



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

State of Air Report

A report on the state of the air in South Africa

THE STATE OF THE AIR REPORT 2005

Baseline information for monitoring the efficacy of the Air Quality Act and its implementation

Presentation to the Media on the Occasion of the Official Launch of
the State of Air Report 2005

12 October 2009

Emerald Casino, Vanderbijlpark

BACKGROUND

- Prior to the enactment of the National Environmental Management: Air Quality Act (the “AQA”, Act No. 39 of 2004) –
 - Limited data;
 - Differing data quality; and
 - Limited access to information
- The State of the Air Report provides the 2005 baseline against which the efficacy of the AQA and its implementation can be measured.



CHAPTER 1 - INTRODUCTION

Chapter I
Introduction

- Provides an introduction to –
 - Air and atmospheric quality;
 - Air pollution and its impacts on health and the environment; and
 - The sources of air pollution

...depends on the quantities of natural and anthropogenic emissions to the atmosphere, and on the atmosphere's potential for dispersing and removing pollutants. ...the state of air quality in South Africa, providing insight into the current situation and associated health, welfare, and broader environmental impacts, as well as identifying important sources, pollutants and areas in which they have an impact. In addition, the report summarises current air quality management practices and reports opportunities for strengthening monitoring and air quality management. The report focuses on particulate matter and local and urban ambient air quality issues.

CHAPTER 2 – AIR QUALITY AND SUSTAINABLE DEVELOPMENT

Air quality and sustainable development

- **Environmental–economic Interface**
 - Sustainable cities
 - Cost-effective air quality monitoring systems
 - Aligning air quality standards with sustainable development
 - Prioritizing sources on the basis of impact and future trends
 - Cost-benefit analysis of strategies to reduce emissions
 - A flexible approach to reducing the impact of air pollution
- **Environmental–social Interface**
 - Addressing air pollution through poverty alleviation
 - Addressing environmental injustice
 - The social acceptability of interventions

CHAPTER 3 – AIR QUALITY STANDARDS AND OBJECTIVES

- **Air quality limits for criteria pollutants**
 - **Suspended particulate matter**
 - **Sulphur dioxide**
 - **Oxides of nitrogen**
 - **Carbon monoxide**
 - **Ozone**
 - **Benzene**
 - **Dust deposition**
 - **Metals**
- **Air quality thresholds for non-criteria pollutants**
 - **Health-based air quality thresholds**
 - **Odour thresholds**
- **Definition of high pollution days**

CHAPTER 4 – ATMOSPHERIC EMISSION SOURCES

- **Fuel combustion-related sources**
 - Electricity generation
 - Commercial and industrial fuel combustion (excluding the electricity generating sector)
 - Household fuel burning
 - Transportation sources
- **Industrial process emissions**
- **Waste treatment and disposal sources**
 - Incineration
 - Landfill operations
 - Wastewater treatment
- **Mining operations**
- **Agricultural burning**
- **Other anthropogenic sources**
- **Regionally-transported pollution**

Atmospheric emission sources

Atmospheric emissions are released from a wide range of sources, including stationary and mobile sources, landfills, and other sources. Stationary sources include power plants, industrial facilities, and other large-scale facilities. Mobile sources include vehicles, ships, and aircraft. Landfills and other sources include household waste, construction waste, and other solid waste. Emissions from these sources can contribute to air pollution and climate change. The following table provides a summary of the major atmospheric emission sources in the United States.

4.1 FUEL COMBUSTION-RELATED SOURCES

4.1.1 Electricity generation

4.1.1.1 Overview and data for electricity generation: www.epa.gov

4.1.2 Commercial and industrial

4.1.3 Residential

4.1.4 Transportation

4.2 INDUSTRIAL PROCESS EMISSIONS

4.3 WASTE TREATMENT AND DISPOSAL SOURCES

4.3.1 Landfills

4.3.2 Incineration

4.3.3 Wastewater treatment

4.4 MINING OPERATIONS

4.5 AGRICULTURAL BURNING

4.6 OTHER ANTHROPOGENIC SOURCES

4.7 REGIONALLY TRANSPORTED POLLUTION

Chapter 5 Indoor air quality

CHAPTER 6 – AMBIENT AIR QUALITY MONITORING AND DATA AVAILABILITY

- **Overview of air quality monitoring**
 - Monitoring agencies and pollutants measured
 - Geographical distribution of monitoring
 - Characterization of pollution sources
 - Characterization of air quality in areas remote from pollution sources
 - Data quality
- **Recommendations and conclusions**
 - National air quality information review conclusions
 - Extension and optimization of the available air quality information
- **Station selection for baseline air quality characterization**

CHAPTER 7 – AMBIENT AIR QUALITY – CURRENT STATUS AND RECENT TRENDS

- **Compliance of common pollutants with air quality limits**
- **Diurnal and seasonal trends characteristic of different source types**
 - **Household fuel-burning**
 - **Vehicle traffic**
 - **Elevated stack emissions**
- **Central witwatersrand dustfall trends**
- **Non-criteria pollutants and monitoring programmes**
 - **VOC concentrations in the city of johannesburg**
 - **VOC and SVOC concentrations in household fuel-burning areas**
 - **VOC concentrations in the sasolburg region**
 - **Roadside concentrations of criteria and non-criteria pollutants**
- **Regions known to be characterized by poor air quality**

CHAPTER 8 – REGIONAL AND GLOBAL AIR POLLUTION CHALLENGES

- Climate change
- Stratospheric ozone depletion
- Persistent organic pollutants
- Transboundary transportation of air pollutants
- Acid deposition

CHAPTER 9 - SCIENTIFIC ADVANCES

Scientific advances

- Introduction
- Cape Town brown haze
- Safari 2000
- Regional-scale aircraft monitoring programme
- Cross-border air pollution impact assessment project (CAPIA)
- Acid deposition
- Biogenic volatile organic compounds (BVOC)
- Regional scale passive monitoring of SO_2 , NO_x , and O_3
- The south african mercury assessment (SAMA) programme

CHAPTER 10 – DEVELOPMENTS IN AIR QUALITY MANAGEMENT

- Legislative and regulatory developments
- Air quality governance cycle
- Cooperative governance
- Air quality management planning regime
- Listed activities, controlled emitters, and controlled fuels
- Sector-specific interventions and initiatives
- Air quality management and climate change

Chapter 10
Developments in air
quality management

At a glance

The National Environmental Management Act (NEMA) requires a shift from

the traditional command-and-control approach to a more integrated and collaborative approach. This approach involves a shift from a focus on individual activities to a focus on the overall management of the environment. The NEMA also introduces the concept of integrated environmental management (IEM) and requires that all activities be managed in a way that takes into account the environment. The NEMA also introduces the concept of integrated environmental management (IEM) and requires that all activities be managed in a way that takes into account the environment. The NEMA also introduces the concept of integrated environmental management (IEM) and requires that all activities be managed in a way that takes into account the environment.

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10.1.1.30. The NEMA and the Air Quality Act

KEY STATE OF THE AIR CONCLUSIONS

- Human health impacts, related in particular to inhalation exposures to household coal and wood emissions, remain the most serious and pressing national air pollution problem. Such impacts have been estimated to result in massive direct health spending.
- High ambient sulphur dioxide (SO₂) and concentrations of fine particulate matter (PM) due primarily to fuel combustion within the household, industrial, and power-generation sectors, represent ongoing air pollution problems in many parts of South Africa.
- Elevated fine particulate (PM₁₀) concentrations occur across the country, with widespread and frequent exceedances of health thresholds. Sulphur dioxide limits are exceeded less frequently and in a more localized way (in the vicinity of significant sources).
- The location of heavy industries and communities of people in close proximity to each other presents persistent health risks and consequent conflict, exacerbated by increased pressure to situate residential areas within former industrial and mining buffer zones.



KEY STATE OF THE AIR CONCLUSIONS (Cont.)

- Emerging air pollution issues are closely associated with the transportation sector, particularly road use. Growing vehicle activity and the ageing of the national vehicle fleet is projected to offset planned and proposed national emission reduction measures aimed at regulating fuel composition and new vehicle technology.
- Air quality limits for nitrogen oxides (NOX) and ozone, aimed at protecting people against acute adverse health effects, are currently relatively infrequently exceeded within South African cities, but a trend towards increasing concentrations of these pollutants is apparent, to which the growth in vehicle activity is expected to contribute significantly. Volatile organic compound releases from fuel filling stations and NOX as well as hydrocarbon releases from major airports further highlight the air quality implications of the country's transportation policies
- Questions remain regarding potential environmental impacts and the transboundary transportation of pollution generated by medium and elevated stack emissions from petrochemical, metallurgical, and mineral-processing operations, and by coal-fired power stations. Concerns have been raised over heavy metal emissions, including mercury and chromium-VI. In these fields, a consolidation of existing knowledge as well as further research are necessary



KEY STATE OF THE AIR CONCLUSIONS (Cont.)

- South Africa is sensitive to global climate change, particularly because global warming is projected to bring a rise in the frequency and intensity of droughts and floods.
- National total CO₂-equivalent emissions were reported to have increased by 9.4% during the period 1990–1994. This growth was due primarily to the significant rise in greenhouse gas (GHG) emissions from the energy sector, whose contribution increased from 75% to 78% during this time. The three source groups contributing most significantly to the energy sector's CO₂-equivalent emissions were energy industries (including electricity generation for the national grid), industry, and transport. The CO₂-equivalent emissions increased from all three groups between 1990 and 1994, with transport emissions increasing the most (by 38%). Road transportation was reported to contribute more than half of the transport sector's emissions.



APPENDIX – AIR QUALITY MONITORING DATA 1990 - 2005

Appendix

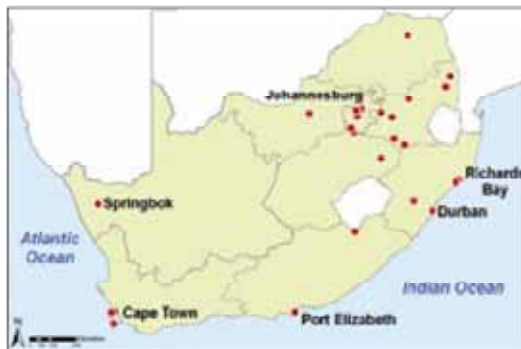


Figure 3.3.1: National distribution of ozone monitoring stations



Location of ozone monitoring stations in the Eastern Cape

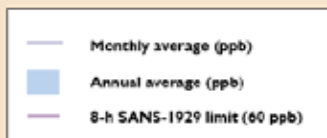


Figure 4.2.1.2: Long-term trend of ozone levels in the Eastern Cape

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM
Environmental Quality and Protection
Chief Directorate: Air Quality Management & Climate Change

THE NATIONAL AIR QUALITY MANAGEMENT PROGRAMME
(NAQMP)
OUTPUT 2.1

Technical Compilation to Inform the Initial State of Air Report

Report compiled by: Mark Zurcher, Juanette John, Pina Tavis, Mogesh Naidoo
CSIR-Natural Resources and the Environment, Pretoria 0001

State of the matter

This Technical Compilation to Inform the Initial State of Air Report provides information on all the ambient air quality monitoring stations in South Africa during the period 1990-2004. The quality of the data is discussed and the data are used to describe the state of air using compliance and long-term trend analysis.

This report contains the technical information used to inform
Initial State of Air for South Africa 2007

Technical Compilation to Inform the Initial State of Air Report – May 2007



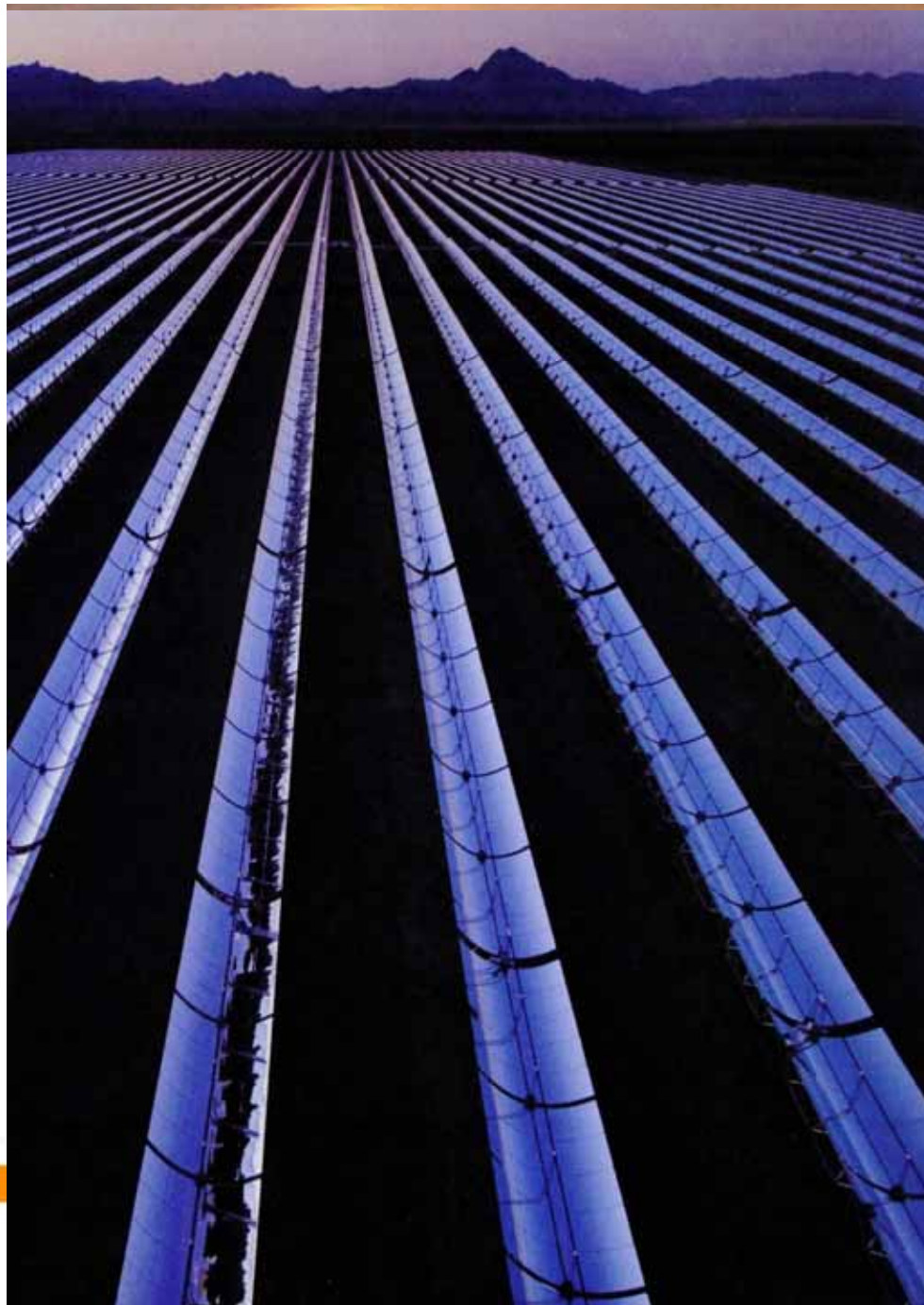
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State of Air Report

A report on the state of the air in South Africa

Forward to a
sustainable
energy future



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