AIR POLLUTION

AIR POLLUTION

- Introduction
- Air Pollutants & Air Pollution
- Major air pollutants
- Impact on human health and the environment
- Trinidad & Tobago Context
- Measures to control Air Pollution in T&T
- Air Quality Monitoring

The AIR we breathe

AIR POLLUTANT…

… is any substance in the atmosphere that is likely to cause harm to:

- Human, plant or animal life
- Damage to man-made materials and structures
- Changes in weather or climate
- Interfere with enjoyment of life or property

AIR POLLUTANTS

- Natural
- Anthropogenic
  - Mobile
  - Stationary
    - Point Source
    - Non-point Source

AIR POLLUTANTS: Point vs. Non-Point

NON-POINT: open areas exposed to wind e.g. construction sites, or large number of smaller sources

POINT: one or more discernible source

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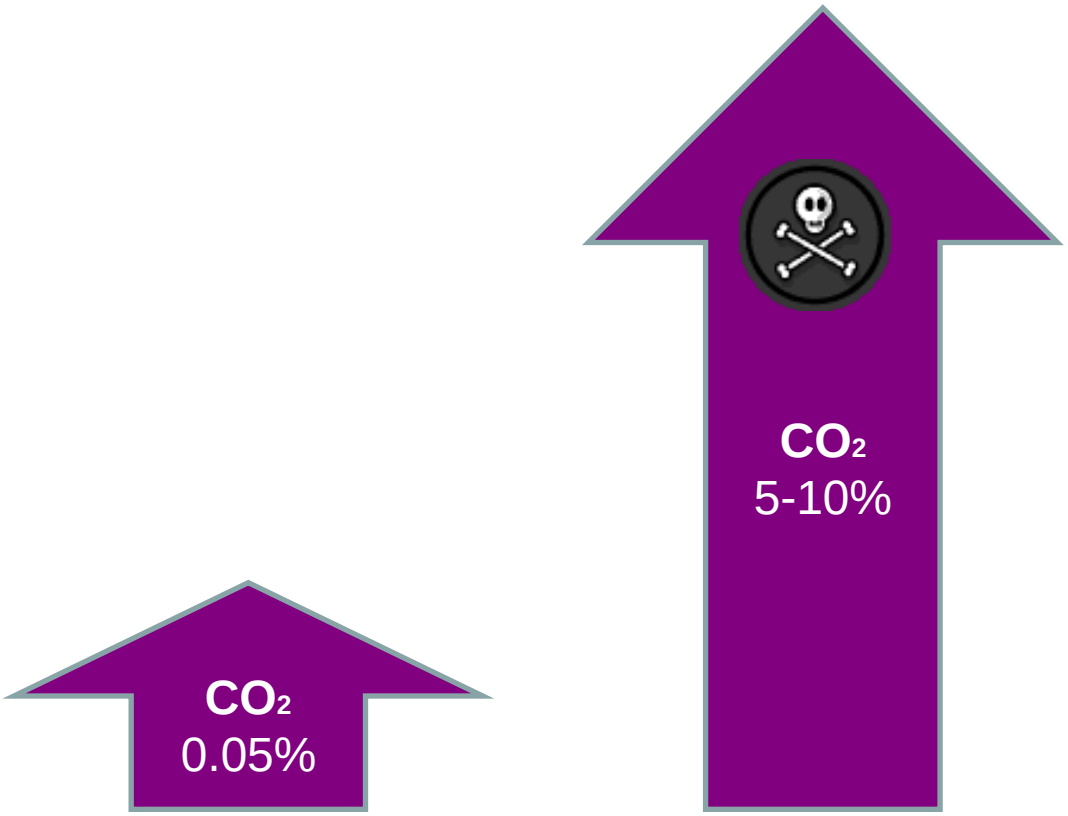
Major Air Pollutants

1. Suspended Particulate Matter
   - TSP
   - PM_{10}
   - $PM_{2.5}$
2. Sulphur Dioxide (SO_2)
3. Nitrogen Dioxide (NO_2)
4. Carbon Monoxide (CO)
5. Ozone
6. Lead
7. Volatile Organic Compounds (VOCs)
8. Greenhouse Gases
9. Chlorofluorocarbons (CFCs)

AIR POLLUTION…

… where the amount or concentration of the air pollutant **(or any chemical)** in the atmosphere is enough to cause adverse effects to human health and the environment.



Factors affecting AIR quality

- Meteorological Conditions
- Topographical Conditions
  - Both affect transport and dispersion of air pollutants

The Current State of our AIR

What is the main factor driving the increasing amount of air pollution?

AIR POLLUTION

How does our lifestyle affect the quality of the air we breathe?

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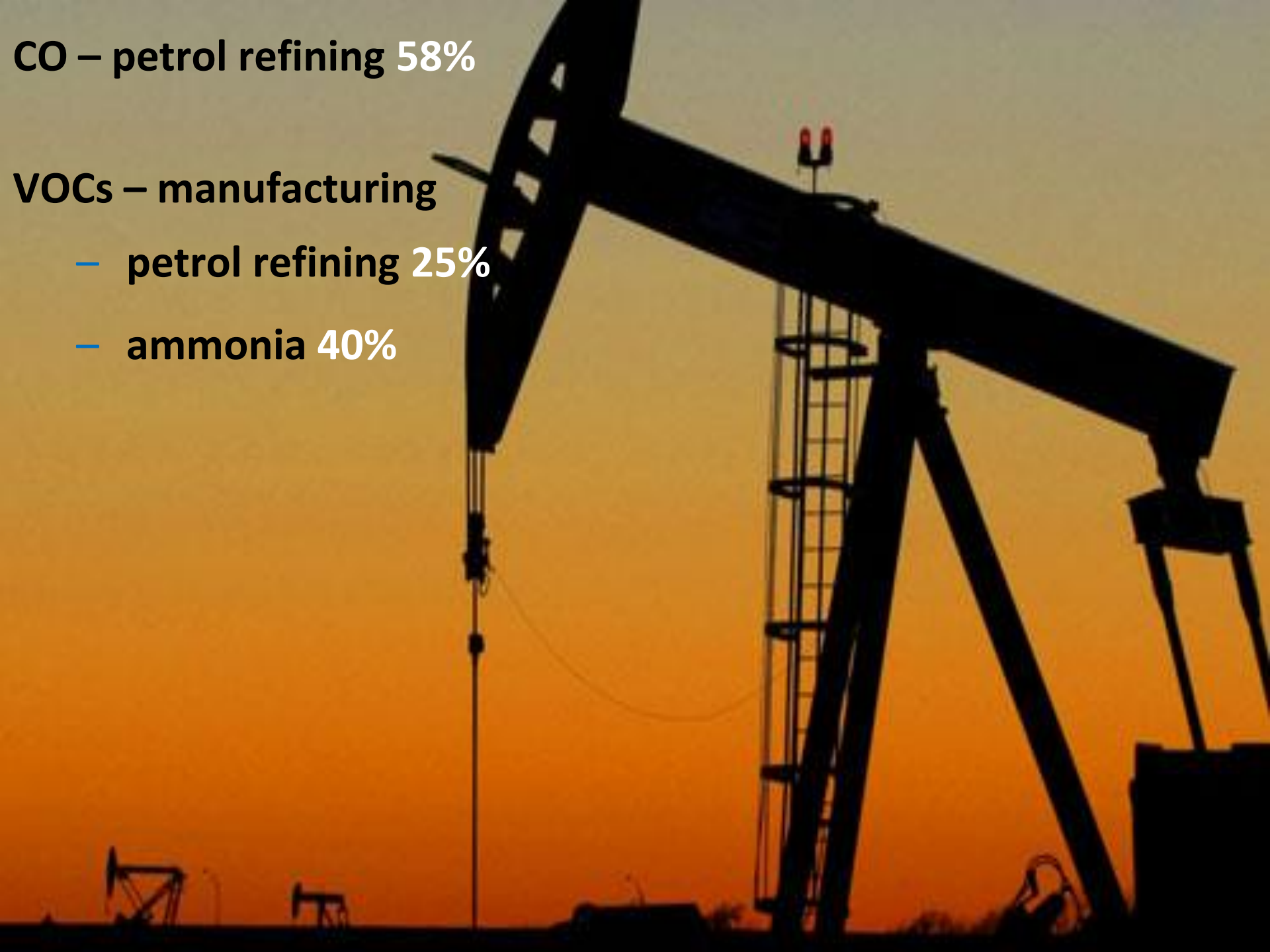
T&T: Air Quality Monitoring Studies

YEAR	AGENCY	PARAMETER(S)	LOCATION
1998	EMA, PAHO, US EPA, UWI	PM_{10}	East-West Corridor
1999	Town & Country Planning Division	No_x, So_x, VOC, TSP, PM_{10}, $PM_{2.5}$	Point Lisas, Chaguaramas
2005	EMA	CO, O_3, NO_2, SO_2, PM_{10}	Point Lisas Industrial Estate

Sources of Air Pollution in T&T

- Main sources based on EMA Complaints Database:
  - 33% - Autobody repair shops and mechanics
  - 27% - Woodworking

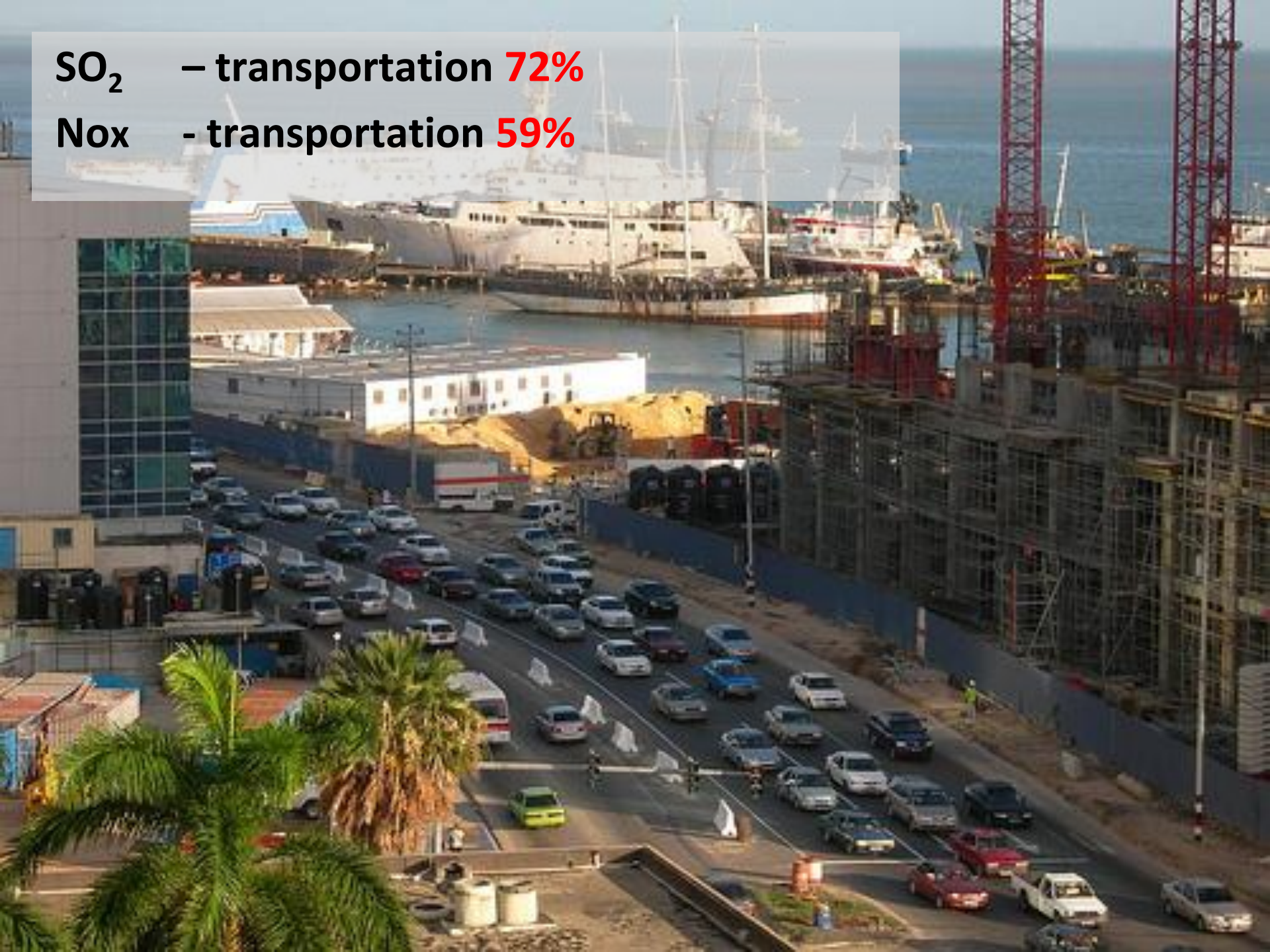
- Main sources based on previous studies (State of the Environment Report 2000):



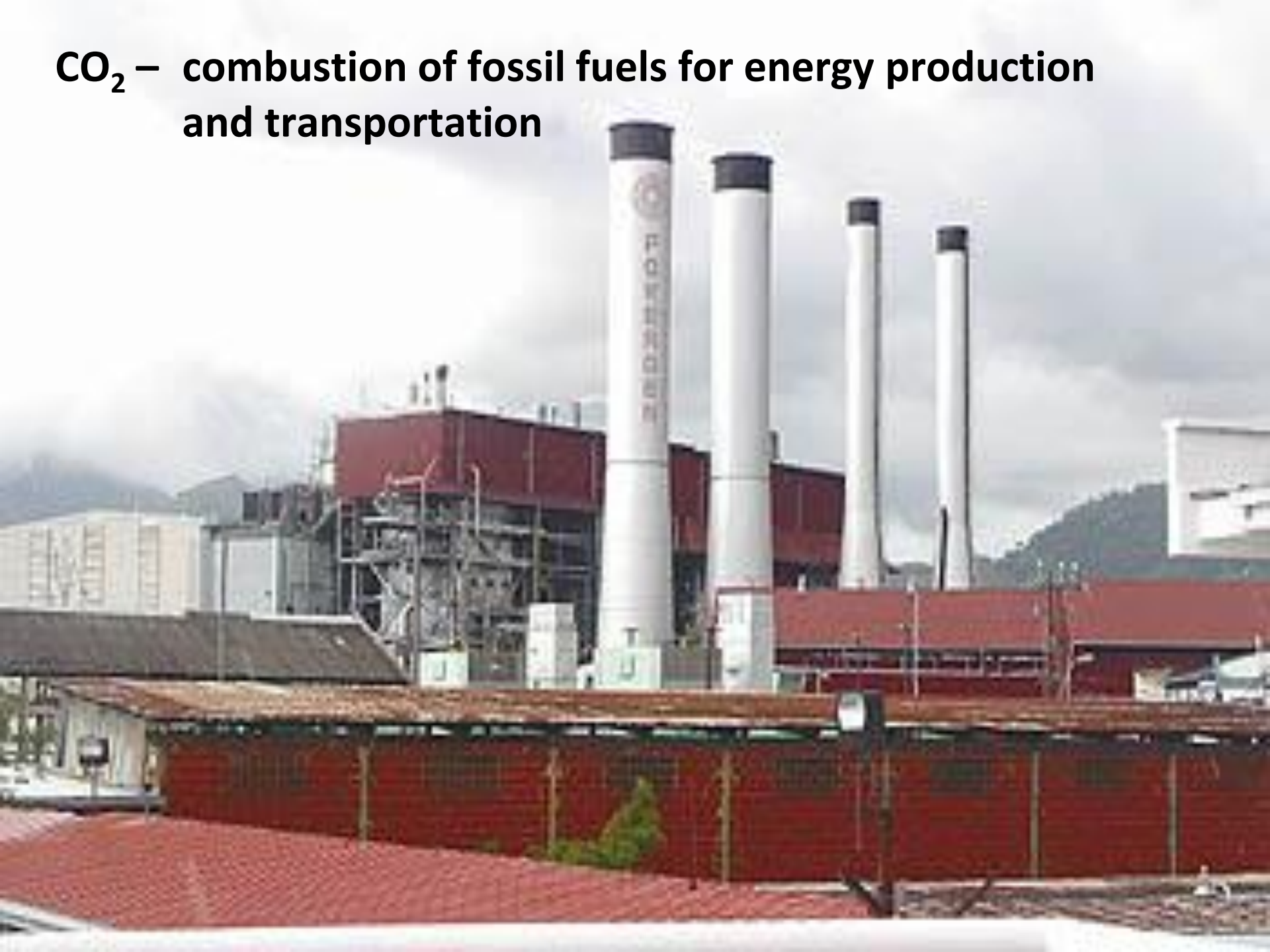
CO – petrol refining 58%

VOCs – manufacturing

- petrol refining 25%
- ammonia 40%


SO_2 – transportation 72%
Nox - transportation 59%

CO_2 – combustion of fossil fuels for energy production and transportation




TSP – quarrying 40%

CH_4 – solid waste disposal on land, wastewater handling

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There is no practical invention we can make to clean air pollution.

Local solutions to our Air Pollution

- Stationary Sources of Air Pollution:
  - No legislation exists for specific air pollutants
  - Non-specific pollutants:
    - smoke, odours, fumes
    - prevent use and enjoyment of property

Municipal Corporation & Ministry of Health

Local solutions to our Air Pollution

- Mobile Sources of Air Pollution:
  - Motor Vehicles & Road Traffic Act
  - Visible Vapour Rule: sparks, smoke or visible vapour
  - New fine: $1000.00

T&T Police Service

Local solutions to our Air Pollution

Do you know of any ‘recent’ initiatives?

Local solutions to our Air Pollution

- Ministry of Works & Transport
  - Cleaner fuel
    - Compressed Natural Gas
    - Unleaded gasoline
  - Mass Transport Vehicles

Local solutions to our Air Pollution

- Ozone Depleting Substances (ODS)
  - Montreal Protocol
    - T&T signed August 1989
  - National Ozone Unit in Ministry of Environment
    - banned importation of CFCs 2007
    - current HCFC phase out
    - trained ARIA technicians to properly handle and dispose refrigerants

Local solutions to our Air Pollution

- Greenhouse Gases
  - United Nations Framework Convention on Climate Change
    - T&T signed June 1994
    - National Greenhouse Gas Inventory

Local solutions to our Air Pollution

- EMA
  - Air Pollution Rules 2005 (draft)
    - List of Designated Activities
    - Maximum permissible levels for Non-Point Sources
    - Maximum permissible levels for Point Sources
    - National Register
    - Prohibits release of air pollutants in violation of standards, conditions or permit requirements

Local solutions to our Air Pollution

- Air Pollution Rules Process:

1. Registration

Who must register?

- Any facility listed in designated activities
- Any facility that releases a substance from point or non-point source that is above the maximum permissible level

Local solutions to our Air Pollution

- Air Pollution Rules Process:
  2. Permits will state
     - Authorised pollutants
     - Quantity, conditions, concentrations
     - Reporting & monitoring requirements
     - Requirements to minimise negative environmental impacts e.g. design, technology, processes

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Air Quality Monitoring

- What are your **objectives**?
- **Objectives** will determine
  - what pollutants to be monitored
  - monitoring location
  - background information

Air Quality Monitoring

- **Objectives** can be
  - Threats to natural ecosystems
  - Population exposure and impact on human health
  - Compliance with national or international standards
  - Informing public

Air Quality Monitoring

- Type of **Background Information**
  - Details of sources and emissions
  - Health status of sample population
  - Demography
  - Land use pattern
  - Any existing air quality information
  - Meteorological information

Air Quality Monitoring

- Note **meteorological** conditions
  - wind speed and direction
  - ambient air temperature
  - relative humidity
  - rainfall

Air Quality Monitoring

- What monitoring **methods** are appropriate?
  - determined by pollutants
  - determined by cost of equipment
  - determined by skill of user

Air Quality Monitoring

- Where is it practical to **locate** the equipment?
  - determined by objective
  - monitoring method
  - physical access
  - security
  - downwind of emission source
  - not enclosed by buildings or overhanging vegetation
  - not close to another source of emissions
  - height sampling usually 2-5m above ground

Air Quality Monitoring

- Where is it practical to **locate** the equipment?
  - **Comparability**: details of each site should be standardised
    - must be open on all sides
    - traffic pollution survey – 3m above street level
    - away from unpaved roads

Air Quality Monitoring

- What **duration** should you monitor for?
  - ideally 3 – 6 months
  - samples in rainy and dry season

Air Quality Monitoring Companies

- **Rose Environmental Ltd.**
  - Tel.: 638-7673
  - Mr. Aaron Ramsingh
    - aaron@roseenvironmentalltd.net
    - 352-0748 (cell)

- **Kaizen Ltd.**
  - Tel.: 299-0009
  - Mr. Nandlal Lall (ext. 248)
    - nlall@kaizen-tt.com

- **CARIRI** (Macoya)
  - Tel.: 662-7171-2 ext. 3300
  - Mr. Gerard Rajkumar, Technical Team Leader for Air Quality Module
  - environ@cariri.com
  - 374-8283 (cell)

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