-ECQ values by the start of MECQ**

Understanding local context: emission sources and weather impacts





Mapping emission sources

Point Sources (Heavy industries and Manufacturing Facilities)
Area Sources (Residential - District level)
Mobile Sources (Road and Port)

Meteorological conditions (wind and $PM_{2.5}$)

Realizing the long-term vision for urban air quality in Asia

- ✓National AQM standards, frameworks and roadmaps
- ✓Local clean air action plans
- ✓Multi-stakeholder collaboration
- ✓Sustained capacity building for AQM
- ✓Increased awareness
- ✓Demonstrated impact

https://www.smartparenting.com.ph/life/home/cleanest-air-philippines-southeast-asia-e00285-20190307

Thank you!

For questions, please email
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