

AIR POLLUTANT: Sulphur Oxides (SO_x) e.g. SO₂ & SO₄

SOURCES: Volcanoes; forest fires; fossil fuel combustion; manufacture of sulphuric acid; conversion of wood pulp to paper; incineration; coal burning; oil burning; production of elemental sulphur & smelting.

HEALTH IMPACTS: Bronchoconstriction accompanied by wheezing; shortness of breath; chest tightness; alterations in pulmonary defences & aggravation of existing cardiovascular disease.

WHAT CAN YOU DO? Stop forest fires; install effective control equipment; promote the use of personal protective equipment in fuel burning industries.

AIR POLLUTANT: Nitrogen Oxides (NO_x) e.g. NO & NO₂

SOURCES: Gas appliances; leaking gas pipes; paraffin heaters; wood fires; tobacco smoke; emissions from coal fired power stations & emissions from motor vehicles.

HEALTH IMPACTS: Reduces our lungs' ability to function; may induce asthma attacks in known sufferers; weakens our bodies' defence systems against infections; irritates eyes, nose and skin when levels are high; may cause irreversible damage to cells on the interior surfaces of the lungs.

WHAT CAN YOU DO? Maintain gas appliances & their flues; use externally vented exhaust fans; open windows & doors of the house on a daily basis to allow indoor pollutants to escape, particularly in winter.

AIR POLLUTANT: Ozone (O₃)

SOURCES: Chemical reaction between NO_x & hydrocarbons is being emitted from petrochemical industries, vehicles & filling stations; photocopiers; laser printers; air purifiers & power generators.

HEALTH IMPACTS: Irritation to eyes & nose; increased incidence of headaches; nausea; respiratory & cardiovascular diseases; may trigger asthma attacks & increase susceptibility to premature death.

WHAT CAN YOU DO? Keep equipment well maintained; use ozone trapping devices on photocopiers & printers; maintain a high degree of air flow within the indoor environment. Introducing best available technology in petrochemical industries.

AIR POLLUTANT: Ammonia (NH₃)

SOURCES: Agricultural activities e.g. use of pesticides & use of fertilizers; metal treatment finishing industries; refrigeration industries & crop spraying.

HEALTH IMPACTS: Can cause fluid build-up in the lungs; possible lung damage; coughing; wheezing; shortness of breath; laryngitis; headaches; fever; nausea; vomiting; pink frothy phlegm; chest pain; asthma; rapid pulse & an increased blood pressure.

WHAT CAN YOU DO? Wear personal protective equipment when using fertilizers & pesticides; use more environmentally friendly products for agricultural activities.

AIR POLLUTANT: Asbestos

SOURCES: Dangerous asbestos fibres may be found in materials like old roofing tiles; gutters; water tanks & flues.

HEALTH IMPACTS: Asbestosis; lung cancer; mesothelioma & pleural abnormalities.

WHAT CAN YOU DO? For information on the safe treatment and handling of asbestos containing products & for guidelines on what to do to prevent or reduce the health effects of asbestos exposure, go to: <http://www.osha.gov/html/RAMap.html>.

AIR POLLUTANT: Hydrogen Sulphide (H₂S)

SOURCES: Flaring at refineries & emissions from steel industries.

HEALTH IMPACTS: Irritation to eyes; nausea; lack of sleep; headaches; reproductive system defects; airway hyper-responsiveness; chronic lung disease & defects on the central nervous system enzymes.

WHAT CAN YOU DO? Install air pollution control equipment to ensure that H₂S is controlled to within acceptable levels.

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Sustainable Measures to Abate and Reduce Threats

REFERENCES

Information compiled from the following sources:

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3. Air Quality and Agriculture (Michigan Dairy Review, Vol 9, www.canr.msu.edu/dept/ans/mdr248.htm)
4. United States Environmental Protection Agency (USEPA, www.epa.gov/airnow)
5. Environmental Health and Safety (New Jersey State Department of Health, www.state.nj.us/health)
6. Report on the Health Effects of Aldehydes in Ambient Air (Department of Health Committee on the Medical Effects of Air Pollutants, www.advisorybodies.doh.gov.uk/COMEAP/statementsreports/aldehydes-imperialcollreview.pdf)

For information on the Western Cape Air Quality, please refer to this website: <https://www.westerncape.gov.za/eadp/about-us/meet-chief-directorates/environmental-quality/air-quality-management>



Western Cape Government
Environmental Affairs and Development Planning

BETTER TOGETHER.



Understanding the health impacts of air pollutants BETTER TOGETHER.

Understanding the health impacts of air pollutants

WHAT IS AIR POLLUTION?

Air pollution is a change in the composition of the air caused by smoke, soot, dust, cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances (*National Environmental Management Air Quality Act No. 39 of 2004*).

CONCENTRATION AND LENGTH OF EXPOSURE TO AIR POLLUTANTS

Effects of air pollutants on human health are dependent on both the duration of exposure and the concentration of the pollutant.

PEOPLE'S SUSCEPTIBILITY TO AIR POLLUTION

The elderly and people with pre-existing lung and cardiovascular diseases are sensitive to air pollution.

Children are more susceptible to polluted air because their respiratory systems are still developing; they breathe more air per kilogram of body weight than adults and they are more likely to be active outdoors.

Pregnant women, athletes and those who play, work and exercise outdoors are even more susceptible to air pollution because they inhale pollutants deeper into their lungs and this can increase the chance of negative health effects.

Infants and foetuses are the most susceptible to pollutants, particularly lead (Pb).

AIR POLLUTANT: Heavy Metals (e.g. Mercury (Hg) and Lead (Pb))

SOURCES: Burning of household waste; industrial activities; steel manufacturing factories; coal-fired power stations; waste incinerators; thinners and paint.

HEALTH IMPACTS: Birth defect; cancer; impaired mental function; kidney failure; irritability; headache; chest tightness; upset stomach; trouble breathing; abdominal pain; fatigue; neurological disease; lead may cause learning disabilities and impaired blood formation.

WHAT CAN YOU DO? Avoid exposure; use a full personal protective kit when working with heavy metals; rotate workers to avoid prolonged contact with heavy metals.

AIR POLLUTANT: Carbon Monoxide (CO) e.g. cars, trucks, construction vehicles and equipment

SOURCES: Motor vehicle emissions; indoor parking areas and tobacco smoke.

HEALTH IMPACTS: At low concentrations, CO may cause lethargy and headaches; at high concentrations, it may cause lack of ability to concentrate; suffocating gas which impairs the functioning of the nervous system.

WHAT CAN YOU DO? Close doors and windows alongside garages and carports when cars are running, to prevent fumes entering indoor areas; keep garages and carports well ventilated; if a vehicle is left to idle, ensure its fumes are not blowing towards you; when choosing a fuel burner, consider the installation of a flue; retrofit vehicles with emission reducing devices e.g. catalytic converters; use alternative fuel or electric vehicles.

AIR POLLUTANT: Carbon Dioxide (CO₂)

SOURCES: Burning of gasoline, coal and wood. Controlled fires; forest and bush fires.

HEALTH IMPACTS: Headache; dizziness; nausea; breathing difficulty; excessive exposure will induce coma.

WHAT CAN YOU DO? Ensure adequate and effective ventilation e.g. open windows.

AIR POLLUTANT: Dioxins (C₄H₄O₂)

SOURCES: Bleached paper products and white cardboard burnt with other waste (e.g. burning of municipal waste at landfill facilities)

HEALTH IMPACTS: Altered immune function and fatigue.

WHAT CAN YOU DO? Buy and use products made from recycled paper; avoid burning paper; avoid burning waste.

AIR POLLUTANT: Methane (CH₄)

SOURCES: Anaerobic decomposition of plant and animal matter; landfills; animal feedlots; chicken broilers and internal combustion engines

HEALTH IMPACTS: In high concentrations it acts as an asphyxiant. It reduces oxygen in the air and leads to increased breathing and pulse rate; abnormal fatigue; nausea; vomiting; convulsive movements; gasping & possible respiratory collapse.

WHAT CAN YOU DO? Retrofit engines to reduce emissions; extract methane to generate electricity; substituting animal dietary requirements; introduce best practical environmental options (BPEO) in the agricultural industry.

AIR POLLUTANT: Volatile Organic Compounds - VOC's (e.g. Benzene; Toluene & Xylene)

SOURCES: Carpets; plywood; paper products; pesticides; disinfectants; air fresheners; cleaning agents; foam insulation; adhesives; paints; lacquers; printers; permanent markers; petrol; fuel tanks at refineries; burning of fossil fuel e.g. coal & oil; tobacco smoke.

HEALTH IMPACTS: May cause sleepiness; loss of co-ordination; damage to the central nervous system; eczema; pulmonary oedema; nausea; irritability; inflammation of eyes & skin; respiratory problems; damage to kidneys & livers; some are known to weaken our bodies' defence mechanisms & make us more vulnerable to infections; some cause cancer & lead to irreversible changes to the generic materials of our cells.

WHAT CAN YOU DO? Reduce use of VOC containing substances; maintain a high degree of air flow between indoor and outdoor environments; healthy plants are known to be efficient at reducing the levels of a variety of air pollutants within indoor spaces; ban smoking inside homes or buildings; install tanks with floating roofs.

AIR POLLUTANT: Styrene (CH₂)

SOURCES: Smoke from burning of polystyrene polymers e.g. plastic bags & other plastic products & burning of waste containing plastics.

HEALTH IMPACTS: Altered nervous system; headaches; fatigue; weakness; drowsiness; nausea; vomiting; less of co-ordination; depression & exposure to extreme levels of styrene may to coma or death.

WHAT CAN YOU DO? Say no to plastic shopping bags; buy in bulk and save on plastic packaging; avoid burning waste containing plastics.

AIR POLLUTANT: Acids & Aldehydes

SOURCES: Burning of coloured paper & cardboard printed with ink; emissions from motor vehicles & industrial sources.

HEALTH IMPACTS: Irritation to eyes and lungs.

WHAT CAN YOU DO? Re-use paper instead of burning it; recycle paper & cardboard (start a recycling program); retrofit vehicles with emission reducing devices; introduce best practical environmental options (BPEO) in the industrial sector.

AIR POLLUTANT: Particulate Matter (PM₁₀ & PM_{2.5})

SOURCES: Burning of fossil fuel e.g. coal & oil; vehicle exhaust fumes; driving on unpaved roads; smoking; ploughing; building & construction activities; open fires; bush fires; controlled fires e.g. agricultural burning.

HEALTH IMPACTS: Reduction of the functional ability of our lungs; exacerbation of respiratory problems such as asthma; cancer; irreversible changes to genetic material within body cells & increased risk of premature death from heart or lung diseases in the elderly.

WHAT CAN YOU DO? Introduce effective control measures to reduce particulate matter from industrial sources e.g. bag filters and fit catalytic converters to vehicles; wet dusting and thorough vacuuming will reduce the level of settled particles in your home; open windows and doors to allow indoor air pollutants to escape; request smokers not to smoke in public; use a synthetic particulate suppressant to suppress dust on unpaved roads; allow materials to dry completely before burning; stop agricultural field activities on windy days e.g. ploughing.

AIR POLLUTANT: Methane (CH₄)

SOURCES: Anaerobic decomposition of plant and animal matter; landfills; animal feedlots; chicken broilers and internal combustion engines

HEALTH IMPACTS: In high concentrations it acts as an asphyxiant. It reduces oxygen in the air and leads to increased breathing and pulse rate; abnormal fatigue; nausea; vomiting; convulsive movements; gasping & possible respiratory collapse.

WHAT CAN YOU DO? Retrofit engines to reduce emissions; extract methane to generate electricity; substituting animal dietary requirements; introduce best practical environmental options (BPEO) in the agricultural industry.

GREENHOUSE GAS

10%

90%

In South Africa more than **90%** of our general waste is sent to our bursting landfill sites.

LESS THAN 10% IS RECYCLED.