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DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM



# **SOUTH AFRICA COUNTRY REPORT**

**FOURTEENTH SESSION OF THE  
UNITED NATIONS COMMISSION ON  
SUSTAINABLE DEVELOPMENT**

**SEPTEMBER 2005**

## List of Acronyms

AGOA	Africa Growth and Opportunity Act
APINA	Air Pollution Information Network for Africa
AQA	Air Quality Act
AQMP	Air quality management plan
AU	African Union
BCI	Business Confidence Index
BEE	Black Economic Empowerment
BFP	Basic Fuels Price
BNM	Basa Njengo Magogo alternative fire lighting method
BPO	Business process outsourcing
CABEERE	Capacity Building in Energy Efficiency and Renewable Energy
CAPCO	Chief Air Pollution Control Officer
CAPEX	Capital Expenditure Programme
CBO's	Community based organisations
CCP	Cities for Climate Protection
CDM	Clean Development Mechanism
CERS	Certified Emission Reductions
CEF	Central Energy Fund
CFC's	Chlorofluorocarbons
CFL's	Compact fluorescent lights
CO	carbon monoxide
CONNEP	Consultative National Environmental Policy Process
CIF	Critical Infrastructure Fund
CP	Cleaner Production
CSD	Commission on Sustainable Development
CSIR	Council for Scientific and Industrial Research
DBSA	Development Bank of Southern Africa
DEAT	Department of Environment and Tourism
DoH	Department of Housing
DME	Department of Minerals and Energy
DNA	Designated National Authority office
DSM	Demand Side Management
The dti	Department of Trade and Industry
ECA	Economic Commission for Africa
EDI	Electricity Distribution Industry
EDRC	Energy and Development Research Centre
EMIA	Export Marketing and Investment Assistance
EMM	Ekurhuleni Metropolitan Municipality
EIA	Environmental Impact Assessment
EU	European Union
FNB	First National Bank
GATT	General Agreement on Tariffs and Trade
GCCC	Government Committee on Climate Change
GDP	Gross Domestic Product
GEF	Global Environment Facility
GODISA	Programme to stimulate technology transfer.
GTZ	German Technical Co-operation Organization
GVEP	Global Village Energy Partnership

GWh	Giga Watt Hours
ICLEI	International Council for Local Environmental Initiatives
ICT	Information and communications technologies
IP	Illuminating paraffin
IDC	Industrial Development Corporation
IeC	Integrated Energy Centre
IP&WM	Integrated Pollution and Waste Management Policy
JSE	Johannesburg Stock Exchange
LRP	Lead Replacement Petrol
LPG	Liquefied Petroleum Gas
MEC	Member of the Executive Council
MFRC	Micro Finance Regulatory Council
Mtoe	Million tonnes of oil equivalent
MW	Mega Watt
NAAMSA	National Association of Automobile Manufacturers of South Africa
NAQMP	National Air Quality Management Programme
NCCC	National committee on Climate Change
NCPC	National Cleaner Production Centre – South Africa
NEDLAC	National Economic Development and Labour Council
NELF	National Electrification Forum
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEPAD	New Partnership for Africa’s Development
NER	National Electricity Regulator
NERI	National Energy Research Institute
NERSA	South African National Energy Regulator
NGO	Non-governmental organisation
NLR	National Loans Register
NSI	National System of Innovation
NTTC	National Technology Transfer Centre
OAU	Organisation of African Unity
PBMR	Pebble-bed modular reactor
PFMA	Public Finance Management Act
ProBEC	Program for Biomass Energy Conservation in Southern Africa
PUC	Productive Use Container
R&D	Research and Development
RDP	Reconstruction and Development Programme
REDS	Regional Electricity Distributors
SA	South Africa
SACEF	South African Competition Economics Forum
SACN	South African Cities Network
SACOB	South African Council of Business
SADC	Southern African Development Community
SALGA	South African Local Government Association
SANS	South African National Standards
Sapia	South African Petroleum Industry Association
SAPP	Southern African Power Pool
SARS	South African Revenue Services
SEA	Sustainable Energy Africa
SET	Science, Engineering and Technology
SETAS	Sector Education and Training Authorities

SEDA	Small Enterprise Development Agency
SEI	Stockholm Environment Institute
SETA	Skills Education & Training Authorities
STEM	Short-term energy market
Sida	Swedish International Development Cooperation Agency
SIP	Strategic Industrial Projects
SMEDP	Small and Medium Development Programme
SMMDP	Small and Medium Manufacturing Development Programme
SME	Small and medium enterprises
SMME	Small, medium and micro enterprises
SPII	Support Programme for Industrial Innovation
SSA	Sub-saharan Africa
TAU	Technical and Administrative Unit
THS	Tax holiday scheme
THRIP	Technology and Human Resources for Industry Programme
TIASA	Thermal Insulation Association
TMM	Tshwane Metropolitan Municipality
TSP	Technology Stations Programme
TWIB	Technology for Women in Business
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	UN Framework Convention on Climate Change
UNIDO	United Nations Development Organisation
USA	United States of America
VAT	Value added tax
W	Watt
WOESA	Women in Oil and Energy
WTO	World Trade Organisation
WINSA	Women in Nuclear

## **Introduction**

The United Nations Commission on Sustainable Development (CSD) was created in to ensure effective follow-up of the United Nations Conference on Environment and Development (UNCED) ; to monitor and report on implementation of the Earth Summit agreements at the local, national, regional and international levels. The mandate of the commission was reaffirmed by the World Summit on Sustainable Development held in Johannesburg in 2002

At its eleventh session, the Commission on Sustainable Development decided that its multi-year programme of work beyond 2003 would be organized on the basis of two-year cycles, with each cycle focusing on selected thematic clusters of issues. CSD 11 further encouraged countries to provide national reports, on a voluntary basis, for every review session on the thematic clusters of issues reflecting the overall progress, trends and emerging issues as well as constraints and challenges. The CSD also invited the Secretariat of the Commission to improve on reporting guidelines and questionnaires with the intention of making reporting more efficient and less cumbersome on countries and more focused on implementation.

The United Nations Division for Economic and Social Affairs (UNDESA) has requested national focal points to submit country reports as a contribution to the Secretary General's Report for CSD 14, which focuses on the thematic cluster of Industrial Development, Climate Change Air Pollution/Atmosphere and Energy for Sustainable Development

This report is the South African country report to the Commission, which reports on the progress made in the implementation of Agenda 21 with regard to the review, evaluation and monitoring processes. It specifically focuses Industrial Development, Climate Change Air Pollution/Atmosphere and Energy for Sustainable Development. The key elements of the CSD-12 Report include a reflection on lessons learnt, best practice, the identification of actions, opportunities and constraints to the implementation of sustainable development and to the formulation of the NSDS.

This report was developed through a rigorous intergovernmental process coordinated by the Department of Environmental Affairs and Tourism with the support of the department of Trade and Industry, the Department of Foreign Affairs, the Department of Mineral and Energy and the Department of Health. The development of the report included consultations and numerous written submissions from representatives of major groups, organised business and labour. This report is globally applicable within a national and even a local context and it was developed through a methodology that does not simply comply with the request from the United Nations but with and to strengthen the Sustainable Development Agenda in South Africa.

## **I. Overview**

### **1. *Atmospheric Pollution and Climate Change***

#### **1.1 Concrete actions taken and progress made in implementation**

Following South Africa's re-acceptance into the international community (both politically and economically) and its adoption of a progressive Constitution and Bill of Rights, the policy approaches to environmental regulation and management in South Africa have changed substantially. This has been undertaken with a view, inter alia, to giving effect to sustainable development and to providing some alignment with international trends.

The *National Environment Management: Air Quality Act (2004)* reformed the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures.

An important standard for air quality (SANS 1929) was published in January 2005. SANS 1929 gives limit values for common air pollutants to ensure that the negative effects of such pollutants on human health is prevented or reduced. Another standard linked to air quality, albeit from an automotive regulatory perspective, is SANS 20049, which is concerned with the emissions of pollutants from different categories of motor vehicles.

The *Climate Change Response Strategy*, launched in October 2004, outlines the framework of how South Africa should respond to climate change. Due to the crosscutting nature of climate change, DEAT has established two formal committees where other government departments are represented. These are the Government Committee on Climate Change (GCCC); and the National committee on Climate Change (NCCC, where all impacted and affected parties are represented). These two bodies coordinate climate change issues, including the implementation of the Climate Change Response Strategy, across all relevant government departments. South Africa ratified the United Nations Framework on Climate Change in August 1997 and acceded to the Kyoto Protocol in March 2002 as a non-Annex 1 signatory. Annex 1 countries are committed to a 5% overall reduction in the period 2008 –2012.

Although South Africa does not have a national air quality problem, a number of air pollution "hot spots" exist around the country where severe air quality problems occur. The Air Quality Act contains specific provisions to deal with these problem areas – the so-called "Priority Area" provisions.

Since the publication of government's Integrated Pollution and Waste Management policy in 2000, government has been implementing the National Air Quality Management Programme 2000 – 2010 (NAQMP) . The programme is divided into four phases with each phase providing the foundation and/or input into the next phase. The NAQMP provides a starting point for the development of the National Air Quality Management Framework required by the Air Quality

Act. Phase 1 has focussed on translating the Integrated Pollution and Waste Management Policy into a strategy and initial implementation action plan for air quality management for the country. The Phase II (Transition) is also underway and phase III (Capacity development) and Phase IV (Maintenance and Review) will follow.

Currently, industrial emissions are regulated by the Chief Air Pollution Control Officer (CAPCO) of the DEAT. Registration certificates for individual industries are issued by CAPCO, which state the actual quantity of particulate emissions that may be emitted as well as the level of emission allowed.

The White Paper on Disaster Management (1998) outlines government's new thinking in relation to disaster management. In line with international trends and our national objectives of efficient and effective management of our nation's resources, priority is given in this new approach to prevention.

The Department of Minerals and Energy (DME), together with the DEAT, are currently working on a vehicle emissions strategy, which aims to control the emissions allowed from vehicles following on from the DME plan for the phase out of leaded petrol and the introduction of lower sulphur diesel from 2006. The DEAT will use the Air Quality Act to implement the vehicle emission policy.

South Africa has almost completely phased out the use of ozone-depleting substances such as chlorofluorocarbons (CFCs) and carbon tetrachloride.

## **1.2 Constraints and challenges**

- Fossil fuels remain the dominant energy source
- Air quality governance has been relatively moribund until 2000 and, as a result, there is an extremely limited specialist air quality management human resource base
- Although some research has been, or is being, carried out in respect of the impacts of fossil fuel burning, detailed research to understand and address the specific contribution of industrial air pollution (e.g. impacts of emissions from the petro-chemical industry) has not been undertaken
- The need/plan to conduct intensive sector specific consultation with the view to developing sector adaptation plans and mitigation plans for reducing greenhouse gas emissions.
- Financial implications associated with the complete phasing out of ozone-depleting substances, lead from petrol and reduction of diesel sulphur.
- Although there has been some research in South Africa on the impacts of climate change on biodiversity, for example in the Western Cape, more research is needed to increase certainty on the range of impacts that can be expected including on human health and ecosystems, particularly as new data becomes available. This would also assist with the development of adaptation strategies to cope with predicted changes. There is a need for a central location for data storage of all exposure, demographic and health data as well as the need to harmonize local government air quality monitoring systems to ensure

compatibility.

## **A. Atmospheric Pollution and Climate Change**

### **A.1 Decision-Making: Strategies, policies, programmes and plans, legislation, policy instruments and the regulatory framework**

#### ***1.1 Assessing ambient air quality and the levels of air pollution***

##### **1.1.1 Policies regulating air quality in South Africa**

The primary legislation governing air quality is the South African Constitution, specifically section 24 which states that everyone has the right to an environment (including ambient air) that is not harmful to their health and well-being. Following South Africa's first democratic elections in 1994, the Consultative National Environmental Policy Process (CONNEPP) was launched in 1995. To this day, this policy development process is regarded as being one of the most participatory national policy development processes experienced both locally and internationally. The end result of this policy development process was the White Paper on National Environmental Management (1997). With this solid policy foundation, by 1998, government had published new legislation empowering it to implement the policy, namely, the National Environmental Management Act (Act No. 107 of 1998) (NEMA).

Immediately following the publication of the National Environmental Management Policy, work started on specific policy relating to pollution and waste and the White Paper on Integrated Pollution and Waste Management was published in 2000. Since then, government has been driving the development of various pieces of legislation that will empower government to implement this policy.

The *National Environment Management: Air Quality Act (Act No. 39 of 2004) (AQA)* reformed the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures.

AQA acknowledges that many areas of the Republic are not conducive to a healthy environment for people, the burden of health impacts associated with polluted ambient air falls most heavily on the poor, air pollution carries a high social, economic and environmental cost that is seldom borne by the polluter and atmospheric emissions of ozone-depleting substances, greenhouse gases and other substances have deleterious effects on the environment locally, regionally and globally.

AQA aims to:

- (a) prevent pollution and ecological degradation;
- (b) promote conservation; and

(c) secure ecologically sustainable development and use of natural resources

AQA replaces the outdated and ineffective 1965 air pollution legislation. In line with other environmental quality related legislation (e.g. the Water Act), AQA takes the Constitution as its foundation by providing for national quality and performance standards. This approach ensures the holistic and integrated management of environmental quality.

## **Standards**

AQA provides an objectives-based approach to air quality management. The objectives are set by means of various standards including: national and provincial ambient air quality standards; national, provincial and local emission standards; emission standards for particular industrial activities (listed activities); emission standards for appliances and activities, including motor vehicle emissions (controlled emitters); standards for planning, reporting, monitoring, etc.

An important standard for air quality (SANS 1929) was published in January 2005. This standard deals with ambient limits for common pollutants and is likely to replace the transitional standards provided for in AQA.

Another standard linked to air quality, albeit from an automotive regulatory perspective, is SANS 20049. This standard, an adoption of the United Nation's ECE R49, is concerned with the emissions of pollutants from different categories of motor vehicles, namely passenger vehicles, buses and minibuses, and LDVs and trucks.

## **Status of South Africa's ratification of atmospheric pollution related conventions**

The Kyoto Protocol was adopted at the 3<sup>rd</sup> Conference of Parties in 1997. The Protocol provides that developed nations accept commitments to limit, or reduce, the emission of green house gases according to different targets. South Africa ratified the United Nations Framework on Climate Change in August 1997 and acceded to the Kyoto Protocol in March 2002 as a non-Annex 1 signatory. Annex 1 countries are committed to a 5% overall reduction in the period 2008 –2012.

The DME has established the *Designated National Authority office*. The DNA office has received 7 projects proposals for review to date. These projects are in the following areas: landfill gas, hydroelectric power, fuel switching and industrial energy efficiency. These projects, if implemented, will reduce 21 million tonnes of CO<sub>2</sub> emissions by the year 2012 and will generate revenue of R618 million by year 2012 from sales of Certified Emission Reductions (CERS).

The *Climate Change Response Strategy*, which was launched in October 2004, outlines the framework of how South Africa should respond to climate change. Cabinet approved the strategy in September 2004. For the financial year 2005/6, the Department will be conducting intensive sector specific consultation with the view of developing sector adaptation plans and mitigation plans. Due to the crosscutting nature of climate change, the department has four formal stakeholder committees. These are:

- The Inter-ministerial Committee on Climate Change involving Ministers from Environment Affairs and Tourism, Science and Technology, Agriculture, Water Affairs and Forestry and Minerals and Energy.
- The Inter-departmental Committee on Climate Change that provides technical support to the Inter-ministerial Committee.
- The Government Committee on Climate Change (GCCC ); and
- The National Committee on Climate Change (NCCC, where all impacted and affected parties are represented).

These structures inform and coordinate climate change issues, including the implementation of the Climate Change Response Strategy.

In 1987, 46 countries signed the Montreal Protocol on Substances that Deplete the Ozone Layer and, since then, more than 160 countries have signed it. South Africa acceded to the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer on 15 January 1990. South Africa is currently developing an Ozone Layer Protection strategy that will indicate response measures necessary to mitigate ozone layer depletion.

South Africa has almost completely phased out the use of ozone-depleting substances such as chlorofluorocarbons (CFCs) and carbon tetrachloride. However, a small amount of legal CFCs are imported and exported to fill asthma inhalers and air conditioners and fridges manufactured prior to 1996. The CFC methyl bromide (used as a pesticide in the agricultural sector) is still being imported and used. DEAT is formulating a full phase-out plan but may be seek UN assistance since the replacement products are very expensive.

### **1.1.2 Overview of air quality studies**

The approach to air quality studies has been fragmented and unsystematic in South Africa and although a number of studies have been completed, results are not integrated and easily accessible. Despite this lack of information, South Africa's air quality is regarded as being relatively good on the whole, but there are a number of air pollution "hot spots" around the country where severe air quality problems are experienced. AQA recognises this problem and provides specific means by which these hot spots may be managed (the so-called Priority Areas).

Often related to these hotspots is the larger problem of indoor air quality. Research highlighted that although outdoor sources often dominate air pollution *emissions*, indoor sources frequently dominate air pollution *exposures*, since exposure is a function of both the concentration in an environment and the person-time spent in the environment.

A number of studies have pointed out that the domestic sector, especially domestic coal burning, is responsible for high levels of air pollution. Although this is true, the specific contribution of industrial air pollution and specifically the contribution of the petro-chemical industry has not been adequately addressed nor fully understood. The impact of air pollution, especially on human health is also well-documented for the domestic and transport sections but few studies have taken full industrial air pollution impacts into account. This notwithstanding, an

epidemiological study related to poor air quality in the South Durban Basin may fill some of the gaps in this regard.

## ***1.2 Control of air pollution***

Since 1965, the approach to air quality management in South Africa was informed and driven by the Atmospheric Pollution Prevention Act (Act No. 45 of 1965) (APPA). For many years, this Act was regarded as outdated for a number of reasons. The publication in May 2000 of government's Integrated Pollution and Waste Management policy (IP&WM Policy) marked a turning point for pollution and waste governance in South Africa. From an air quality management perspective, the new policy presented a complete paradigm shift from the APPA approach. As such, a new approach to air quality management was required.

With the publication of the IP&WM Policy, government immediately set about developing a strategy and action plan to implement the air quality management components of the new policy. The first phase of this process was referred to as the 'definition phase' as it defined the implementation plan and legislative framework that was required to efficiently and effectively implement government's IP&WM Policy. The plan and legislative framework was then subjected to a participatory process that informed, tested and fine-tuned the approach. The culmination of the definition phase was the promulgation of AQA.

Government's vision with respect to the NAQMP is that the programme will develop, implement and maintain an air quality management regime that contributes to sustainable development and a measurable improvement in the quality of life of all, by harnessing the energy and commitment of all South Africans for the effective prevention, minimisation and control of atmospheric pollution.

The goals for the NAQMP are taken from the IP&WM Policy wherein seven strategic goals are identified for, among others, achieving sustainable air quality management as follows:

### **Goal .1: Effective Institutional Framework and Legislation**

This goal is defined as follows:

*To create, develop, implement, maintain and continuously improve an effective, adequately resourced and harmonised institutional framework and integrated legislative system and to build institutional capacity.*

Government has already delivered a key output required to meet this goal, namely, the AQA. However, as AQA is largely 'framework' legislation, much work is still required to ensure an "integrated legislative system". This work will include, among others, the development of various regulations, lists and schedules.

Furthermore, although much work has already taken place in building an effective, adequately resourced and harmonised institutional framework for sustainable air quality management in all affected spheres of government, there is still a long way to go. In this regard, although AQA itself directs or implies the required institutional framework, the 'resourcing' of this framework remains a challenge. As such, the remaining years of the NAQMP will continue to address this component of the goal.

## **Goal 2: Pollution Prevention and Impact Management**

This goal is defined as follows:

*To promote holistic and integrated air quality management through pollution prevention, minimisation at source and impact management.*

Although AQA directly links the Atmospheric Emission Licensing process to the environmental impact assessment (EIA) process and provides various regulatory tools aimed at promoting cleaner production, much work remains to be done to ensure the effective utilisation of these tools.

## **Goal 3: Holistic and Integrated Planning**

This goal is defined as follows:

*To develop mechanisms to ensure that air quality management considerations are effectively integrated into the development of government policies, strategies and programmes, all spatial and economic development planning processes, and all economic activities.*

AQA introduces an air quality management planning regime that fits seamlessly with existing planning regimes. However, much work is still required to ensure that this planning is properly implemented and fully integrated with existing plans.

## **Goal 4: Participation and Partnerships in Air Quality Management Governance**

This goal is defined as follows:

*To establish mechanisms and processes to ensure effective public participation in air quality management governance.*

Although AQA provides formal participatory processes, less formal, but structured participation and partnerships must be established to ensure that the AQA objectives are met. This is especially important with respect to the development of the National Air Quality Management Framework required by AQA.

## **Goal 5: Empowerment and Education in Air Quality Management**

This goal is defined as follows:

*To promote the education and empowerment of South Africa's people to increase their awareness of and concern for air pollution issues, and assist in developing the knowledge, skills, values and commitment necessary to achieve efficient and effective air quality management.*

This goal will be a primary focus for the remaining years of the NAQMP.

## **Goal 6: Information management**

This goal is defined as follows:

*To develop and maintain databases and information management systems to provide accessible information to interested and affected parties that will support effective air quality management.*

Although AQA provides for a comprehensive national, provincial and local air quality information system, much work is required to develop, implement and maintain this system.

**Goal 7: International cooperation**

This goal is defined as follows:

*To develop mechanisms to deal effectively, and in the national interest, with international issues affecting air and atmospheric quality.*

Although AQA provides various ways in which South Africa is able to implement its commitments and obligations in respect of various air quality related multi-lateral environmental agreements, much work is still required in using AQA effectively for this purpose.

***The NAQMP Implementation Plan***

The Implementation of the NAQMP is divided into four phases with each phase providing the foundations and/or inputs for the following Phase.

**Table 1: Timing of the NAQMP**

NAQMP PHASE	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Phase I: Definition</b>											
<b>Phase II: Transition</b>											
<b>Phase III: Capacity Development</b>											
<b>Phase IV: Maintenance and Review</b>											

**Phase I: Definition**

Phase I of the NAQMP was initiated following the publication of the IP&WM Policy and was concluded with the promulgation of AQA in February 2005. In essence, Phase I focused on translating the IP&WM Policy into a strategy, legislative framework and initial implementation action plan for air quality management in the country. The Phase I outputs included, among others: an air quality management framework strategy and initial implementation action plan in the form of the draft NAQMP; and, the AQA that provides the legislative framework for the implementation of the IP&WM Policy and the NAQMP.

**Phase II: Transition**

Phase II of the NAQMP was initiated in 2002 once there was initial, broad agreement on both the draft NAQMP and the draft National Air Quality Management Bill. As the name of the phase implies, Phase II of the NAQMP concentrates on ensuring a smooth transition from the old air quality management regime (i.e. APPA) to the new regime defined in AQA.

This phase of the NAQMP is implemented through a number of projects, including, among others:

*The South Durban Multi-Point Plan* – A project initiated by the Minister aimed at addressing the air pollution problems associated with the South Durban Basin. Although the project is specifically aimed at dealing with the air pollution in this well known pollution ‘hot spot’, the project also provides a number of important inputs into the NAQMP and acts as a pilot project for air quality management in pollution hot spots.

*The NEDLAC Air Quality Study* - The NEDLAC initiated study to examine the potential socio-economic impact of measures to reduce air pollution from combustion (2004), has confirmed the belief that investments in air quality management are investments in public health. As such, it has effectively flipped the question of “can we afford air quality management?” on its head into the question “can we afford not to have efficient and effective air quality management?”

*The SO<sub>2</sub> ambient standard setting initiative* – This project was completed in 2002 with the publication of a new APPA SO<sub>2</sub> ambient guideline. This ‘guideline’ is now an interim ambient air quality standard in terms of AQA and the process to establish this standard has provided a possible model for the development of future air quality standards.

*The SABS standard setting initiative* - This project was completed in 2004 with the publication of SANS 1929 that provides ambient air quality limit values for a number of priority pollutants. These limit values are likely to replace interim ambient air quality standards in terms of AQA and, as above, this project provided another possible model for the development of future air quality standards.

*The NAQMP Phase II and IIB Projects* – This project was initiated on 1 April 2004 and will conclude in late 2005. The project outputs include: National Air Quality Management Programme documentation and website; Trained Provincial Air Quality Officers; AQA Implementation Manual; AQA Implementation Course; Pollutant Prioritisation and Standard Setting Process Protocol; Initial schedule of Listed Activities; Initial schedule of Controlled Emitters; Initial regulations; Strategy and Action Plan Development Manual; Air Quality Information Review; Air Quality Information System Framework; Pilot Air Quality Information System in operation within DEAT and Gauteng province; and an initial ‘State Of The Air’ Report.

*The vehicle emission strategy* – This joint DEAT – Department of Minerals and Energy (DME) project is linked to DME’s fuel reformulation initiative (see below).

*The Fuel Reformulation initiative* – This initiative, implemented by DME, is a real cleaner production initiative as it deals with pollution control at source. The project will ensure the complete phasing out of leaded petrol in 2006 and a significant reduction in the sulphur content of diesel.

*The Licensing Capacity Development Project* – This project builds on the experience of the South Durban Multi-point Plan (see above) by creating a draft template for Atmospheric Emission Licenses that can be used nationally. This project will become sub-component of the APPA Review Project (see below).

*The Vaal Triangle SEA* - This multi-stakeholder initiative to undertake a strategic environmental assessment of the Vaal Triangle will be used to provide further lessons for the management of national priority areas.

*The APPA permit review project* - This project will commence following the conclusion of a tender process (July 2005). In essence, a project will be implemented that will result in: (i)

current, accurate, relevant and complete information on all APPA Registration Certificates captured, sorted and stored; (ii) an initial list of ‘problem’ air polluters prioritised for review in such a way as to ensure that the review process yields initial air quality management capacity in provinces and affected local authorities as well as measurable air quality improvements during, and immediately following, the period of transition between APPA and AQA; (iii) prioritised Registration Certificates are reviewed jointly with provinces and affected local authorities and the process provides sufficient information to ensure practical and reasonable amendments of Registration Certificates; (iv) amended prioritised Registration Certificates; (v) a license fee administration protocol; and (vi) 30 licensing authority staff in each province trained in the use of the procedures, protocols, standard formats, process steps, process flow-charts, process check-lists, etc. contained in an Atmospheric Emission Licensing Manual.

*AQM enforcement initiatives* – Significant and/or serious air pollution cases have been prioritised for enforcement action by the Environmental Management Inspectorate (the so-called Green Scorpions) in order to build awareness around air quality compliance and send out the message that indiscriminate air pollution will no longer be ignored.

*The Priority Area identification initiative* - The department is working on the identification of priority areas as provided for in sections 18 to 21 of AQA. This important air quality management tool has three strategic drivers: (i) It effectively allows for the concentration of limited air quality management capacity (human, technical and financial) on dealing with acknowledged problem areas in order to obtain measurable air quality improvements in the short-, medium- and long-term; (ii) It prescribes a cooperative governance regime by effectively handing-up air quality management authority to the sphere of government that can provide leadership and coordination. For example, because the Vaal Triangle area falls across provincial boundaries, the national department must coordinate the development and implementation of the priority area air quality management plan; and (iii) It allows for ‘cutting edge’ air quality management methodologies that take into account all contributors to the air pollution problem, i.e. “air-shed” air quality management.

*Numerous independent local authority initiatives* – Many local authorities, especially Metros, have already taken up the challenge of the new approach to air quality management and many have already developed detailed air quality management plans for the areas under their jurisdiction. The NAQMP will ensure that the lessons learned from these initiatives are translated into case studies and guidelines to assist other local authorities.

*The Residential Air Pollution initiative* - The DME has embarked on the implementation of an Integrated Clean Household Energy Strategy initiated to curb coal-based indoor and outdoor pollution and the resultant negative impact on health and the environment. The Strategy has identified three phases to address residential air pollution: (1) Popularisation of the Basa Njengo Magogo (BNM) low-smoke fire lighting method (immediate term); (2) Manufacturing and distribution of an acceptable, affordable low-smoke fuel (medium term); and (3) Promotion of housing insulation and energy efficient housing design (medium to long term). With respect to the Low-Smoke Fuels Programme, this nine-stage program was developed to address the health and environmental concerns of burning D-grade coal, which is commonly found in the South African domestic market and consists of: (i) Preliminary studies and a synthesis report; (ii) Formulation of standards based on the synthesis report; (iii) Tests of low-smoke fuels; (iv) The determination of the social acceptability of the fuel; (v) Techno-economic evaluations to determine whether the fuels tested conformed to standards and whether they could be

economically viable; (vi) Macro-scale experiments to ascertain whether the low-smoke fuel will make an appropriate contribution to the reduction of air pollution to an acceptable level; (vii) Policy Formulation; (viii) legislation development; and (ix) education and awareness-raising.

### **Phase III: Capacity Development**

Phase III of the NAQMP commenced with the promulgation of AQA and focuses on building the necessary air quality governance capacity for the efficient and effective implementation and enforcement of the AQA.

As with Phase II, this phase will also consist of a number of coherent and coordinated projects that are likely to include, among many others:

*Accredited Air Quality Management Qualifications* – Tertiary training institutions will rollout formal accredited courses aimed at ensuring that qualified air quality managers are available to both government and the private sector.

*The NAQMP Information Series* – The department will publish a number of books and booklets with a view to advancing the science and understanding of air quality management. Three series are currently envisaged, namely, the general information series, the air quality management specialist series, and the AQA implementation series. The latter being in the form of AQA implementation manuals for use by air quality management officials.

*The national AQIS rollout* – The department will coordinate the rollout of the national air quality information system (AQIS) that will provide accurate, current and complete air quality information for decision-shapers and decision-makers.

### **Phase IV: Maintenance and Review**

This, the final phase of the NAQMP, deals with the maintenance of efficient and effective air quality governance in South Africa, i.e. the normal day-to-day management of air quality throughout the country. Furthermore, this phase will also include the continuous monitoring and review of the efficacy of both the NAQMP and its implementation and, from this, the continuous revision of the NAQMP to ensure that the overall objective of the programme is being met.

### **Local Government Interventions**

According to the Constitution, municipalities have executive authority in respect of air pollution control. Municipalities must develop their own Air Quality Management Plans to address specific air quality problems in their areas. For example, Cape Town, Johannesburg, Ekurhuleni, Ethekweni and Tshwane have developed air quality management plans. As an example, the air quality management plan for Tshwane will ensure that:

- significant sources of atmospheric emissions are controlled cost-effectively and fairly;
- best air quality management practices are implemented routinely; and
- air quality is acceptable in terms of health, welfare and the broader environment.

Using Tshwane as an example, the Environmental Health Section of the Municipality has been tasked with developing an effective air quality management plan (AQMP) for the city. The

AQMP will be used as a management and performance-monitoring tool for air quality control and to provide a baseline assessment of air quality issues within the municipal area.

A comprehensive AQMP for Tshwane will assist with the following:

- To achieve acceptable air quality levels throughout the City of Tshwane
- To promote a clean and healthy environment for all residents of Tshwane
- To minimise the negative impacts of air pollution on health and the environment
- To promote the reduction of greenhouse gases in support of the climate change protection programme

The process of developing the AQMP focuses on two areas. The first focus area is a baseline assessment of air pollution concentrations and air quality management practices in Tshwane. This means that a technical team will be investigating the current air quality situation in the municipal area. The second focus area is the drafting and compilation of the actual plan for Tshwane, taking the following into account:

- Operational and functional structure requirements
- Air quality management system component requirements
- Identification of sources of pollution and prioritisation of them
- Possible implementation of emission reduction measures

In the 2005 Budget Vote Speech the Minister committed DEAT to meet with the communities worst-affected by air pollution to hear their most urgent concerns, to share with them the actions being taken by Government, and to announce the roll-out and implementation of the new air quality laws at provincial and local level. Areas such as the Vaal Triangle, Durban South, Secunda, Richards Bay, and Table View were identified as areas badly affected by air pollution. For example, in the Vaal Triangle there are a number of major sources of air pollution - heavy industries, refineries, a power station, motor cars, and more than 14 000 households burning coal for heat and cooking. Recent studies have shown that the health costs of burning fuels in the Vaal, associated with respiratory diseases, are estimated to be more than R274 million every year. The problem is further complicated because air concerns in the Vaal stretch across the Gauteng and Free State border.

### ***1.3 Plan(s) to deal with severe air pollution incidents***

The White Paper on Disaster Management (1998) outlines government's new thinking in relation to disaster management. In line with international trends and our national objectives of efficient and effective management of our nation's resources, priority is given in this new approach to prevention. Unlike previous policies that focused predominantly on relief and recovery efforts, this White Paper underscores the importance of preventing human, economic and property losses, and avoiding environmental degradation. Preparedness measures for more efficient rescue operations will remain necessary. But much greater attention must be directed to the introduction of preventive strategies aimed at saving lives and protecting assets before they are lost. Previously, scarce resources were diverted for disaster relief at the expense of growth and developmental opportunities, resulting in the worsening of the plight of poverty-stricken

communities. In line with government's priorities, this White Paper pays specific attention to the pressing needs of poor communities in relation to both natural and human disasters.

Control of emergency incidents (where incident means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed) is also specifically dealt with in Chapter 7, section 30 of NEMA.

An example at a local level is the Durban multi-point plan. The following are elements of the multi-point plan:

- Health Risk Assessment Study (HRA) and Epidemiological Study  
To commission a Health Risk Study (HRA) as well as an Epidemiological study to ascertain the extent of the impact of air pollution on human health in the area. The Epidemiological Study, will follow directly on the HRA, and will commence at Island View. This is because the information and scientific data gathered during the HRA will feed into the Epidemiological Study.
- Phasing out of Dirty Fuel  
To reduce the use of coal and heavy furnace oil by industry in the area, as this contributes to high levels of particulate matter in the atmosphere.
- To improve measurement of fugitive emissions from Tank Farms and develop guidelines for reducing the emissions
- Revision of sulphur dioxide (SO<sub>2</sub>) guidelines  
To revise SO<sub>2</sub> guidelines for the Durban South area with aim of striving towards World Health Organisation guidelines.
- Improved monitoring:  
To identify the gaps and improve the ambient and source emission monitoring of sulphur dioxide (SO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), and volatile organic compounds (VOCs) in the area.
- Strengthening of Enforcement Capabilities, through training and recruitment of skilled staff.

## ***1.4 Programmes designed to reduce indoor air pollution***

### **1.4.1 Clean household energy strategy**

The Department of Minerals and Energy (DME) embarked on the implementation of an Integrated Clean Household Energy Strategy initiated to curb coal-based indoor and outdoor pollution and the resultant negative impact on health and the environment. The Strategy identified three phases to address residential air pollution: (1) Popularisation of the Basa Njengo Magogo (BNM) low-smoke fire lighting method (immediate term); (2) Manufacturing and distribution of an acceptable, affordable low-smoke fuel (medium term); and (3) Promotion of housing insulation and energy efficient housing design (medium to long term).

### **1.4.2 Low-Smoke Fuels Programme**

This nine-stage program was developed to address the health and environmental concerns of burning D-grade coal, which is commonly found in the South African domestic market. This coal has a lower calorific value and on combustion, releases the unburned volatiles as visible smoke. Natural low-smoke coals like anthracite and lean bituminous coal are also found in South Africa. The intervention comes after two previous attempts at investigating the potential of low smoke fuels during the 1960's and 70's. In the 1970's a low-smoke stove was developed, but despite good sales, this initiative was largely unsuccessful because it was reported that users modified the combustion chamber (to improve burning) thereby negating the smoke suppression features of this appliance. More information is provided in the 'Technology Standardization' section.

The multi-stage program included the following key activities: Preliminary studies, which would lead to a synthesis report; Formulation of standards based on the synthesis report; Tests of low-smoke fuels, which were available to determine technical factors of the low-smoke fuels, such as emission and ignitability; Determine the social acceptability of the fuel. Following the laboratory and field test, techno-economic evaluations were to be undertaken to determine whether the fuels tested conformed to standards and whether they could be economically viable. Macro-scale experiments were to be designed to ascertain whether the low-smoke fuel will make an appropriate contribution to the reduction of air pollution to an acceptable level. Once the viability of the low-smoke fuel was determined, formulation of policy in terms of its promotion in townships was to follow. The implementation phase will be followed by policy/legislation. In addition, an education and publicity campaign was undertaken to raise awareness about the coal use and coal burning procedures.

The experiments undertaken in Qalabotjha and eMbalenhle informed the main results of the Program since 1994 as follows:

- Cost: a subsidy of R416 million (US\$ 60.4 million) p.a. would be required; however, this figure could be reduced if all other potential market intervention is considered. It is assumed that the state would benefit through increased revenue because of VAT (value added tax). If consumers can be persuaded to pay more, the subsidy could be gradually be phased out.
- Desirability: Low-smoke fuels are not as desirable as ordinary coal, because of poor ignition, or poor heat retention, and a tendency to crumble when transported. There is an added complication, namely that of soliciting support from coal merchants.
- Effectiveness in reducing domestic air pollution: mixed results, but success is deemed possible if the product is further improved.
- Phase of development: no low-smoke fuel is available for full-scale implementation.

### **1.4.3 Basa Njengo Magogo Method**

The method was named after an elderly lady who was able to demonstrate the 'top-down' or 'Scottish method' of burning coal in eMbalenhle This method was first introduced by the Nova Institute, a South African NGO, to the eMbalenhle community to overcome the debilitating impacts of unhealthy indoor air.

The Basa Njengo Magogo method has a direct impact on the combustion process of the coal, which results in a significant reduction in visible smoke and particulates. The process involves adding a small quantity of coal on top of the coal, newspaper, and wood (in that order) once the paper and wood is burning well. The idea is that the fire burns from the top down, affecting the combustion process of the coal in such a way that the particulates in coal smoke are combusted, thereby reducing smoke emissions and increasing the efficiency by which coal is burnt.

The pilot project conducted, by Palmer Development Consulting, in the Orange Farm area in late 2003 held over 300 demonstrations for nearly 19.5 thousand households. Over 98% of those present adopted the method and 99% of that total was still using the method after one month. Over 75% of the residents of Orange Farm noticed substantially less smoke after one month of use. Interestingly, over 65% of household also noticed less smoke in the streets which may indicate that the traditional method of lighting coal fires was leading to neighbourhood pollution as well. These figures indicate that hands-on demonstrations are a very effective tool for bringing about behaviour change and thereby reducing exposure to indoor air pollution.

Various stakeholders have expressed strong interest in the project, and the Department of Mineral and Energy is currently in the process of developing a program at the national level. This program will approve specific projects and provide trainings, workshops, standards and logos for marketing effort.

### ***1.5 Policy measures taken to improve the quality of fuels***

On 3 March 2005, Cabinet approved a cleaner fuels strategy for South Africa with effect from January 2006; this will see an end to lead being added to petrol and lower sulphur standards for diesel. This decision by Cabinet is part of a process that will see newly formulated fuels being introduced, which will contribute to the improvement of urban air quality.

#### **1.5.1 Policies promoting cleaner transportation measures and technology**

The Department of Minerals and Energy, together with DEAT, are currently working on a vehicle emissions strategy aimed at regulating emissions from road-going vehicles. The immediate aim of the strategy is to introduce Euro 2 emission standards on all new vehicles coming into the South African market as of 2006. The impending phase out of leaded petrol by 2006, initiated by DME will go a long way in enhancing the objectives of the strategy as this will pave the way for the installation of emission control technologies such as catalytic converters in new vehicles. The strategy also provides for the phase out of the use of lead-replacement metallic additives by 2010. The development of the strategy was informed by the need to address air pollution from all sources in order to meet the constitutional mandate of ensuring air quality that is not harmful to the health and well-being of the South African population.

#### **1.5.2 Specific policy measures designed to reduce the level of lead in gasoline**

A co-ordinated strategy has been established to address the issue of improving urban air quality by means of the introduction of vehicle technology to reduce harmful vehicle emissions and the

introduction of fuels with improved specifications, which will enable this, improved vehicle technology to work optimally. For this purpose, a grouping has been set up, comprising the Department of Minerals and Energy, the motor manufacturers, the oil industry and environmental interest groups, to formulate a strategy that will result in the reduction of harmful vehicle emissions. This has resulted in targets being set, which include the removal of lead from all petrol leaving our refineries and the reduction of sulphur in diesel from the current 3 000ppm to 500ppm by 1 January 2006.

This initiative means that lead will no longer be emitted to the atmosphere from vehicle exhausts from that time. This will have the effect of considerably reducing the exposure of this heavy metal to urban populations. The availability of unleaded petrol also enables the widespread introduction of catalytic converters on vehicle exhausts. These catalysts reduce the release of other harmful emissions, such as unburned hydrocarbons, nitrogen oxides and carbon monoxide, by up to 90%. The reduction in sulphur will also reduce the release of particulates and sulphurous compounds, resulting in further improvements in air quality.

The removal of lead from petrol and the reduction in sulphur, has other advantages, apart from the environmental benefits. Unleaded petrol can result in the lowering of servicing costs through extended exhaust and spark plug life and extended oil change intervals. The reduction in diesel sulphur can also lead to improved driving performance, the introduction of more sophisticated engine technology and extended oil change intervals.

However the removal of lead and reduction of sulphur comes at a cost. To achieve the 2006 Clean Fuels targets, the South African refineries are expected to spend in the order of R10 billion for equipment upgrades and process changes – a considerable cost which cannot be directly recouped by the oil companies.

Another issue is the maintenance of a suitable octane grade structure without the use of lead.

As from 1 January 2006, oil companies may market the unleaded octane grades of 91, 93 and 95 both inland and at the coast. The grades actually marketed in the different regions will depend on the requirements and market demands in each region. The National Association of Automobile Manufacturers of South Africa (Naamsa), will, together with Sapia, be publishing a list of vehicles currently on South African roads. The list will list the octane grades that each model can use and which octane grade best suits each model, so that motorists will be able to decide which octane grade to buy. Government has indicated that it intends to introduce an additional levy on 95 octane unleaded petrol in the inland areas to encourage motorists not to use a grade higher than the one they need. Each vehicle model is designed to use a certain octane grade range, and the use of a higher grade will not improve performance.

The Naamsa/Sapia (South African Petroleum Industry Organisation) list of vehicle models will also indicate which models need to use lead replacement petrol (LRP)

There is no doubt that the removal of lead from petrol and the reduction of diesel sulphur to 500ppm, together with the improved engine technology, will result in a significant reduction in harmful vehicle emissions. Further improvements in the fuel specifications are currently being

discussed for 2008 and 2010. These further fuel changes will not have such a dramatic effect on improving urban air quality as the 2006 targets but will nevertheless assist the motor manufacturers to use improved engine technology and enhance engine efficiency.

### ***1.6 Economic and market-based incentives to meet national air quality goals***

The Integrated Pollution and Waste Management (IP&WM) policy refers to market based instruments while AQA outlines two specific instruments, namely **recognition programmes** and **trading schemes**. Lastly, National Treasury completed a discussion document addressing air pollution levies in which user charges and emission taxes are provided.

### ***1.7 Nature and impacts of transboundary air pollution***

International obligations and agreements are covered in chapter 6 of NEMA and also chapter 6 of the NEM: Air Quality Act. South Africa has acknowledged its good neighbourly intentions by signing and adhering to international agreements.

The Air Pollution Information Network for Africa (APINA) has been established to address issues related to air pollution. APINA is a regional network of scientists, policy-makers and non-governmental organizations in southern Africa. Similar networks have been established in Asia (APINAP) and Latin America (APINLA). These activities form part of a Programme on Atmospheric Environment Issues in Developing Countries coordinated by the Stockholm Environment Institute (SEI) and funded by the Swedish International Development Cooperation Agency (Sida) under a project entitled "Regional Air Pollution in Developing Countries (RAPIDC). The main role of APINA is to form a strong link between the air pollution scientific community and policy makers at national and regional levels. APINA acts as a conduit of knowledge and data derived in scientific programmes and existing research to influence policy and decision-makers in matters related to air pollution. APINA aims to act as a link between different networks and programmes on air pollution in Africa.

APINA has a Memorandum of Understanding with the Environment and Land Management Sector (ELMS) of SADC to provide support on various issues concerning air pollution in SADC.

The programme elements of the Memorandum of Understanding between APINA and SADC are as follows:

1. Assessment of air pollution in southern Africa:
  - Collate information of emission levels, impacts, monitoring activities, develop assessment models
  - List of on-going and historical information on monitoring
2. Development of SADC air pollution guidelines and standards through involvement of stakeholders:
  - National workshops of stakeholders
  - Regional meetings

3. Policy Development: Facilitate development of national and regional legislation guidelines on transboundary air pollution
4. Develop capacity in southern Africa on monitoring and mitigation of transboundary air pollution:
  - Training of SADC nationals in issues of air pollution
  - Acquisition of relevant equipment and software for use in air pollution monitoring, impact prediction and related activities
5. Promotion of national action programmes to combat air pollution:
  - Generating information on air pollution from motor vehicles, indoor cooking (using wood) and creating awareness
  - National stakeholder workshops
6. Information Dissemination:
  - Structures to be used in data and information sharing e.g. website, newsletter,
  - Creation of various databases
7. Networking: Link up with relevant individuals, institutions and organisations at national, regional and international levels involved in issues of air pollution

Greenhouse gas emissions and their contribution to global climate change are an important transboundary air pollution issue. Although the majority of the world's greenhouse gas emissions are emitted by industrialised countries, the impacts of climate change are predicted to fall disproportionately on developing countries and the poor in particular. South Africa is clearly vulnerable to a range of climate change impacts including water scarcity, biodiversity loss, agricultural and health impacts. Therefore it is essential that adaptation strategies are developed to cope with these various impacts in locally appropriate ways.

Eskom has contributed to research conducted in southern Africa on the thermodynamic structure of the atmosphere and regional scale air flows. The haze layer, which frequently occurs over the southern African region, is comprised of the emission products from vegetation fires and aeolian dust, often being transported into South Africa from neighbouring countries, mixing with the combustion derived sulphur aerosols from the industries located on the South African Highveld. This material can re-circulate over the entire southern African region and, under certain circumstances, it is also transported to remote parts of the African continent and beyond. Although the industrial component is significant, nonetheless, even in its absence the transboundary migration of air pollution would still occur frequently.

## **A.2 Capacity-Building, Information, Research and Development**

NGOs play an important role in raising public awareness on climate change issues in South Africa. SACAN in particular has worked with the media and others to build a broader understanding of this issue both by the public and policy makers. More can be done to realise

synergies with government activities and to ensure that NGO and government efforts are mutually reinforcing, especially including fulfilling commitments to taking stakeholder input in the development of public information and educational materials on board. Eskom's Atmospheric Research Portfolio aims to quantify the impact of emissions from power stations on the receiving environment. In addition it provides information to decision-makers concerning the need for mitigation measures. The portfolio addresses scientific concerns relating to global and regional issues including climate change and climate prediction, trans-boundary transport of pollutants and modelling.

### ***2.1 Availability of data concerning: a) the impacts of air pollution on human health and ecosystems; and b) the levels of pollution in different industries.***

The need for a central location for data storage of all exposure, demographic and health data is crucial in South Africa as well as the need to harmonize local government air quality monitoring systems to ensure compatibility.

Although there has been some research in South Africa on the impacts of climate change on biodiversity, for example in the Western Cape, more research is needed to increase certainty on the range of impacts that can be expected including on human health and ecosystems, particularly as new data becomes available. This would also assist with the development of adaptation strategies to cope with predicted changes.

Under ICLEI's (International Council for Local Environmental Initiatives) Cities for Climate Protection initiative, a number of local governments (for example, Johannesburg, Cape Town, Ekurhuleni, Ethikweni) are participating to achieve measurable reductions in the emissions that cause air pollution and global warming. To participate in the Cities for Climate Protection, local governments commit to achieve 5 milestones:

- Conduct baseline inventory and emissions forecast;
- Set emission reduction goal;
- Develop action plan;
- Implement emission reduction measures;
- Monitor results achieved.

The quantification of externalised costs of the energy supply system must still be addressed.

### ***2.2 Capacity to carry out air dispersion modelling.***

Although there is some capacity in research institutions to carry out air dispersion modelling, sufficient skills are limited.

### ***2.3 Programmes designed to increase citizens' awareness about the impacts of indoor air pollution***

The multi-cultural dimension of the South African society represents a particular challenge to develop culturally appropriate health promotion messages for implement intervention implementation. A significant 4.6 million South Africans aged 20 years and older have no formal schooling with an additional 4.1 million having some primary school education (Statistics South

Africa, Census 2001). More than 8 million South Africans may thus not be able to benefit from health promotion material that is designed for the more educated population.

See section 1.4.3 on the Basa Njengo Magogo method.

#### ***2.4 R & D programmes in the areas of: atmospheric conditions; air quality management; air pollution control technology; clean fuels technology; environmental economics; environmental impact assessment; and remote sensing.***

South Africa launched its National Cleaner Production Centre (NCPC) at the WSSD in 2002. For further detail, see section C4, 4,1 in the Industrial section.

The Ethekewini (Greater Durban) Municipality is considering using gas from three of its landfill sites to generate electricity for the city. The project, which seeks to harness biomass energy in order to reduce harmful emissions into the atmosphere, is in line with South Africa's ratification of the Kyoto Protocol and its support of the implementation of a Clean Development Mechanism. The project is expected to generate up to 10 Megawatts of electricity, or enough fuel to illuminate 9 000 homes, from the three landfill sites at Bisasar Road, Mariannhill and La Mercy. Electricity generated by the landfill sites could be injected directly into the municipality's power grid and help cut back on the amount of coal burnt at power stations that serve the city. As much as 80 000 tons of coal could be saved per year, which would otherwise have been burnt and added to the greenhouse gases that are already emitted to the atmosphere.

### **A.3 Financing**

#### ***3.1 Financing for related programmes from bilateral or multilateral sources***

The South African Government has ratified the Kyoto Protocol and subscribes to the ideals of the UN Framework Convention on Climate Change as mentioned in various National Communications to the UN. The UNFCCC urges cooperative efforts by interested Parties to the Convention in order to positively address climate change via its political plenary the Conference of the Parties, which utilizes the adoption of the Kyoto Protocol as its implementation instrument. The Kyoto Protocol is an international instrument that provides for specific co-operative mechanisms that can be used to achieve the emission reductions required in the developed countries. One of these, the Clean Development Mechanism (CDM), allows developed and developing countries to work together to achieve the objectives of the Protocol.

Attracting CDM investment is regarded as a competitive process, which mirrors efforts of attracting Foreign Direct Investment (FDI). Beyond the environmental objectives of the Convention, the CDM presents South Africa with an opportunity to assist in meeting varied domestic objectives. The key areas of interest for South Africa relating to CDM are to utilize the CDM to leverage foreign investment (and hence create employment opportunities) in the sectors that may be able to achieve emission reductions, utilize CDM investment to promote various policy initiatives that could also contribute to emission reductions, use the CDM to leverage the transfer of technology that could underpin the achievement of policy objectives relating to increased competitiveness and value addition.

Incentives have a role to play in various areas of CDM implementation. These include lowering costs associated with the Project Activity Cycle such as establishing baseline methodologies, new methodologies, monitoring costs, validation and verification, project registration, environmental impact assessment. These costs could be offset by schemes such as the competitiveness enhancing incentives and grants included in the main funds such as the Competitiveness Fund (CF), & the Sector Partnership Fund (SPF). These schemes are designed to assist firms improve their competitiveness by applying better environmental practices or improve their innovative ability via technology development. Ongoing costs for monitoring could also be offset by these schemes. The current training grants can be provided to services sector firms via the services Skills Education & Training Authorities (SETA) for the acquisition of new skills by firms seeking to enter new areas of service e.g. for DoE's to acquire skills.

Many policy areas that advocate subsidies, which could with investment support schemes improve the marginal nature of many CDM projects. The investment incentives that could be accessed include those targeted at investments under R100m such as the SMME Development Programme, or the Strategic Investment Project scheme for projects bigger than this, which meet criteria set out for eligible projects. Other preferential financing models available from IDC and DBSA (especially PCF financing) offer opportunities for investment finance. The existence of schemes such as the Umsobomvu Youth Fund, Risk Capital Facility, and NEF ventures funding can also be targeted by CDM projects. Accessing technology and enhancing support is possible via schemes such as the Technology Innovation Schemes (Support Program for Industrial Innovation (SPII), Partnership for Industrial Innovation (PII), Technology Human Resource in Industry Programme (THRIP), & Innovation Fund). These schemes would thus be available for projects involved in innovative technology activities in the CDM arena. The Export Marketing Investment Assistance scheme can be utilized to assist in export support activities for CDM projects could also lower transaction costs.

The Danish Government through Danida is providing substantial support for the National Air Quality Management Programme (specifically phase 2 but also committed substantial support for phase 3). The Norwegian Government through Norad supports the Multi point plan in Durban and USAID have supplied limited support.

## **A.4 Cooperation**

### ***4.1 Efforts to establish or participate in regional, multilateral or bilateral agreements to address transboundary air pollution concerns***

Certain international agreements impose specific requirements on South Africa. Also see section 1.7 discussing the Air Pollution Information Network for Africa (APINA), which has been established to address issues related to air pollution.

Some of the international treaties to which South Africa is a party relate specifically to the pollution of water, air and land environments; others are of a cross-cutting nature and impact on all three environmental media. To date, 26 international agreements (17 conventions, 4 protocols,

3 treaties and 2 agreements) pertain to integrated pollution and waste management, 19 of which have been acceded to or ratified by South Africa.

## **A.5 Case study of a successful national atmosphere/air pollution programme/strategy**

### ***5.1 The problem or issue addressed:***

The South Industrial Basin is the economic heartland of the Durban Metropolitan Area (DMA). It contributes over 40% of Durban's gross geographic product and occupies over 50% of the industrial land in the city. It is also environmentally degraded, experiencing air pollution and waste disposal problems, and the loss of important natural resources. The South Durban Basin is a heavily industrialized area with some significant air pollution problems. There are more than 100 factories in the area, many of which emit significant volumes of emissions. South Durban has the largest concentration of petrochemical industries in the country, and it refines approximately 60 percent of South Africa's petroleum.

Apart from being overwhelmed with petrochemical companies, the South Durban industrial basin is also home to waste water treatment works, an airport, a paper manufacturing plant and a number of chemical process industries. This situation has undermined the quality of life of residential communities in the area. It has also negatively impacted on the competitiveness of the business environment. The close interface between residential and industrial activities in the area has also created tensions between residential communities, local government and industry regarding future development in the area.

### ***5.2 Name of the programme:***

South Durban Basin Multi-point Plan

The plan is aimed at monitoring the concentration of air pollution largely in the South Durban industrial basin. When the plan was first implemented in 2000, just four monitoring stations were put up and presently there are 16 that cover not only the refinery valley in south Durban, but other industrial areas, the city centre and a few outlying areas.

### ***5.3 Timeframe***

Year started: 2000

### ***5.4 Status***

Ongoing, since October 2000

### **5.5 Main objectives**

The main objectives of the Durban Multi-Point Plan are to resolve the air quality issues in the basin through:

- Developing a comprehensive air quality monitoring system in the basin, a health study and an air quality management plan to inform the planning and development approval process and help to resolve some of the air quality problems in the area.
- To provide an improved and integrated decision making framework for air pollution management at local government level.
- To achieve improved quality of life for the local communities and move towards reduction in air pollution to meet health based air quality standards.
- A health risk analysis and epidemiological study to assess extend of impact of air pollution on human health;
- Phasing out dirty fuel by reducing the usage of coal and heavy furnace oil;
- Improve measurement and control of fugitive emissions from tank farms and develop guidelines for local implementation;
- Revision of national sulphur dioxide (SO<sub>2</sub>) guidelines with the aim of striving towards World Health Organisation standards to be also applied at local level;
- Identify gaps and improve the ambient and source emission monitoring of sulphur dioxide (SO<sub>2</sub>), oxides of nitrogen (Nox) and volatile organic compounds (VOC's) in the area; and
- Strengthening of the enforcement capabilities.

### **5.6 Lead institution**

eThekweni Municipality

### **5.7 Other implementation arrangements and stakeholders involved**

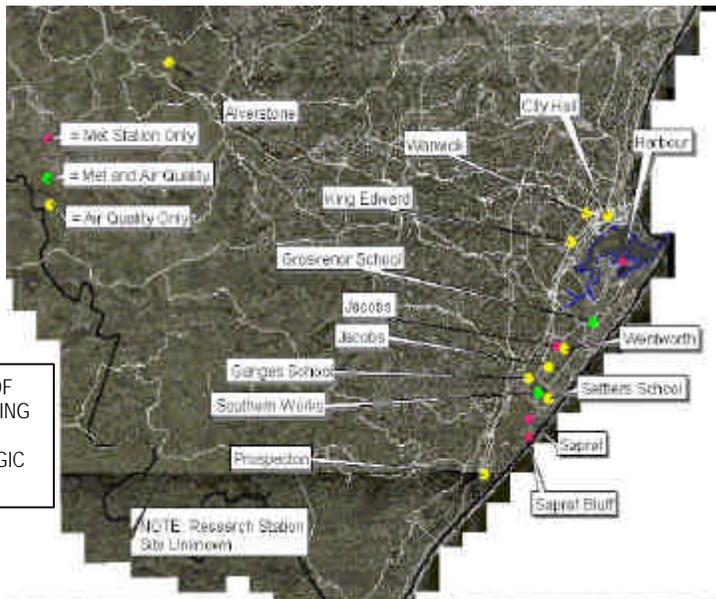
The CSIR has been commissioned by the eThekweni Municipality to investigate National and International best practices in Air Pollution Management. This will be used for the development of local by –laws on Air Pollution Management.

- Community and Industry Stakeholders participate in capacity building initiatives.
- DEAT has developed legislation (AQA) meant to set air pollution standards .It is also establishing the National Framework for Air Pollution Management as well as standards for vehicle tail pipe emissions.
- DEAT is involved with the South African National Standards Body to propose limit values for the priority air pollutants.
- Norwegian Institute for Air Research, the Norwegian Pollution Control Authority and the Canadian Sustainable Cities Initiative

### **5.8 The results achieved**

The South Durban Basin, located on the eastern seaboard of South Africa, has a mix of heavy industrial activity and residential settlements in close proximity. In response to many decades of struggle for cleaner air, an inter-governmental process established the air quality monitoring

network as one of many strategic projects within the Multi-point Plan for the basin. The plan is aimed at improving air quality to meet health based criteria. The main objective of the network is to provide a quantitative measure of air quality and provide a means of verification for the dispersion modelling system. The network was designed by an expert team from the eThekweni Health Department under the technical guidance of NILU, the Norwegian Institute for Air Research.



The thrust of the Multi-Point Plan (MPP) is the development of the Air Quality Management System (AQMS) which ultimately will show the linkages between emissions and ambient concentrations (ie pollution levels on the ground). This is being achieved by an air-dispersion modelling system and an air quality monitoring network. Once the linkages have been established, the AQMS can be used as a planning tool to manage air quality. A successful air quality management plan constitutes two

essential elements: adequate quality controlled data to represent air quality trends and an enforceable regulatory system. If the air quality levels are above the air quality objective or standard, then it would be imperative to establish an AQMS as in the case of the South Durban Basin. Through a system of target-setting, measurements and reporting, it is intended to drive down pollution levels within the framework of an environmental management system and using a continuous improvement approach.

The eThekweni Municipality now has a functioning air quality monitoring network as a concrete outcome of the Multi-point Plan. The network began generating data in December 2003. Since March 2004, real-time data access has been possible in the eThekweni Health Department through dedicated data lines and the Envidas data acquisition system. This development represents a four-fold increase in monitoring capacity. Further, the availability of data to government in real time is a significant improvement as it facilitates efficient decision-making. Raw data is subjected to various levels of quality control to ensure accuracy is maintained and the system operates optimally. Durban has now become a learning centre in the development of an integrated air quality network, and ideas are now being conceptualized to link the air quality information system to the regulatory system such as in the design of permits and directives.

The total project budget for the MPP is R29.8 million, the contributors being industry (R10 million, proposed) and three tiers of government (R17.7 million). Over the six months to November 2004, about two-thirds of industry's funding was secured. However, 24 companies have agreed to contribute R9.4 million, with the remaining R0.6 million expected to be sourced from various small to medium emitters in the basin. Each company's contribution was in

proportion to the amount of priority pollutants that they are emitting, and the extent that this could have a health impact. Getting local industries to co-fund the implementation of the plan and the process of engaging with top management in industry are seen as important breakthroughs for the plan.

In terms of capacity building, a dedicated team of people within the eThekweni Health Department is working on the various aspects of the air quality management system. Work areas include building up emission inventories, sampling for benzene and hydrogen sulphide, operating the AirQUIS software, providing IT support and developing model permits. These developments have been possible due to collaboration with the Norwegian Institute for Air Research, the Norwegian Pollution Control Authority and the Canadian Sustainable Cities Initiative. The intention within government is to have this knowledge base applied to other air pollution hot spots in the eThekweni Municipality and to share it with other municipalities in South Africa. An emerging focus in building capacity to improve environmental quality is to look to cleaner production methods to reduce emissions and costs, and improve environmental performance.

Monitoring schools: Seven primary schools, four in the South Durban Basin and three in the northern suburbs of Durban, have been selected for intensive pollutant and bio-medical monitoring. Until November 2004, there had been three intensive data collection runs at each of the schools; each run runs for a period of two weeks. In addition to the monitoring, there are pupil and parent interviews, indoor air monitoring and specialized monitoring for toxics such as dioxins, furans and a range of volatile organic compounds.

A new internet-based reporting system has been developed to facilitate public access to information about air quality. Designed by eThekweni Health and the Norwegian Institute for Air Research, NILU, the system publishes air quality data for the different pollutants measured at the different stations. The public can make an assessment of air quality by viewing user-friendly graphical displays of concentration trends against air quality guidelines and a comparative assessment can also be made between different stations. The system also generates concentration profiles over time and produces a colour-coded index on the state of air quality. The address for the municipality's air quality website: [www2.nilu.no/airquality/](http://www2.nilu.no/airquality/)

## ***5.9 The relationship of the programme to internationally agreed goals and targets***

Relation to the Johannesburg Plan Of Implementation, section 4 paragraph 39 which calls for states to enhance cooperation at the international, regional and national levels to reduce air pollution, including transboundary air pollution, acid deposition and ozone depletion, bearing in mind the Rio principles, including, inter alia, the principle that, in view of the different contributions to global environmental degradation, and section 6 paragraph 56 calling for the reduction of respiratory diseases and other health impacts resulting from air pollution, with particular attention to women and children,