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ENVs Project

TOPIC : Air Pollution

OVERVIEW

A.INTRODUCTION
B.WHAT IS AIR POLLUTION?
C.TYPES OF AIR POLLUTION
D.SOURCES OF AIR POLLUTION
E.MAJOR POLLUTANTS
F.MONITORING OF AIR POLLUTION
G.INDOOR POLLUTION
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I. OZONE HOLE
J. MONTREAL PROTOCOL

INTRODUCTION

- Air is essential for life it self, without it we could survive only a few minutes.
- It constitutes immediate physical environment of living organisms.
- The atmosphere is layered in to four distinct which are: Troposphere, stratosphere, mesosphere, and thermosphere.

Normal components of our atmosphere

- Nitrogen – 78.1%
- Oxygen – 20.9%
- Carbon Dioxide – 0.03%
- Everything else – 0.07%

Noble gases

- krypton
- xenon
- argon
- helium

%

What is air pollution?

Air pollution consists of gases, liquids, or solids present in the atmosphere in high enough levels to harm humans, other organisms, or materials may be defined as any atmospheric condition in which certain substances are present in such concentrations that they can produce undesirable effects on man and his environment.

Types of Air Pollution

✓ Two categories

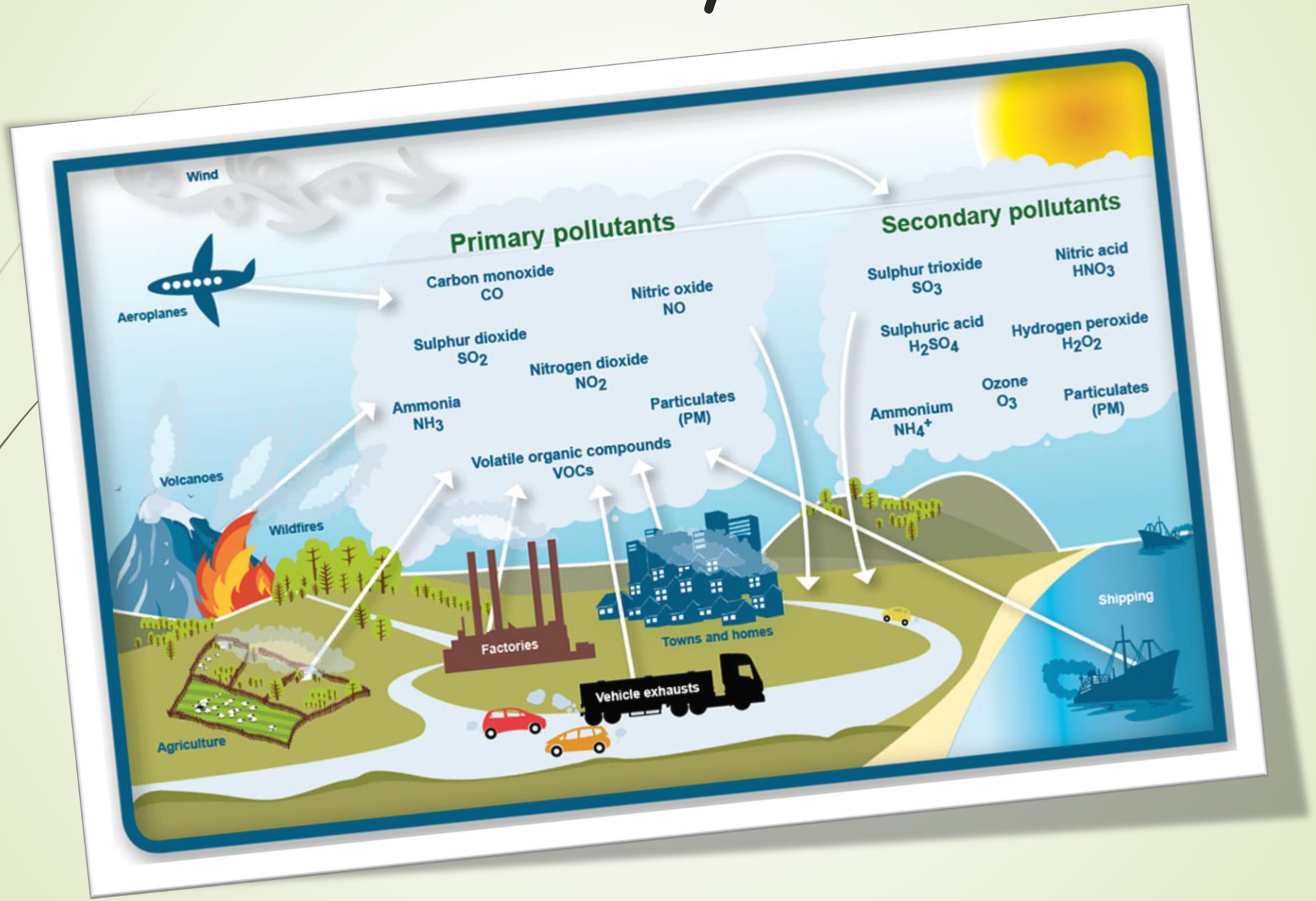
❖ Primary Air Pollutant

- Harmful substance that is emitted directly into the atmosphere

❖ Secondary Air Pollutant

- Harmful substance formed in the atmosphere when a primary air pollutant reacts with substances normally found in the atmosphere or with other air pollutants

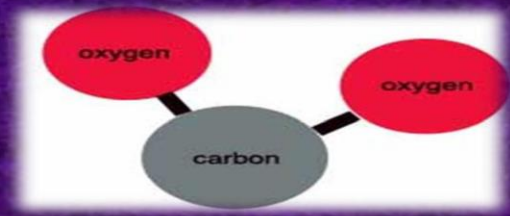
Sources of Primary Air Pollutants



Major Pollutants

Pollutants

- Carbon Dioxide
- Carbon Monoxide
- Sulfur Dioxide
- Nitrogen Dioxide



(1) Carbon dioxide

- Carbon Dioxide or CO_2 is a greenhouse gas that is natural and harmless in small quantities, but as levels rise it can affect productivity and sleep.
- Carbon dioxide is a gas consisting of one part carbon and two parts oxygen
- As CO_2 builds up in our atmosphere from burning fossil fuels, it has a warming effect that could change the earth's climate.

Effect of CO2 pollution on the health:

- Carbon dioxide emissions impact human health by displacing oxygen in the atmosphere.

- CO2 can produce a variety of health effects. These may include headaches, dizziness, restlessness, a tingling or pins or needles feeling, difficulty breathing, sweating, tiredness, increased heart rate, elevated blood pressure, coma, asphyxia, and convulsions.03-Jun-2021

(2) Carbon monoxide

- It is colorless , odorless gas , a product of incomplete combustion of carbon containing materials, such as in in automobiles, industrial process, heating facilities and incinerators.

- Some widespread natural non biological and biological sources have also been identified.

- Concentrations in urban areas depend on weather and traffic density

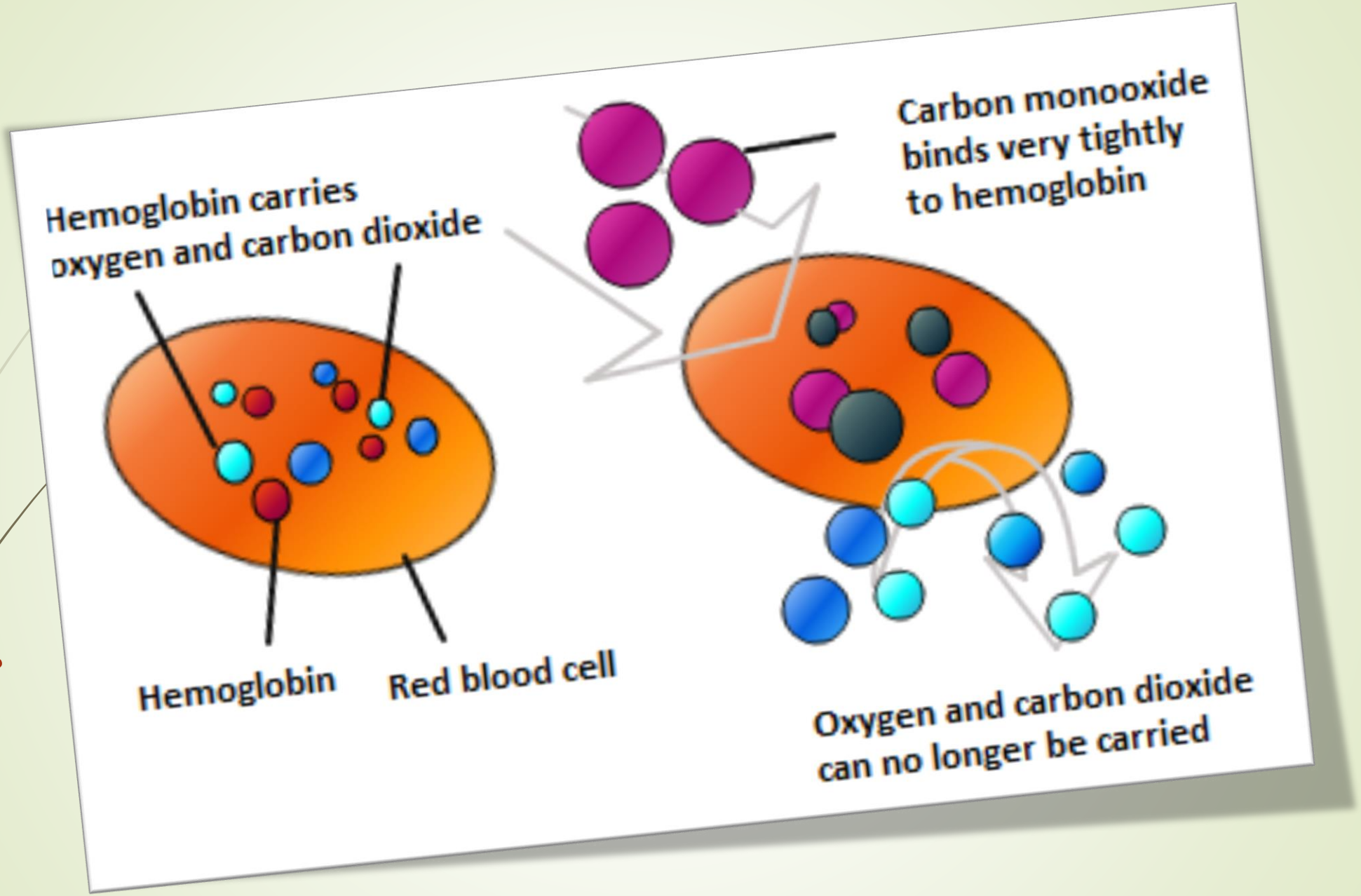
Effect of CO pollution on the health:

- ✓It causes harmful effect by reducing oxygen delivery to body organ , in extremely high level it can cause death

- ✓CO's affinity for Hb is 240–270 times greater than oxygen and Fetal Hb has higher affinity for CO , so it competes with O2 to bind (irreversibly) with haemoglobin

- ✓ By this exposure to it reduce the oxygen -carrying capacity of the blood to the heart, brain and other organs .

- ✓ deprives body of O2 causing headaches, fatigue, MI and impaired vision


Hemoglobin carries
oxygen and carbon dioxide
Carbon monooxide
binds very tightly
to hemoglobin
Hemoglobin
Red blood cell
Oxygen and carbon dioxide
can no longer be carried

(3) Sulfur dioxide

- It is one of the several forms in which sulphur exists in air
- The others include H2S,H2SO4and sulphate salts.
- Sulphur dioxide results from the combustion of sulphur containing fossil fuel, and when coal and fuel oil are burned.
- Domestic fires can also produce emissions containing sulphur dioxide
- Acid aerosol - sulphuric acid (H2S04)is a strong acid that is formed from the reaction of sulphur trioxide gas (S03) with water

(4)Nitrogen Dioxide

- reddish, brown gas present in car exhaust and power plants.

- Levels of exposure to nitrogen dioxide that should not be exceeded (WHO guideline levels) are respectively 400 µg/m3 (0.21 parts per million (ppm) for one hour and 150 µg/m3 (0.08 ppm) for 24 hours (WHO, 1987a)

Monitoring of air pollution

A. The best indicators of air pollution are :

Smoke and suspended particles:

- ✓A known volume of air is filtered through a white filter paper under specified conditions and the stain is measured by photoelectric meter.
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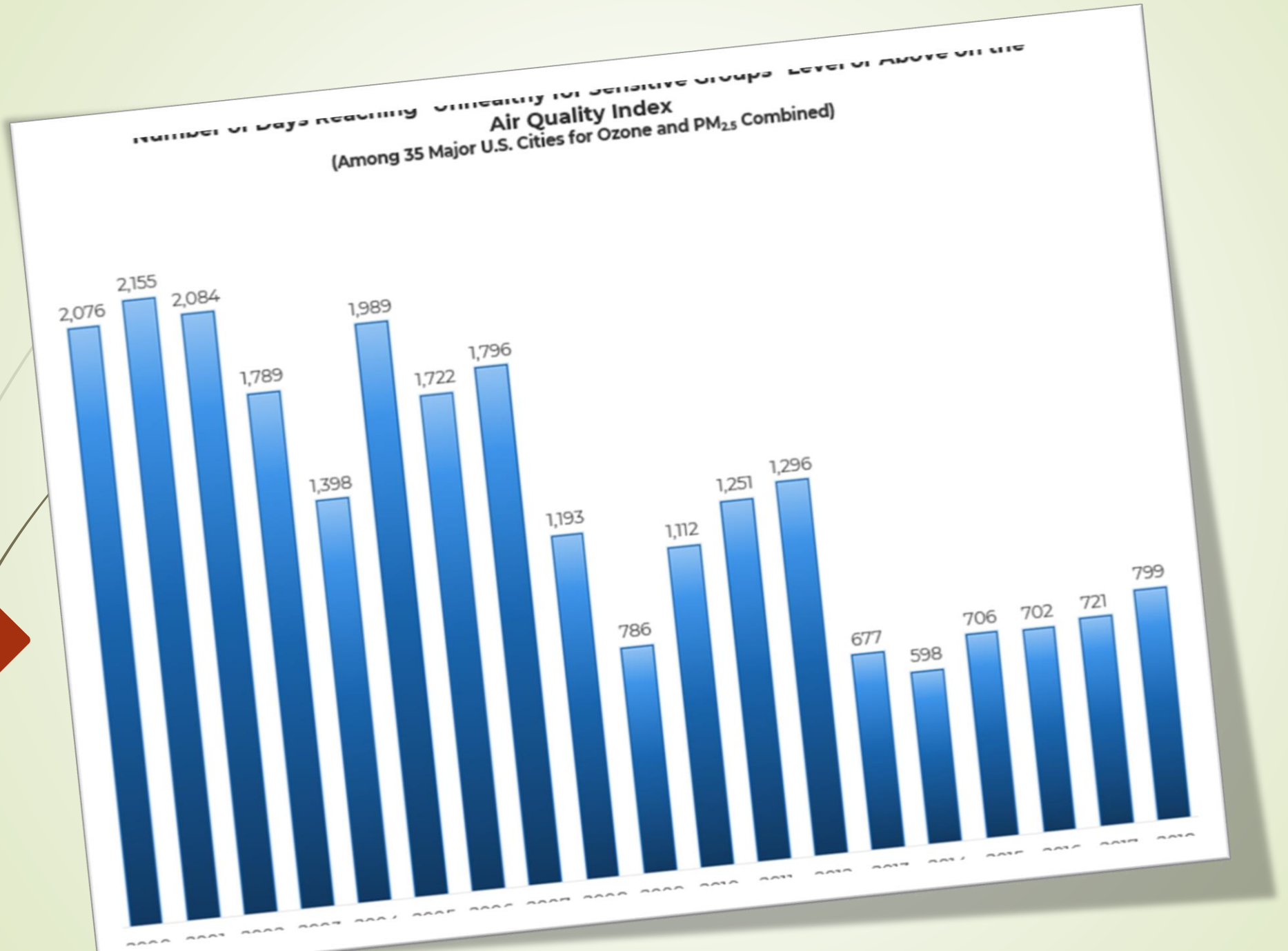
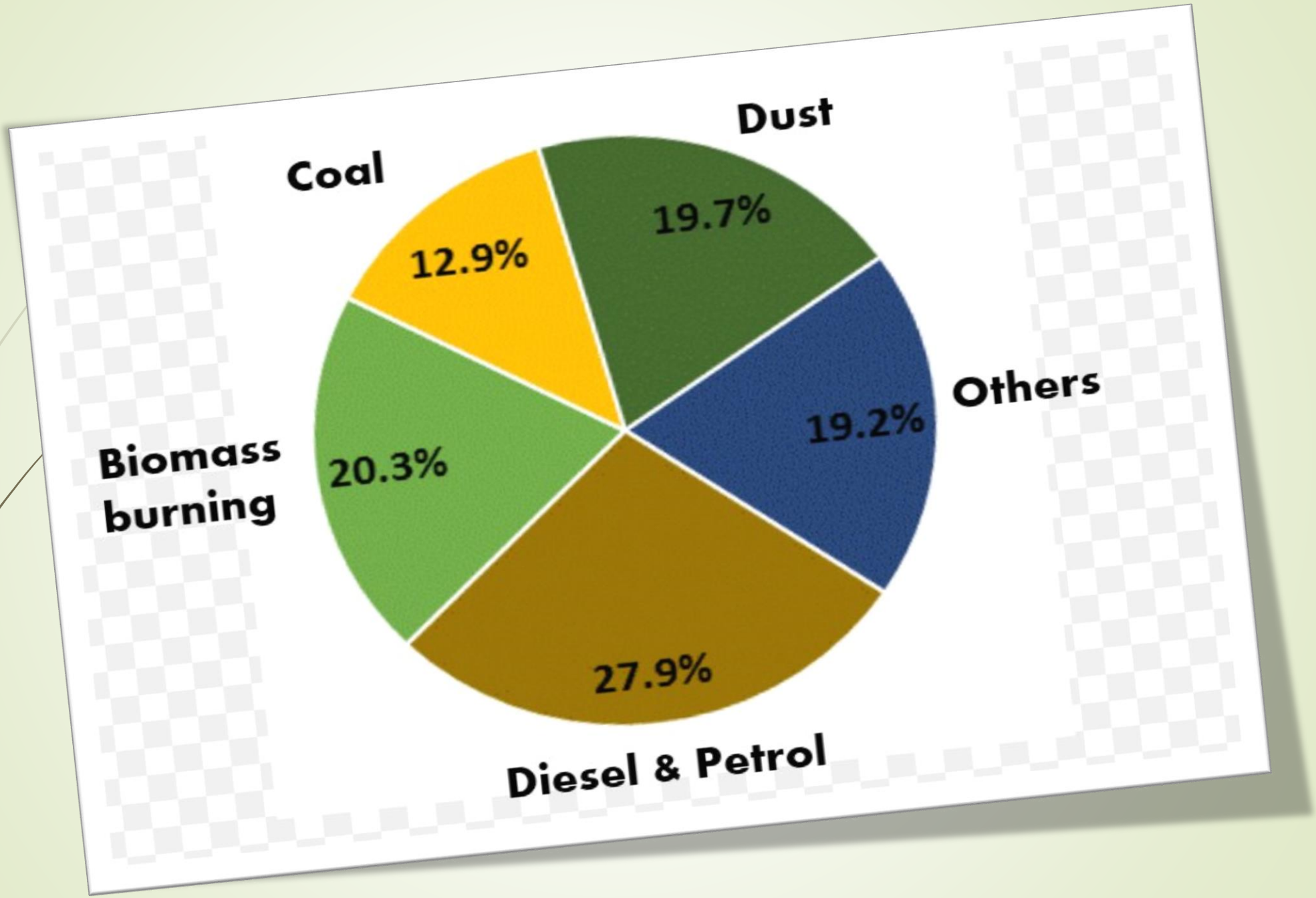

Air Quality Index
(Among 35 Major U.S. Cities for Ozone and $PM_{2.5}$ Combined)
2,076
2,155
2,084
1,789
1,398
1,989
1,722
1,796
1,193
786
1,112
1,251
1,296
677
598
706
702
721
799

B. AQI: Air Quality Index

- Indicates whether pollutant levels in air may cause health concerns or not
- Ranges from 0 (least concern) to 500 (greatest concern)


Dust
19.7%
Coal
12.9%
Others
19.2%
Biomass burning
20.3%
27.9%
Diesel & Petrol

Indoor air pollution

I. Indoor air pollution is one of the most critical global environmental problems
II. probably exposes more people worldwide to important air pollutants than does pollution in outdoor air.
III. Rural people in developing countries may receive as much as two-thirds (2/3) of global exposure to particulates.

Sources of Indoor Pollutants

Outdoor air
Particulate matters, pathogens, VOC's, odours and emmissions

Bathroom
Mould, mildew, odours and other microbial pathogens

Bedroom
VOC's from perfumes, hairspray, nail polish, upholstery, furniture and carpet, dust mites in bedsheets

Air conditioning units
Unable to remove pathogens, VOC's and odours
Circulates without ventilating rooms

Laundry room
VOC's from cleaning products, mould, mildew, odours and other microbial pathogens

Kitchen
Cooking devices
Fuel oil

Living room
Animal hair dust and dander, tobacco smoke, diesel particles, VOC's from paint, varnishes, upholstery, furniture and carpet

According to WHO

- Around 3 billion people still cook and heat their homes using solid fuels in open fires and leaky stoves
- About 2.7 billion burn biomass (wood, animal dung, crop waste) and a further 0.4 billion use coal.
- Such cooking and heating produces high levels of air pollution with a range of health-damaging pollutants

SMOKY COOKING FUELS

- Open fire cooking stoves produce heavy smoke containing:

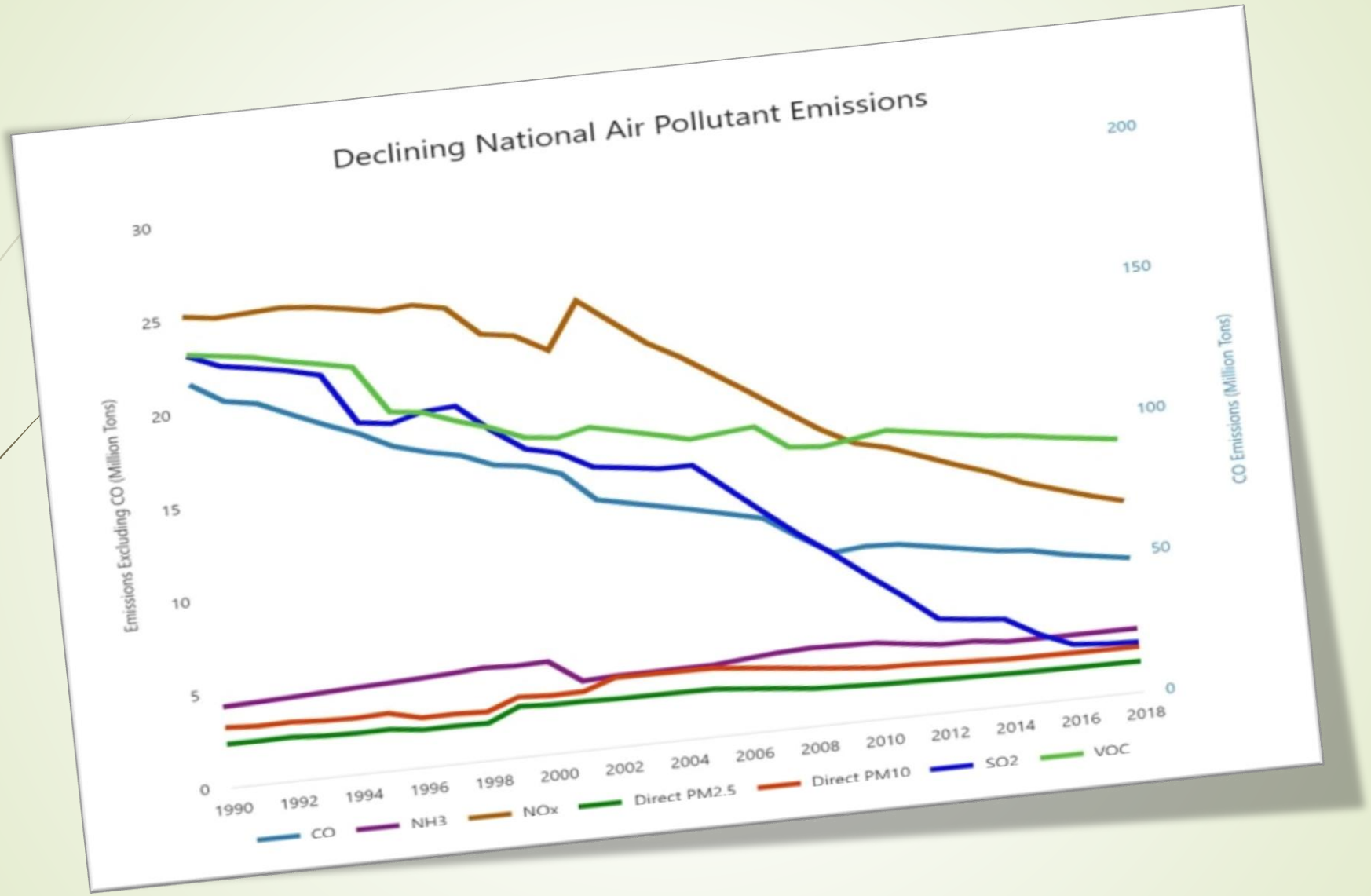
- Fine particles
- Carbon monoxide (CO)
- Polycyclic aromatic hydrocarbons (PAHs)

The Clean Air Act

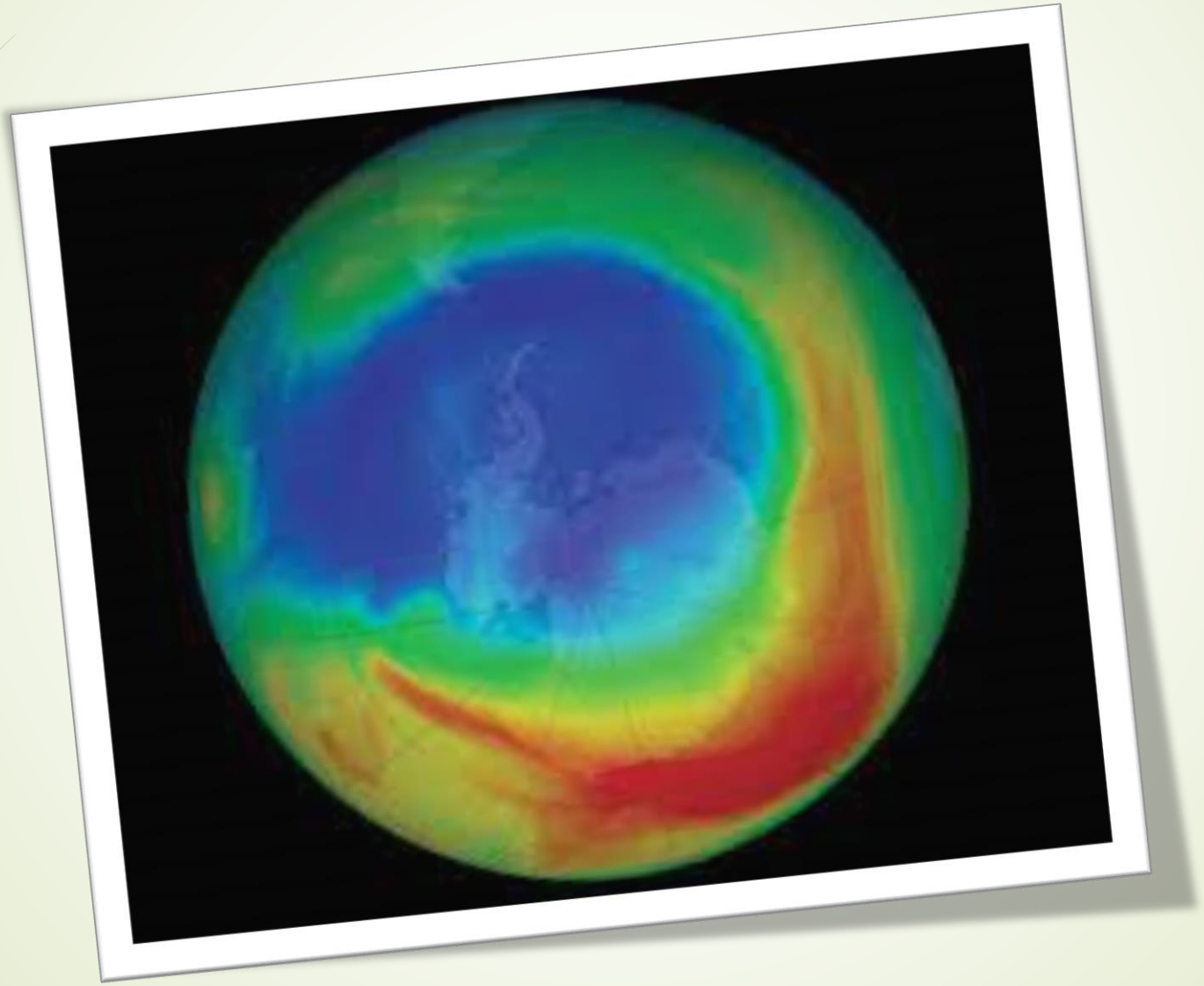
- Authorizes EPA to set limits on amount of specific air pollutants permitted
- Focuses on 6 pollutants

- lead, particulate matter, sulfur dioxide, carbon monoxide, nitrogen oxides, and ozone

- Act has led to decreases!


Declining National Air Pollutant Emissions
Emissions Excluding CO (Million Tons)
CO Emissions (Million Tons)
30
25
20
15
10
5
0
200
150
100
50
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
CO
NH3
NOx
Direct PM2.5
Direct PM10
SO2
VOC

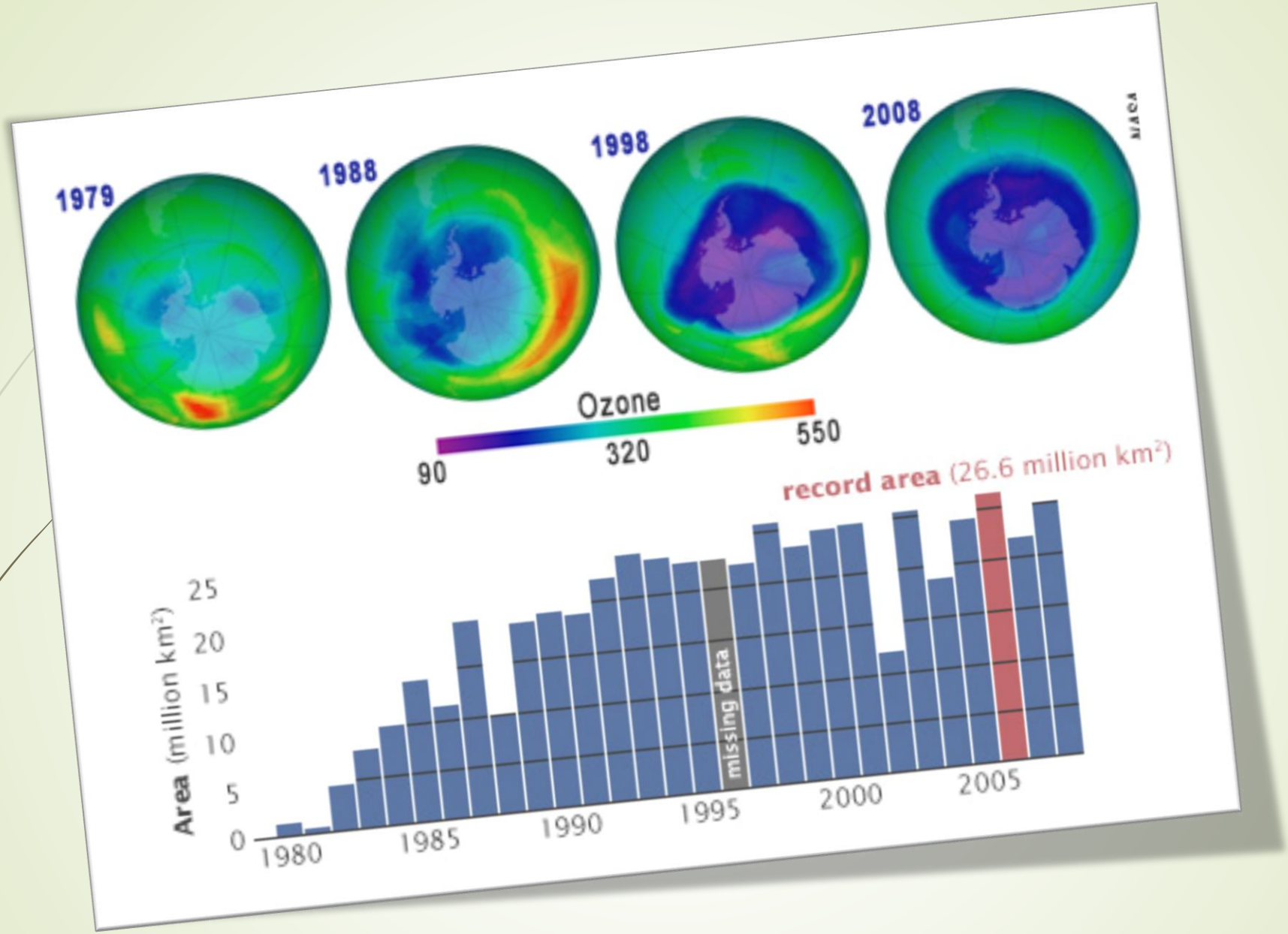
OZONE HOLE



WHAT IS OZONE HOLE?

- The term ozone hole refers to annual thinning of the ozone layer observed yearly over the South Pole areas
- Whereby the amount of ozone in the atmosphere drastically decreases in local spring
- Since the beginning of the eighties one notices that this hole is getting deeper and that the covered surface is getting larger.

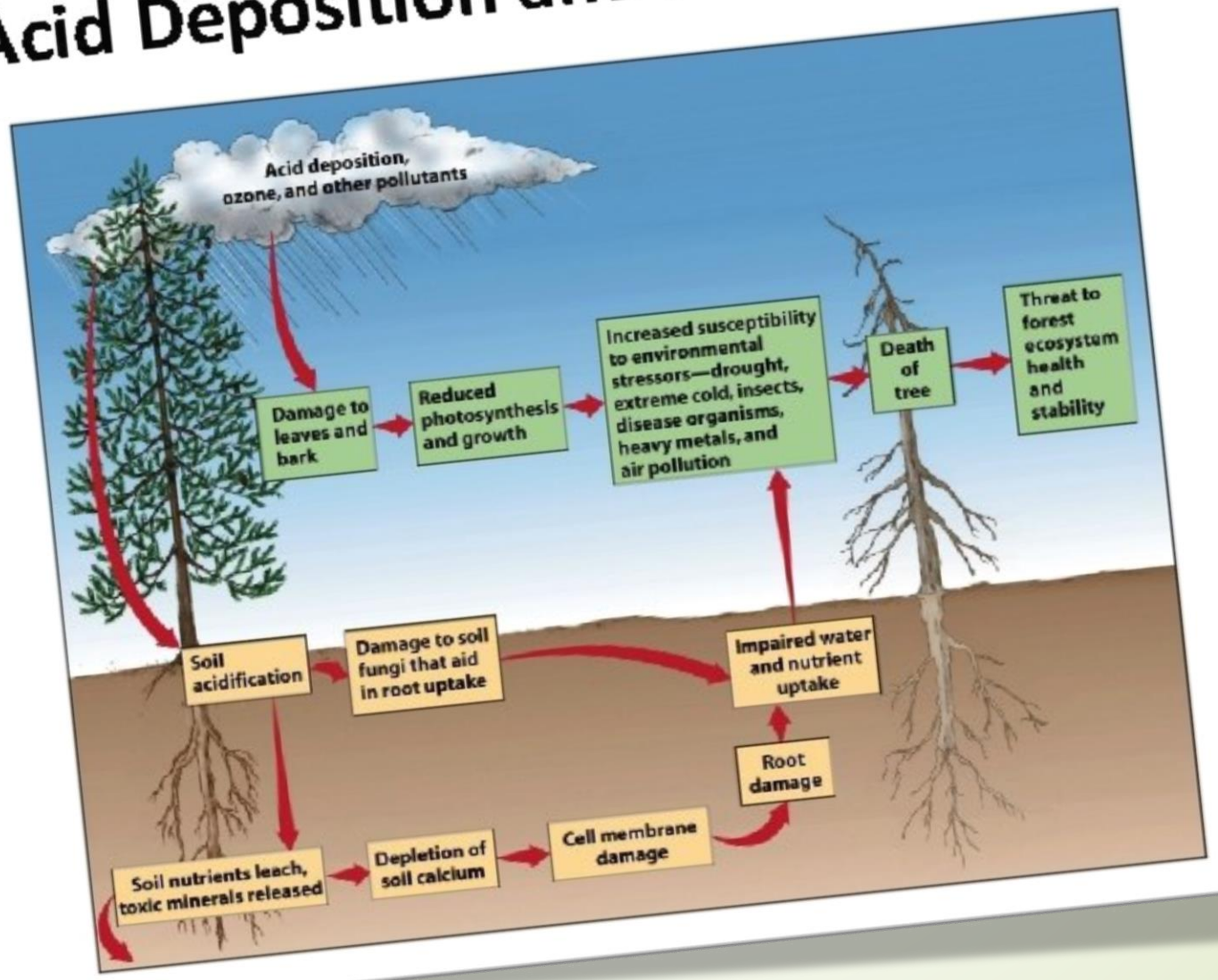
MONTREAL PROTOCOL



Celebrating 25 years of Montreal Protocol and looking ahead

- ✓The Montreal Protocol was one of the first environmental agreements to formally recognize the precautionary principle.
- ✓Related actions taken consistent with this principle have included the preemptive decision to ban new ozone depleting substances before they were ever produced commercially
- ✓In 2009, the Montreal Protocol became the first treaty in history to achieve universal ratification with 196 governments (Parties)
- ✓As a consequence, it can now be said that the entire global community has legally committed it self to meeting specific time bound targets for the virtual phase-out of nearly 100 chemicals that have ozone depleting properties

Acid Deposition and Forest Decline




STOP POLLUTION


Thank You
for
Watching!