

South African Country Report for the Eighteenth Session of the United Nations Commission on Sustainable Development (CSD-18)

DEPARTMENT OF ENVIRONMENTAL AFFAIRS

JANUARY 2010

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List of Acronyms

10YFP	10-Year Framework of Programmes
AMCEN	African Ministerial Conference on the Environment
ARSCP	African Roundtable on Sustainable Consumption and Production
ASPASA	Aggregate and Sand Producers Association of South Africa
AVCASA	Association of Veterinary and Crop Association of South Africa
BBBEE	Broad-Based Black Economic Empowerment
BRT	Bus Rapid Transit
CAIA	Chemical and Allied Industries' Association
CDM	Clean Development Mechanism
CHIETA	Chemical Industries' Education and Training Authority
CSD	Commission for Sustainable Development
CSIR	Council for Industrial and Scientific Research
DAFF	Department of Agriculture, Fisheries and Forestry
DDT	Dichlorodiphenyltrichloroethane
DEA	Department of Environment Affairs
DMR	Department of Mineral Resources
DoH	Department of Health
DoL	Department of Labour
DoT	Department of Transport
DST	Department of Science and Technology
dti	Department of Trade and Industry
DWA	Department of Water Affairs
EGS	Environmental Goods and Services
EIA	Environmental Impact Assessment
EPR	Extended Producer Responsibility
EPWP	Expanded Public Works Programme
eWASA	E-Waste Association of South Africa
FIFA	Federation International of Football Association
GFIP	Gauteng Freeway Improvement Project
GHG	Greenhouse Gases
GHS	Globally Harmonized System
GN	Government Notice
GRI	Global Reporting Initiative
HCFC	Hydrochlorofluorocarbons
HCRW	Health care risk waste
HDSA	Historically Disadvantaged South Africans
HS	Harmonised System
ICCA	International Chemical Council Association
ICCM	International Council for Mining and Metals
IFR	Injury Frequency Rates
IGFMMMSD	Intergovernmental Forum for Mining, Minerals, Metals and Sustainable
IGRFA	Intergovernmental Relations Framework Act
INC	Intergovernmental Negotiating Committee
IRPTN	Integrated Rapid Public Transport Network
ITAA	International Trade Administration Act
ITAC	International Trade Administration Commission
JIPSA	Joint Initiative for Priority Skills Acquisition
JPOI	Johannesburg Plan of Implementation
JSE-SRI	Johannesburg Stock Exchange-Social Responsibility Index
MCCM	Multi-stakeholder Committee for Chemicals Management
MEAs	Multilateral Environmental Agreements
MERIECO	Mercury-in-ecosystems
METF	Mining Education Trust Fund
MPRDA	Mineral and Petroleum Resources Development Act
MTEF	Medium Term Expenditure Framework
NATMAP	National Transport Master Plan
NCCM	National Committee on Chemicals Management
NCPC	National Cleaner Production Centre
NECSA	Nuclear Energy Corporation of South African
NEDLAC	National Economic Development and Labour Council
NELI	National Eco-label Initiative
NEM:AQA	National Environmental Management: Air Quality Act
NEM:WA	National Environmental Management: Waste Act
NEMA	National Environmental Management Act
Nepad	New Partnership for Africa's Development

NERSA	National Energy Regulator of South Africa
NFSD	National Framework of Sustainable Development
NGO	Non-Governmental Organisation
NIP	National Implementation Plan
NMT	Non Motorised Transport
NNR	National Nuclear Regulator
NOCS	National Overload Control Strategy
NPIF	National Industrial Policy Framework
NSDS	National Skills Development Strategy
NSJME	Nedbank Securities Junior Mining and Exploration Index
NWA	National Water Act
NWMS	National Waste Management Strategy
ODS	Ozone-depleting substances
OEHRU	Occupational and Environmental Health Research Unit
OHS	Occupational Health and Safety
PCBs	Polychlorinated biphenyls
PCFV	Partnership for Clean Fuels and Vehicles
PCI&S	Principles, Criteria, Indicators and Standards
PET	Polyethylene Terephthalate
PIC	Prior Informed Consent
POPS	Persistent Organic Pollutants
PPP	Public Private Partnership
PRF	Waste Reception Facilities
PTIF	Public Transport Infrastructure Systems Grant
QMS	Quality Management System
R&D	Research and Development
RBH	Royal Bafokeng Holdings
RTSSA	Rural Transport Strategy for South Africa
SAAQIS	South African Air Quality Information System
SABS	South African Bureau of Standards
SADC	Southern African Development Community
SAICM	Strategic Approach to International Chemicals Management
SAMA	South African Mercury Assessment
SAMDA	South African Mining Development Association
SANAS	South African National Accreditation System
SANParks	South African National Parks
SANS	South African National Standards
SANWIT	South African Network of Women in Transport
SAWIC	South African Waste Information Centre
SAWIS	South African Waste Information System
SCP	Sustainable Consumption and Production
SDM	Sustainable Development through Mining
SHE	Safety, Health and Environment
SQAM	Standards, Quality Assurance, Accreditation and Metrology
SRI	Socially Responsible Index
TBT	Technical Barrier to Trade
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNITAR	United Nations Institute for Training and Research
WAHSA	Work and Health in Southern Africa
WSSD	World Summit on Sustainable Development

Executive Summary

The World Summit on Sustainable Development (WSSD) reaffirmed the Commission on Sustainable Development (CSD) as the highest-level commission dealing with sustainable development within the United Nations system. The CSD meets annually, in two year cycles with each cycle focusing on selected thematic clusters of issues. The current fourth implementation cycle focuses on transport, chemicals, waste management, mining and sustainable consumption and production patterns.

The CSD encourages countries to submit country reports in the first year of each thematic cycle outlining concrete progress towards achieving sustainable development taking into account the economic, social and environmental pillars. Countries are encouraged to report on progress on the thematic areas under review in relation to the implementation of the Johannesburg Plan of Implementation (JPOI) targets; lessons learnt and best practices; highlight relevant trends, constraints, challenges and emerging issues. This South African Country Report focuses on the response to the JPOI targets for the current thematic clusters.

Chemicals

Chemicals are ubiquitous in the application of modern technology, and in the South African context are intensively used in such industries as mining, agriculture, wood, pulp and paper products, textiles, metals, paint and plastics production, the armaments industry and the health sector. The South African industry is dominated by the basic chemicals subsector, whose liquid fuels, olefins, organic solvents and industrial mineral derivatives together account for around 31% of chemicals production in the country. The potential health and environmental effects of chemicals and hazardous waste have been central to the development of multilateral environmental agreements (MEAs) and associated structures such as the Strategic Approach to International Chemicals Management (SAICM). The sound management of chemicals and hazardous wastes throughout their life cycles is critical to the implementation of sustainable development as this relates to the chemicals industry.

Commitment has been shown by South Africa towards the implementation of JPOI targets 23 and 68 including through ratification of the key international chemical MEAs, appointment of focal points and development of the national chemicals profile and the implementation of the Globally Harmonized System. A comprehensive legal framework for sound management of chemicals is in place. Through initiatives such as Responsible Care, the chemicals industry has progressed towards achieving their 2020 targets.

Key areas requiring enhancement in South Africa are enforcement and interdepartmental harmonization of the numerous pieces of legislation which pertain to sound chemicals management. Furthermore, an extensive public education system needs to be developed to build knowledge on the imperatives for sound chemicals management in line with requirements of the new Waste Act (NEM:WA). Resources need to be directed to ensuring coordinated and centralized information on research priorities, and improved monitoring, evaluation and reporting and initiatives towards achievement of the JPOI targets for chemicals. Significant opportunities exist for expansion of cleaner production, such as through integrated pest management, to ensure environmentally sound goods and services to niche and mainstream local and international markets.

Mining

Historically, South Africa has been a leading global supplier of minerals and mineral products, and it retains an important role in mining and minerals demonstrated by 55 minerals being produced from some 1113 mines in 2005. Mined product is sourced from open-cast, underground, alluvial, offshore, dune as well as artisanal mining. An estimated 7% direct contribution was made to GDP by mining in 2006 and R140 billion to South African exports in the same year, although when multipliers are accounted for the Gross Domestic Product contribution is closer to 40%. Efforts to address the environmental, economic, health and social

impacts of mining are essential, particularly in the South African context where mining has been, and continues to be the backbone of the economy. The development of strategies and policies which enhance transparency and accountability by the mining sectors was highlighted as a key element in the JPOI targets 46 (a-c).

The Sustainability Development through Mining programme has given rise to initiatives vital to enhancing the sustainability of mining in South Africa. Initiatives introduced by the South African mining industry to improve safety in the country's mines, have resulted in a more than 50% reduction in fatalities. The mining industry has adopted a zero harm policy and wellness of employees as a top priority. Since the mid-1990s, government has sought to promote black economic empowerment in the mining industry. The process will take time, but black-owned firms are now beginning to play an important role in the mining industry, and several new mining giants have emerged. The South African Mining and Biodiversity Forum has been initiated by the Chamber of Mines of South Africa and the World Conservation Union in South Africa to improve biodiversity management practices in the mining industry. In addition, the Department of Mineral Resources has developed a Beneficiation Strategy for the South African Minerals Industry in accordance with Section 26 of the Minerals and Petroleum Resources Development Act and is aligned to broader policy objectives. The Department has initiated a Small Scale Mining Strategy.

Other noteworthy initiatives include: the South African Cyanide Guideline for Gold Mining; the International Council for Mining and Metals Resource Endowment Initiative which identifies circumstances in which positive socio-economic outcomes can flow from minerals endowments; the Responsible Jewellery Council that promotes responsible, ethical, human rights, social and environmental practices in a transparent and accountable manner throughout the gold and diamonds industries from mine to retail; the United Nations Global Compact for businesses that want to align their operations and strategies with ten universally accepted principles in the areas of human rights, labour environment and anti-corruption; and the Johannesburg Securities Exchange-Socially Responsibility Index established to aid investors to differentiate between companies based on their triple bottom line performance.

The Chamber of Mines is leading the private sectors' reporting on sustainable development. The Chamber issued a Transformation and Sustainability report for 2007/2008 that reported on progress in the mining industry with regards to sustainability issues and indicators, such as environment, occupational health, safety, HIV/AIDs and transformation. Many private companies now issue annual sustainability reports.

There has been significant change in the mining, minerals and metals sector since the WSSD. Substantial changes to mining legislation have occurred and policies and guidelines have been developed in response to the changes in the legislation. Mining companies are taking initiative in their sustainability policies and reporting. The mining, minerals and metals industry still faces numerous challenges and targets to meet, with regards to transformation, healthy and safety and the environment.

Transport

Transport systems form the backbone of South Africa's socio-economic activities by enabling the movement of people and products. Apartheid planning has left a legacy of poorly integrated transport networks, and the majority of citizens live far from places of work. Many people still do not have access to an existing and extensive formal railway and road infrastructure, and live in areas where there is no reliable transport.

Transport has major implications for sustainable development, in particular as this relates to atmospheric pollution and human settlements including urban sprawl. Sustainable transport is critical for ensuring poverty alleviation, access to markets and employment, as well as to education.

Substantial progress has been made towards the JPOI targets in the development of policies, strategies and programmes for the transport sector in South Africa. Transport delivery projects currently underway are comprehensive and address all areas of transportation needs to various levels of detail. Priority areas of intervention include: public transport infrastructure and service delivery; road expansion projects to deliver improved capacity and reduce congestion; and non-motorised transport programmes, rural roads and infrastructure development.

To a large extent the 2010 FIFA World Cup has presented a significant stimulus to the transport sector and service delivery especially with respect to public transport projects. As a result South Africa is witnessing the most significant infrastructure construction and expenditure programme since the early 1980s. However, the public transport focus remains largely on the urban area and substantial work is still required to improve rural access and mobility.

Waste management

Management of waste was highlighted through Agenda 21 to be of major concern in maintaining the quality of the Earth's environment, which was reaffirmed at the WSSD. Solid wastes include all domestic refuse, hazardous and non-hazardous wastes. Policies advancing waste avoidance (or hierarchy of waste) as a first choice, followed by waste minimization, recycling and landfill only as a last resort, are key to ensuring improved sustainability around waste management. South Africa has a relatively high rate of waste generation compared to other developing countries, with a disproportionate amount of this waste being generated by the affluent.

There has been good progress towards the implementation of JPOI targets 22 and 23 which are pertinent to waste management. Of relevance is the ratification of international MEAs as these relate to waste management. Of particular importance for South Africa has been the development of policy and legislation, culminating in the recent enactment of the National Environmental Management: Waste Act (NEM: WA) (Act 59 of 2008) which has far-reaching ramifications for implementation of environmentally sound waste management. Application of a hierarchy of waste management which focuses on waste avoidance and minimization rather than disposal is central to the approach being implemented.

Improvements in provision of waste services include the right to free basic services including waste removal. The dynamic nature of the location of much of the population in South Africa is proving a challenge to ensure that this system is in place. Compliance and enforcement have been given a boost through the empowerment of the 'Green', as well as 'Blue Scorpions', and now further resources need to be allocated to ensuring that the policy and legislation is translated into the regulatory framework. Opportunities for economic instruments which can provide incentives for waste avoidance and minimization need to be promoted. Cleaner production which has now been initiated on a pilot scale amongst industries needs to be applied on a far larger scale, a particular challenge for the mining industry which is the largest generator of waste in South Africa. Resources also need to be directed to change in behaviour of the public towards waste avoidance, minimization and recycling needs to become entrenched in the day-to-day behaviour of the public. Expansion of community-based recycling and waste management, in tandem with structuring initiatives in the waste industry towards improved broad-based black economic empowerment compliance represents a key opportunity for sustainable management of waste.

Sustainable Consumption and Production Patterns

Sustainable Consumption and Production (SCP) is broadly defined as a holistic approach to minimizing negative environmental impacts from production and consumption in society and it can be considered as a practical implementation strategy to achieve sustainable development. The main objective of SCP is to promote social and economic development within the carrying capacity of ecosystems and to de-couple economic growth from environmental degradation. At the WSSD in 2002 the global community undertook to take action to change unsustainable consumption and production patterns, reinforcing the commitments to Agenda 21. Furthermore, countries agreed to encourage and promote the development of a 10-year framework of programmes (10YFP) in support of SCP.

SCP is relevant in the South African context given the resource intensive nature of its economy, which is energy intensive due to the low cost of coal and the historical dominance of primary sectoral activities such as mining, mineral processing, metal smelting and synthetic fuel production. Increasing global attention on SCP coupled with the growing scarcity of resources and cost of treating and managing waste in South Africa, has contributed to greater receptiveness by government, business and citizens to change unsustainable patterns of consumption and production.

South Africa has made significant progress towards the development of a framework for the promotion of sustainable development. A key aspect is the effort made in shifting unsustainable patterns of consumption and production, and the participation in the development of the 10YFP. Key progress made by South Africa regarding SCP includes: the development of policy and legislation; initiatives to save energy; enabling environments for renewable energy; major move towards cleaner production piloted and implemented through industry; establishment of mechanisms for funding and sustainable procurement; and increased consumer protection and awareness.

Although South Africa has made significant strides in moving its society towards consumption and production patterns that are more sustainable, the country still faces significant challenges in bridging the gap between the first and second economies, eradicating poverty and improving the quality of life of poor South Africans. Stronger policy alignment is required to maximise the use of funds, capacity and tools that have been dedicated to SCP implementation. The development of a SCP strategy will greatly assist this process. More still needs to be done to inform the choices of consumers and in so doing change their behaviour in a manner that promotes sustainable development.

Cross-cutting issues

Poverty and environmental health

Prior to democratization of South Africa, the poor and most vulnerable communities were frequently located in situations which could be harmful to their health due to close proximity to industries, including chemical industries. The impact of inadequate pollution and waste management practices has thus by large been disproportionately borne by the poor, contributed to by the historic South Africa legacy of the apartheid city design. Life in close proximity to industrial and mining developments and the waste they generate can have serious implications for people's health, including silicosis from mine dust and direct exposure to wastes that are harmful to health such as toxic and otherwise hazardous substances.

Inadequate refuse removal also detracts from the aesthetic appeal of the environment, thus impacting on peoples' well-being and sense of place in their surroundings. Further, access to drinking water in South Africa is a concern to human health due to potential spread of disease caused by contamination of drinking water sources. The government has major initiatives underway to provide free safe drinking water to South Africa's population by 2012.

*Protecting and managing the natural resource base***Biodiversity**

Biodiversity in South Africa has been negatively impacted through air, water and soil pollution including from mining and industry. Influences include acid mine drainage, siltation of rivers and water bodies. Mining has further resulted in the transformation of over 200 000 hectares of natural habitat in South Africa.

Energy and water

There has been a strong shift in focus to cleaner production and energy efficiency in South Africa and best available technology, accelerated by energy shortages. Through its Integrated Energy Plan the government promotes the diversification of energy mix and a move towards alternative energy sources such as nuclear power and natural gas, as well as various forms of renewable energy.

Looming water shortages combined with water quality issues in many of South Africa's inland water sources has also prompted greater emphasis on production efficiency, including within the Chemical Industry Sector. A further priority in cleaner production initiatives is the management of waste, necessary since coordinated waste management is becoming an increasing necessity for the country.

South Africa is a water stressed country, and thus pollution of the limited freshwater resources is a priority concern for South Africa. The problem is compounded by activities including intensive mining which makes relatively little use of recycled water while using about 60% of the available water in South Africa. Acid mine drainage from operational and abandoned coal and gold mines is a particular threat to surface and groundwater quality, as well as ecosystem health. Solutions to these and similar problems are a priority, given issues including the high cost of treatment of chemically polluted water, downstream impacts on marine resources as well as South Africa's responsibilities to downstream neighbours.

Air quality and climate change

Mining and mineral beneficiation are energy demanding activities. Mineral beneficiation alone is responsible for approximately 60% of South Africa's total industrial greenhouse gas emissions, with 97% of total fugitive methane emissions being from coal mines. With climate change at the forefront of international priorities and a shift towards low-carbon economies is taking place globally, South Africa's dependence on coal-based power is a concern both economically and environmentally.

1 Introduction

1.1 Background

The World Summit on Sustainable Development (WSSD) reaffirmed the Commission on Sustainable Development (CSD) as the highest-level commission dealing with sustainable development within the United Nations system. The CSD meets annually, in two year cycles with each cycle focusing on selected thematic clusters of issues. Each cycle is comprised of a review year and a policy year. The review year evaluates progress made in implementing sustainable development goals and identifying obstacles and constraints, while the policy year decides on measure to speed up implementation and mobilize action to overcome these obstacles and constraints. The current cycle focuses on transport, chemicals, waste management, mining and sustainable consumption and production patterns.

The CSD encourages countries to submit country reports in the first year of each thematic cycle outlining concrete progress towards achieving sustainable development taking into account the economic, social and environmental pillars. Countries are encouraged to report on progress on the thematic areas under review in relation to the implementation of the Johannesburg Plan of Implementation (JPOI) targets and the Millennium Declaration Goals and Agenda 21; lessons learnt and best practices; highlight relevant trends, constraints, challenges and emerging issues. This South African Country Report focuses on the response to the JPOI targets for the current thematic clusters.

1.2 Overarching policy and legislative framework

The advent of democracy in South Africa brought far-reaching political, economic as well as social changes. The overhaul of public sector governance has been strengthened by the realisation by government and the private sector that sustainable development is fundamental to achieving growth. This is coupled with the recognition that South Africa can no longer assume socio-economic goals can be attained if the underlying ecosystems and resources are depleted and degraded. The environmental law reform process in South Africa has been rooted in this need for improved access to, and the sound management of, South Africa's natural resource base.

South Africa's commitment to the CSD and JPOI has resonated with the new democratic structures, policy and legislative development. The National Framework for Sustainable Development (NFSD) was developed in response to the JPOI negotiated at the WSSD. The intention of the framework is to 'enunciate South Africa's national vision for sustainable development and indicate strategic interventions to re-orientate South Africa's development path in a more sustainable direction'. The sustainable development vision for South Africa as articulated in the NFSD is presented in Box 1 below.

Box 1: South Africa's Sustainable Development Vision

South Africa's Sustainable Development Vision

South Africa aspires to be a sustainable, economically prosperous and self-reliant nation state that safeguards its democracy by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations, and by advancing efficient and effective integrated planning and governance through national, regional and global collaboration.

Source: Extracted from the National Framework for Sustainable Development in South Africa, 2008

There is an overarching suite of legislation in place in South Africa that supports the implementation of sustainable development underpinned by the Constitution (Act 108 of 1996). The Constitution of South Africa enshrines human rights, including human dignity, justice and fairness, and democratic governance. It also guarantees the right to an environment that is not harmful to health or well-being, and the right to have the environment protected while promoting justifiable economic and social development.

Key pieces of legislation that apply to the themes include: the Broad-Based Black Economic Empowerment (BBBEE) Act No.53 of 2003 embodying the framework for the economic empowerment of previously disadvantaged people in South Africa; the Mineral and Petroleum Resources Development Act, 2002, (Act No 28 of 2002) (MPRDA), with the key purposes being to promote equitable access to mineral and petroleum resources; the Occupational Health and Safety Act (Act No. 85 of 1993) (OHS Act) that provides for the health and safety of persons at work and the protection of people against hazards arising out of activities of persons at work; and the National Environmental Management Act (Act No 107 of 1998 as amended (NEMA) that provides the core principles and framework for sustainable development in South Africa and which sets out environmentally sound policy including the ‘precautionary’ and ‘polluter pays’ principles. A wide-ranging series of Acts and Amendment in terms of NEMA covers the management of air, biodiversity and protected areas, coastal and marine areas, and most recently waste management. The National Water Act (Act No 36 of 1998) (NWA) emphasizes the scarcity and uneven distribution of water in South Africa, in terms of its natural distribution through historical practices which prevented equal access.

2 Background to Thematic Areas

This section of the report provides a brief overview of the country’s progress towards the JPOI targets relating to the thematic areas under review. Detailed information on progress towards the implementation of the JPOI targets by South Africa is provided in the subsequent sections covering the thematic areas of chemicals, mining, transport, waste management and sustainable consumption and production patterns.

Chemicals

The potential health and environmental impacts of chemicals and hazardous waste have been central to the development of several multilateral environmental agreements (MEAs) and associated initiatives such as the Strategic Approach to International Chemicals Management (SAICM). The sound management of chemicals and hazardous wastes throughout their life cycles is critical to the implementation of sustainable development as this relates to the chemicals industry. An overview of South Africa’s approach to sustainable management of chemicals is provided in Box 2 below.

Box 2: South Africa’s sustainable development vision for chemicals

The Constitution of South Africa enshrines the protection of health and the environment, and the right to have an environment that is not harmful to health and well-being. Furthermore, the Constitution commits to the protection of the environment for the benefit of present and future generations while promoting justifiable economic development. The Constitution along with South Africa’s comprehensive range of laws relating to economic, social and environmental sustainability, form a sound mechanism for sustainable management of chemicals in South Africa. *Source: Drawn from the Constitution of the Republic of South Africa (Act 108 of 1996)*

Strong commitment from industry for the sound management of chemicals includes the Chemical and Allied Industries Association of South Africa and its member companies’ adoption of JPOI targets 23 and 68 (see Section 3-2)

Mining

Efforts to address the environmental, economic, health and social impacts of mining are essential, particularly in the South African context where mining has been, and continues to be the backbone of the economy. The development of strategies and policies which enhance transparency and accountability by the mining sectors was highlighted as a key element in the JPOI targets. South Africa's vision for sustainable development through mining (SDM) is encapsulated in the text contained in Box 3 below.

Box 3: South Africa's sustainable development vision for mining

By 2010, the South African minerals sector is able to contribute optimally to sustainable development. This is based on the four pillars of Sustainable Development for Mining (SDM), namely:

- good governance;
- improve the health, income and living conditions of the poor majority
- accelerate economic growth with greater equity and self-reliance
- ensure equitable and sustainable use of natural resources now and into the future

The goals for SDM cover:

- achieving balanced and informed decision-making regarding abstraction and use of mineral resources
- enabling of measurement and assessment of progress towards sustainable development
- minimizing impacts and risks (including improved health and safety)
- developing tools and mechanisms for improved compliance and regulating capacity
- increasing poverty alleviation and improving growth and competitiveness so as to close the gap between first and second economies in South Africa.

Source: Drawn from the Strategic Framework for Implementing Sustainable Development in the South African Minerals Sector: Towards developing sustainable development policy and meeting reporting commitments, Discussion Document 2nd Draft (August 2009)

Transport

Transport has major implications for sustainable development, in particular as this relates to atmospheric pollution and human settlements including urban sprawl. Sustainable transport is critical for ensuring poverty alleviation, access to markets and employment, as well as to education. Box 4 below provides the Department of Transport draft vision for transport.

Box 4: South Africa's sustainable development vision for transport

Sustainable transport vision for South Africa is underpinned by the social, economical and environmental pillars of sustainable development. It aims to provide an integrated, well-managed, viable and sustainable transport infrastructure meeting national and regional goals into the 21st century, in order to establish a coherent base to promote accessibility and the safe, affordable, reliable movement of people, goods and services.

Transport infrastructure in South Africa will serve as a hub for transport in Southern Africa, promote economic development by removing constraints on latent demand in development corridors, encourage public passenger transport, allow for seamless intermodalism and be structured to ensure environmental sustainability and achievement of international accepted standards.

Source: Drawn from White Paper for Transport Policy

Waste Management

Management of waste was highlighted through Agenda 21 to be of major concern in maintaining the quality of the Earth's environment, which was reaffirmed at the WSSD. Solid wastes include all domestic refuse, hazardous and non-hazardous wastes. Policies advancing waste avoidance (or

hierarchy of waste) as a first choice, followed by waste minimization, recycling and landfill only as a last resort, are key to ensuring improved sustainability around waste management. Objectives for sustainable management of waste in South Africa are set out in the preamble to the National Environmental Management: Waste Act (Act 59 of 2008) (NEM:WA). This is adapted and provided in Box 5 below:

Box 5: South Africa's sustainable development vision for waste management

The NEM:WA sets out to protect health and the environment in terms of the constitutional right to have an environment that is not harmful to health and well-being, and to have the environment protected for the benefit of present and future generations while promoting justifiable economic development. This is to be achieved through measures including uniform application of strategies throughout the Republic as well as norms and standards which seek to ensure best waste practices within a system of co-operative governance to achieve:

- prevention of pollution and ecological degradation through institutional arrangements, planning and standards for regulating waste management by all spheres of government;
- remediation of contaminated land
- implementation of the national waste information system
- compliance and enforcement.

Sustainable development requires:

- generation of waste to be avoided, or where it cannot be avoided, that it is reduced, re-used, recycled or recovered
- only as a last resort should waste be treated and safely disposed of
- the protection of the environment through measures including the minimisation of pollution and the use of natural resources through vigorous control, cleaner technologies, cleaner production and consumption practices, and waste minimization.

Source: Drawn from the preamble to the National Environmental Management: Waste Act

Sustainable Consumption and Production Patterns

A 10-year framework of programmes was initiated at the WSSD to commit governments to change unsustainable patterns of consumption and production (SCP). SCP needs to be implemented through concerted effort at regional, national and local level to ensure it is effective, in line with the JPOI targets which call for regional and national initiatives to foster the acceleration of change towards social and economic development taking into consideration the carrying capacity of ecosystems. Box 6 below provides the vision for sustainable consumption patterns and production contained in the SCP National Round Table Background Paper.

Box 6: South Africa's vision for sustainable consumption and production patterns

Vision: South Africa aspires to be a society that ensures sustainable growth and development through adopting socially viable, economically sound and environmentally sustainable consumption and production methods.

Mission: South Africa's mission is to ensure that the future generations are awarded the opportunities for access to all resources that are currently available to achieve a responsible sustainable consumption and production growth in SA

These will be reached through the following principles:

- Adopting the precautionary approach in the production of goods and services
- Promoting social and economic development within the carrying capacity of ecosystems
- Adopting and implementing policies and measures aimed at promoting SCP, applying, inter alia, the polluter-pays principle
- Building capacity and developing awareness-raising programmes on the importance of sustainable production and consumption patterns
- Enhancing corporate environmental and social responsibility and accountability
- Promoting waste minimization
- Rewarding best practice for sustainable development and SCP.

Source: Extracted from Discussion Paper: National Roundtable on Sustainable Consumption and Cleaner Production (August 2008)

3 Chemicals

3.1 Thematic context

Chemicals are ubiquitous in the application of modern technology, and in the South African context are intensively used in such industries as mining, agriculture, wood, pulp and paper products, textiles, metals, paint and plastics production, the armaments industry and the health sector. The South African industry is dominated by the basic chemicals subsector, whose liquid fuels, olefins, organic solvents and industrial mineral derivatives together account for around 31% of chemicals production in the country. Of the roughly 80 000 types of basic or pure chemical currently manufactured on a commercial basis in the world, South Africa manufactures around 300, most of which are commodity, low-value and high-volume products.

South Africa has the largest chemical industry in Africa, and is pivotal for the local economy in that it adds more value than any other sector. It accounts for over half the jobs created by the manufacturing sector as a whole, and generates over 150 000 direct employment opportunities annually. The chemicals industry in South Africa is characterised by large companies in the upstream sector, and small, medium-sized and micro-enterprises (SMMEs) making up the downstream sector. A few large upstream producers are responsible for between 60% and 70% of the chemicals sector turnover dominate SA chemicals sector, which reflects the rationalisation that has been happening globally over the past 18 years. While the industry remains dominated by local companies, a number of multinationals have local distribution points and several have become involved in local manufacture. Currently, around 60% of upstream chemicals are consumed within the chemical pipeline as feedstock.

Mining chemicals which are supplied to South Africa's large-scale mining industry include explosives, processing and refining chemicals. The agricultural sector, also fundamental to the South African economy, is heavily dependent on the use of manufactured fertilizers and pesticides. South Africa is also a major exporter of agricultural chemicals, is one of the largest producer in Africa of nitrogenous fertilizer. It can be anticipated that overall demand for chemicals will be on the increase in South Africa, including through domestic demand which is now on a broader basis as the emerging middle class continues to be included in the formal economy.

Currently more chemicals are being imported into South Africa than are exported, but the South African government has prioritized the development of the chemicals sector. The development of the chemicals sector is included in the national industrial policy framework to boost the country's value-added exports through beneficiation.

3.2 JPOI targets

JPOI targets 23 (a-g) and 68 are directly relevant to the sound management of chemicals and can be summarized as follows:

- Renew the commitment, as advanced in Agenda 21, to sound management of chemicals throughout their life cycle and of hazardous wastes for sustainable development for minimization of significant adverse effects on human health and the environment, using transparent science-based risk assessment and management procedures. Support developing countries in strengthening their capacity for the sound management of chemicals and hazardous wastes by providing technical and financial assistance.
 - Promote the ratification and implementation of relevant international instruments on chemicals and hazardous waste;
 - Develop a strategic approach to international chemicals management based on the Bahia Declaration and Priorities for Action and urge relevant organisations to closely cooperate;
 - Encourage countries to implement the new globally harmonized system for the classification and labelling of chemicals;
 - Encourage partnerships to promote activities aimed at enhancing environmentally sound management of chemicals and hazardous wastes, implementing multilateral environmental agreements, raising awareness of chemicals and hazardous waste issues and use of additional scientific data;
 - Promote prevention of international illegal trafficking of hazardous chemicals and hazardous wastes, and transboundary movement and disposal of hazardous wastes to be done in a manner consistent with obligations under relevant international instruments;
 - Encourage coherent and integrated information on chemicals, such as through national pollutant release and transfer registers;
 - Promote reduction of the risks posed by heavy metals harmful to human health and the environment.
- Achieve sound management of chemicals, with particular focus on hazardous chemicals and wastes, inter alia, through initiatives to assist African countries in elaborating national chemical profiles and regional and national frameworks and strategies for chemical management and establishing chemical Focal Points.

3.3 Progress

South Africa has signed and ratified the Stockholm Convention, and has acceded to the Rotterdam and Basel Conventions as well as the Montreal Protocol which are the key MEAs for sound management of chemicals and hazardous waste. The country is host to the Basel Convention Regional Centre (BCRC) for English speaking African countries.

The Basel Convention on Control of Transboundary Movement of Hazardous Waste and their Disposal was established to protect human health and the environment against adverse effects resulting from the generation, management, the transboundary movement and disposal of hazardous waste. South Africa acceded to the Basel Convention on 5 May 1994, and as a Party is expected to minimise the generation of hazardous waste in terms of quantity and hazardous level, and to dispose

of wastes as close to the source of generation as possible to reduce the movement of hazardous wastes.

The Rotterdam Convention on Prior Informed Consent, an internationally binding instrument, entered into force on 24 February 2004. Acceded to by South Africa on 4 September 2002, the Convention covers pesticides and industrial chemicals banned or restricted for health or environmental reasons by Parties. It further creates legally binding obligations for the implementation of the Prior Informed Consent (PIC) procedure.

Information on the Stockholm Convention and Montreal Protocol is provided in Section 1.2.2.

SAICM

The Strategic Approach to International Chemicals Management (SAICM) provides an overarching vehicle for promoting the sound management of chemicals in terms of Multilateral Environmental Agreements (MEAs). SAICM is a voluntary structure for implementing the WSSD target and MEAs, the core policy objectives of which are to promote risk reduction, science-based approach to decision-making, knowledge and information, governance, capacity-building, and prevention of illegal traffic. The SAICM Declaration, Overarching Policy Strategy and Global plan of action as well as the African Regional Action Plan were adopted in 2006 and 2007 respectively. The process also saw the launch of the Responsible Care Global Charter and a Global Product Strategy as the industry's main contribution to the initiative. South Africa has provided financial contribution towards the Quick Start Programme, the objective of which is to support initial enabling capacity-building and implementation activities in developing countries, least developed countries, small islands developing States and States with economies in transition. South Africa contributed an amount of US\$100 000 to the SAICM Quickstart programme, to support implementation of MEAs by developing countries. The scope of SAICM currently includes agricultural and industrial chemicals, (as well as hazardous waste) with a view to promoting sustainable development and covering chemicals at all stages of their life-cycle, including products.

South African Chemicals and Allied Industries Association (CAIA), a member of International Chemical Council Association (ICCA) and Responsible Care, was active in the formulation and adoption of the SAICM as the means of implementing paragraph 23 of the JPOI.

Globally Harmonized System for Classification and Labelling of Chemicals

Towards the JPOI Target 68, the SADC Trade Protocol provides of the harmonization of standards to facilitate trade in the region. Development of a regional Globally Harmonized System (GHS) standard has been achieved via the South African Development Community Cooperation in Standardisation (SADCSTAN) in which the South African Bureau of Standards (SABS) plays a major role. South Africa participated as a pilot country in the Globally Harmonized Capacity Building Programme.

3.3.1 Developments in national policy and legislative framework

South Africa has various pieces of legislation covering the chemicals supply chain administered by a number of government departments. An administrative mechanism which provides a foundation for the coordination of the activities required to fulfill the country's obligations under the Rotterdam Convention has been set up through the National Committee for Chemicals Management (NCCM). Listed below is some of the key legislation relevant to the management of chemicals and implementation of the MEAs in South Africa.

Management of sustainability

The National Environmental Management Act No 107 of 1998 as amended (NEMA) provides key components of the sustainability framework in which the chemicals industry is required to operate, and under which there are several relevant acts and regulations including the NEM:WA which sets out measures for hazardous waste management. Environmental impact assessment regulations set out the environmental requirements for listed activities. The NWA deals with all aspect of water quality and quantity management directly applicable to the sound management of the chemicals industry. Other relevant pieces of legislation include the Disaster Management Act No 57 of 2002, the Dumping at Sea Control Act No 73 of 1980, Marine Pollution (Control and Civil Liability) Act No 6 of 198, the Marine Pollution (Prevention of Pollution from Ships) Act No 2 of 1986.

Transport

Safe transport of chemicals falls under the jurisdiction of the Department of Transport, with relevant legislation including the National Road Traffic Act No. 93 of 1996 and the Cross-border Road Transport Act No 4 of 1998. The responsibility for the transportation of dangerous goods is now contained in the National Road Traffic Act and encompasses a number of SABS Codes of Practice and Standards Specification which forms part of the legislation. The dangerous goods inspectorate has also been established consisting of several role players including the South African Police Services. Accident/incident reports are further required to be completed within 30 days.

Health

The Departments of Health (DoH) and Labour (DoL) play a key role in relation to environmental and occupational health as this pertains to chemical management, along with municipalities who are responsible for environmental health at the local level. Relevant legislation includes that relating to health and safety in the workplace. Hazardous substances are defined to includes a broad spectrum of substances including electronic products and E-waste, as well as radioactive substances.

Imports and exports

The dti is mandated with the import and export of hazardous chemicals or pesticides in South Africa, and it also has the mandate to promote the growth and marketing of the South African chemicals industry. This promotes effective coordination, management and administration of the imported and exported chemicals in and out of the country.

3.3.2 Actions in response to international and local policy

Approach and strategy

South Africa is addressing gaps between the MEAs and the national legislation in order to promote their domestic implementation. One of the key components to effective implementation of the MEAs in South Africa is coordination to ensure an integrated and seamless approach to chemicals management considering the number of acts, ministries and government departments as well as private organisations involved. To this end, the South African government has set up the National Committee for Chemicals Management (NCCM) and the Multi-stakeholder Committee for Chemicals Management (MCCM) which provides a platform for coordinated implementation of the MEAs.

The NCCM also provides technical input into the position papers drafted for international meetings and facilitates implementation of international decisions at a national level such as for phasing out of chemicals and the identification of alternatives. The dti and DEA consult with other relevant national

departments and structures including the Inter-Departmental Disaster Committee, SABS, South African National Defense Force and the South African Police.

The MCCM aims to ensure involvement by a broad cross-section of role players in the chemicals sector, providing a platform for sharing information, proper understanding of the conventions and coordination. Other partnerships include the National Cleaner Production Centre of South Africa (NCPC-SA), which focus on cleaner production in the chemical sector, as well as organizations such as CAIA which commits its members to Responsible Care.

Implementation of the MEAs

Rotterdam Convention

Key actions for the implementation of the Rotterdam Convention have included: distribution of Decision Guidance Documents for import responses for South Africa, as developed by the Secretariat and the Final Regulatory Action forms for chemicals restricted or banned in South Africa. There has also been the development and distribution of a report reviewing requirements for the legislative framework for chemicals management. Furthermore, tariff codes have been refined, and the designated national authority's recommendation on import responses and final regulatory actions are available on departmental websites. Research needs for implementation of the Rotterdam Convention have been determined. Further information which is made available relates to decisions affecting the management of chemicals taken by national departments. Rotterdam Convention Import response for all chemicals listed in Annex III of the Rotterdam Convention is expected to be in place in 2010. Researchers in the School of Public and Family Health at University of Cape Town have upgraded the pesticide incident report form which is now in the process of being rolled out as an improved system for reporting of poisoning incidents via local government and the DoH.

Montreal Protocol Ozone Depleting Substances Strategy

Actions include the development of the Draft Ozone Depleting Substance (ODS) Regulations and the draft hydro chlorofluorocarbons (HCFC) survey and management plan. A survey and management plan for methyl bromide have been developed, as has a report and database on ODS consumption.

Basel Convention

South Africa hosts the BCRC for African English speaking countries and its core functions includes technology transfer, information-sharing and awareness-raising regarding sound management of hazardous waste. Other key functions are to assist Regional Parties faced with incidents or accidents and to perform other functions assigned by the Conference of the Parties of the Basel Convention or the Region. DEA has a procedure in place to implement the provisions of the Basel Convention.

South Africa at times receives hazardous chemicals from other Africa states that do not have the facilities to deal with the destruction of these substances, and this is then dealt within South Africa according to the relevant norms and standards. Control of import and export of chemicals and hazardous waste has been integrated through the International Trade Administration Act (ITAA). The Government of South Africa through the South African Revenue Services (SARS) and the dti, in collaboration with the ITAC, administer the import and export of all chemicals for the country. An investigations unit from ITAC enforces ITAA and ensures compliance with permit conditions.

Polychlorinated biphenyls (PCBs) have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators

used in capacitors, and old microscope and hydraulic oils. However, owing to their persistence in the environment they are classified as POPs under the Stockholm Convention. Amongst other role players, Eskom, the energy utility in South Africa, has been running a programme for the removal of PCB-containing capacitor cans from decommissioned sites; these have been transported to a European incineration facility for disposal. This process has been carried out in line with the Basel Convention, and as such disposal certificates were obtained.

Stockholm Convention

South Africa participates in the Stockholm POPs Convention Review Committee where a review based on scientific data is carried out on the addition of chemicals to the convention. Information generated by South African research institutions on POPs is submitted to the review committee. Participation in the ad-hoc committee for the development of a toolkit for the quantification of dioxins and furans by UNEP. Members of the South African research community participate in and are currently chairing the 3-yearly review for the continued use of DDT in the SADC region.

The Rotterdam Convention National Action Plan has been drafted. In order to facilitate progress towards implementation of the Rotterdam Convention and Prior Informed Consent (PIC) and development of the NIP, a workshop was hosted by DEA in February of 2009, and it was resolved that a similar meeting should be held regarding the Stockholm Convention.

Risk-based approach to chemicals management

The Departments of Agriculture, Forestry and Fisheries (DAFF) and Health (DoH) conduct/facilitate risk assessment for every chemical before registration and records incidents relating to chemicals. The DoH is a member of the International Programme of Chemical Safety, the overall objectives of which are to establish the scientific basis for assessing risks to human health and the environment from exposure to chemicals. This is achieved through an international peer review process, as a prerequisite for the promotion of chemical safety, and to provide technical assistance in strengthening national capacities for the sound management of chemicals. South Africa is represented in the International Union of Toxicology through its Toxicology Society, at whose meeting pertinent issues of global concern on toxicity of chemicals are discussed.

A key example of the risk-based approach to chemicals management is in the use of DDT for the prevention of malaria in South Africa. Annual spraying inside homes achieves the protection of approximately 5-6 million people from contracting malaria in Limpopo and Kwazulu-Natal provinces, and has been successful in the control of malaria. The ongoing use of approximately 20 tons per annum of DDT for this process, which equates to roughly 60-180 grams per household per annum of DDT, is reviewed on a three-yearly basis through the Stockholm Convention processes. Roleplayers involved include the DoH and the DEA who submit reports on the review of the use, management and production of DDT to the Secretariat of the Stockholm Convention.

Globally Harmonized System of Classification and Labelling of Chemicals

Globally Harmonized System of Classification and Labelling of Chemicals (GHS) is in the process of being implemented. An inter-departmental committee is to be established by the DoL to coordinate the harmonized legislative implementation strategy to include compliance and enforcement, guide budget allocations and implementation by industry. An implementation strategy for South Africa was concluded in December 2003, which included an implementation plan for the GHS in South Africa. Legislation and policy instruments related to labelling and classification of chemicals were reviewed to ensure alignment with the GHS requirements.

Pesticides

The African Stockpiles Programme (ASP) is aimed at the safe removal of obsolete pesticide stocks, and the avoidance of future accumulation. South Africa is one of six African countries selected for Phase 1 of the ASP. Work commenced in 2006, and Limpopo province has been largely cleared of stockpiles on farms by a partnership between DEA, DAFF, Association of Veterinary and Crop Association of South Africa (AVCASA), CropLife International and EnviroServ Waste Management (Pty) Ltd. Storage of the waste has mainly taken place at Holfontein's H1H hazardous waste disposal site. It is estimated that 79.6 tons having been collected in Limpopo province, but a substantial challenge remains in implementing the technical cleanup of the remaining eight provinces (see Section 3.6 dealing with Constraints and Challenges).

DAFF have been through a process to ban the POPs Endosulfan ('Thiodan' and 'Thionex') and Gamma Benzene Hexachloride ('Lindane') have recently been banned by DAFF. The DoH is reviewing the package insert for pharmaceutical applications of Lindane. Further efforts to avoid and minimize the use of pesticides include the integrated pest management initiative handbook which is produced and distributed by Croplife-SA. A large portion of the fruit produced in South Africa is done in terms of the GlobalGAP programme. The scope of GlobalGAP currently includes Integrated Pest Control.

A National Action Plan framework for the Rotterdam Convention has been drawn up and needs to be updated and finalised. Community-focused implementation plans are administered by the government through its DoH. These cover the raising of awareness of communities on the sound use, storage and disposal of household chemicals.

The South African process has also included the establishment of a chemical sector cleaner production programme. The NCPC-SA, hosted by the dti, promotes the implementation of the sustainable use and production of chemicals in South Africa. Participating companies have introduced measures to decrease chemicals used in production processes, as well as the retrieval of chemicals from waste streams. Small, medium and micro enterprises sectors which have been assisted by the NCPC include textiles manufacturing, metal finishing and fish-processing.

Heavy metals

Action on avoiding and minimizing risk from heavy metals has included the banning of lead in paint via the promulgation of regulations, and the phase-out of the use of leaded fuel in January 2006.. Phasing out of healthcare equipment and products containing mercury in Kwazulu-Natal constitutes progress on the UNEP mercury initiative. Furthermore, a conference on promotion of alternatives to mercury for the health care sector was organized by NGOs in association with United Nations agency. The mercury issue is being carried forward by roleplayers including the National Energy Response Team (NERT) working with the lighting industry on mercury containing light bulbs; the South African Mercury Assessment (SAMA) Programme which is a web-based collaboration between government, industry and non-governmental organisations to provide information on current policies and legislation, research protocols and programmes, and practical guidance related to mercury; was initiated to carry the mercury issue forward. The CSIR has a large team of researchers from various disciplines furthering the understanding of the dynamics of mercury in the South African environment.

Asbestos

The phase out of asbestos and asbestos-containing products (excluding 'identified products' for which safe and effective alternatives have not been found) has been implemented in South Africa through the promulgation of regulations

Work in Progress

- A National Chemical Safety Programme is being developed through a multi-stakeholder participatory approach and is anticipated to be completed in 2010.
- *Development of an Integrated Permitting System for export/imports under MEAs:*The Government of South Africa is developing an integrated permitting import and export procedure, which will allow for International Trade Administration Commission (ITAC) to become the point of contact for all importers and exporters, and relevant regulatory departments to be consulted as required in the process. Identification of a system for implementation of the Harmonised System (HS) codes is underway.
- The import-export strategy covering all chemicals controlled by conventions is being developed to tackle the issue of illegal international trafficking of chemicals in terms of the Basel Convention. To this end, the NCCM is in the process of developing mechanisms for analyzing annual reports on tonnages of waste transported
- The National Implementation Plans (NIP) for the Stockholm Convention is in the process of being drafted.
- Alignment of the hazardous waste classification and transport legislation are anticipated for 2010. The executive director of Africa Institute has been appointed and, strategic and business plans adopted for implementation. The governance, management and institutional arrangement of the institute have been adopted by the council of institute for implementation.

3.3.3 Monitoring and evaluation

There are extensive and comprehensive ways in which chemicals are currently being monitored and evaluated in South Africa. Some indicators listed in the guideline by the United Nations which could be applied in South Africa include fertilizer use efficiency, use of agricultural pesticides, area under organic farming, generation of waste and generation of hazardous waste, for which draft regulations are in place. A monitoring system for waste, also relevant to the chemicals sector, is being implemented in South Africa through the South African Waste Information System (SAWIS).

Air quality

SAAQIS which falls under the auspices of the DEA and the South African Weather Service aims at providing stakeholders with access to accurate and up-to-date information on national air and atmospheric quality to facilitate informed decision-making for South African ambient air quality objectives.

Water quality

The National Water Act makes provision for the establishment of the national monitoring systems that monitor, record, assess and disseminate information on water resources. DWA is implementing a series of national water quality monitoring programmes including a National Toxicity Monitoring Programme which reports on the status and trends of the nature and extent of potentially toxic

substances in South African water resources and the potential for toxic effects to selected organisms. Water quality monitoring is also carried out by bulk water suppliers.

Occupational and human health

Public health monitoring in relation to chemicals falls under the DoH and the DoL in relation to occupational health and safety. Approved inspection authorities facilitate biological monitoring periodic collection and analysis by collection of body fluid, tissues, excreta or exhaled air in order to detect and quantify the exposure to or absorption of any substance or organism by persons. Trained health and safety officials further monitor, investigate and report on health and safety matters and also accompany inspectors during inspections. The environmental health departments of the local municipalities also carry responsibility for routine monitoring.

Monitoring in relation to health (including POPs and pesticides) as well as ecotoxicology is undertaken at various research institutes and universities in South Africa. The research is relevant to both the Rotterdam and Stockholm Conventions.

Work and Health in Southern Africa (WAHSA) is a collaborative research initiative covering community capacity-building and surveillance on pesticide toxicity. The unit also deals with risk communication on hazardous chemicals.

The environmental protection unit called the “Green Scorpions” has been mandated to act against any contraventions related to pollution as a result of chemicals. They work in collaboration with national, provincial and local authorities.

Monitoring by industry

South Africa has a comprehensive list of South African National Standards (SANS) applicable to the management of chemicals, which are incorporated in a range of national legislation. These cover the storage, transport, classification and identification of hazardous and dangerous substances, and management of chemicals waste. Furthermore, the chemicals and allied industries through CAIA and performance reporting on Responsible Care have a comprehensive set of monitoring procedures and indicators. Responsible Care performance is independently verified, which includes implementation of Product Stewardship Management Practice. ICCA is committed to reporting on approximately 15-20 more product stewardship performance metrics in the future. These will be implemented in South Africa via CAIA over the next five years, where possible. Other industry-driven monitoring and evaluation programmes include ISO (see Section 3.5.6) and GlobalGAP (see Section 3.3.3).

Non-ferrous metals

Monitoring and evaluation of the extent of mercury release into the environment is being undertaken via research conducted by roleplayers including the CSIR and the SAMA programme. The work, relevant to the United Nations Environmental Programme’s Global Mercury Programme, covers determination of volumes and end purpose of mercury entering the country, via both products and in its pure form, and what happens to this mercury. The interactions between mercury in runoff from landfills, leachates and groundwater pollution are further being explored. Analytical techniques to measure mercury in leachates are being set up within the CSIR. A strategy for managing contaminated sites is being developed. One of the projects focuses on the development of mercury-in-ecosystems (MERIECO) model which aims to integrate the mercury data collected in the national water survey with the results of atmospheric monitoring and modeling and the waste management project. Monitoring of zinc, copper and lead is also occurring through institutions including the CSIR.

Use of pesticides

A suite of project standards/guidelines has been developed for assessing the use of pesticides by the Working for Water project for the control of alien invasive plant species. DAFF further uses the principles, criteria, indicators and standards (PCI&S) system to monitor and evaluate compliance by private plantations in the application of pesticides.

Control of non-compliance

The South African law makes provision for prosecution for non-compliance with laws pertaining to sustainability, and is policed through mechanisms via organisations including DEA, DWA, DoH and DoL.

3.4 Means of implementation

3.4.1 Capacity-building, education, training and awareness-raising

Most of the multilateral environmental agreements recognize the importance of educating the public and increasing public awareness of the conventions. For example, the PIC Procedure of the Rotterdam Convention that emphasizes the sharing of responsibility of chemicals management by Parties through, amongst others, sharing of information on chemicals.

Local and national initiatives

Local and national initiatives for capacity-building and awareness raising on sound management of chemicals in South Africa include the following:

- The Sector Skills Plan for the chemicals sector, for implementation by the Chemical Industry Education and Training Authority (CHIETA). This programme has identified priority scarce skills for development, such as Artisans; Research and Development (R&D) scientists in specific areas; Metrology and Operational supervision
- Capacity building on the GHS needs to include human expertise for classification and understanding of criteria, test methods, labelling and legislation. Success with implementation requires training, particularly in the work place, in transport and the delivery of emergency services, while consumer awareness training also needs to be effective. Actions include promotion of the accreditation of testing facilities for all hazard criteria through the SANAS accreditation system; and establishment of infrastructure for effective emergency response to chemical poisoning incidents and chronic impacts of chemicals.
- Training on use of pesticides is carried out through initiatives of AVCASA and Croplife. Training programmes are targeted at both upcoming farmers and established farming operations.
- The government programmes on Safety Towards Our People is aimed at educating and improving awareness among the people regarding managing or handling of household chemicals including their use, storage, disposal of obsolete chemicals and disposal of empty containers. The Paraffin Safety Programme is also directed at addressing the problem of poisonings, mainly of children, which are caused by paraffin.

International initiatives

The Nepad secretariat's work in collaboration with UNEP/GEF on a capacity-building programme for locally appropriate sub-regional environmental action plans for implementation of environmental international instruments focused in the JPOI. Priorities include facilitation of national policy frameworks and institutional mechanisms for implementation of the Stockholm, Rotterdam and

Basel MEAs. Maximization of synergies between environmental and other global and regional conventions is also facilitated.

Exchange of information amongst decision-makers on matters including transboundary river basins, pollution and environmental trends is promoted, and capacity is built in preparation for negotiations and technical skills at the major global conventions. A further priority is the promotion of public awareness of global conventions and related sustainable development instruments. OHS training forms an integral part of the safety, health and environment (SHE) unit standards developed on an ongoing basis by the Chemical Industries' Education and Training Authority (CHIETA). The training issues raised in the implementation strategy should be referred to the SHE Unit Standard Working Group. CAIA has adopted a number of capacity-building initiatives, including the development and dissemination of an internal industry compliance manual for chemical conventions, training on implementation of GHS and ongoing training workshops on the implementation of Responsible Care.

3.4.2 Mobilisation of finance

During the compiling of the National Chemicals Profile for South Africa, lack of funding resources was identified as a key limitation to the effective and coherent management chemicals by the responsible government departments. Therefore, means such as the fiscus and the MTEF provide the main means for funding of the ministries and government departments dealing with chemicals management. The NCPC-SA has further been successful in securing funding through the dti's Sector Wide Enterprise, Employment and Equity Programme to undertake activities within the chemical sector in support of the sector objectives and goals. Funding for initiatives such as Working for Water for the control of alien plant species, including through use of pesticides, is provided by the national government.

Steps have been taken by the South African financial sector to include sustainable development principles in banking policies and practices, through involvement in initiatives such as the Financial Services Charter and the dti's Codes of Good Practice, in order to assist in leveraging funding. Global and intergovernmental specialized agencies and programmes could potentially become a source of funding including:

- Stockholm Convention on Persistent Organic Pollutants (POPs) which has dedicated financial instruments linked to the GEF to assist with implementation. Once the NIP has been submitted, this mechanism could generate funds for implementation of the Stockholm Convention in South Africa
- Quick Start programme for developing countries under the umbrella of SAICM. South Africa has provided funding into this mechanism for the assistance of other African nations.

3.4.3 Technology development, transfer and dissemination

Technology and infrastructure pose a critical challenge towards the achievement of sound management of chemicals in developing nations. Although South Africa is not immune to these challenges, some strides have been made to establish infrastructure to assist with the sound management of chemicals in the country.

Government support of technological development

The major push for technology development, transfer and dissemination are taking place through the DST which has a 10-year innovation plan on science and technology for the period 2008 to 2018.

The purpose of the 10 Year Innovation Plan is to transform South Africa to become a preferred destination for science and technology investment. To achieve this goal, South Africa's international partnerships need to be strengthened, both to enhance knowledge and create a conducive environment for the transfer of technology. The DST plan also aims to strengthen the science and technology base throughout Africa. This requires strategic cooperation and collaboration through a range of international and regional forums and established scientific protocols, as well as targeted initiatives with other developing countries. It is aimed to leverage foreign direct investment through South Africa's extensive bilateral and global research networks and the existing international competencies; and strengthening South Africa's infrastructure development through appropriate international connections, and to become a leading player in the implementation of the African Research Area under the auspices of the African Ministers Committee on Science and Technology.

Parastatal and private sector initiatives

South Africa is at the cutting edge of technological advances relating to aspects of the chemicals industry. A key example is the gas-to-liquids joint venture involving South African companies PetroSA and Sasol. The breakthrough technology allows for the conversion of gas to the clearest wax to date, without the need for secondary clean-up, making it possible for various automotive fuels to be produced more easily. Another example of technology transfer in South Africa is integrated pest control which is promoted through organisations such as GlobalGAP and Crop-Life.

Potential technology sources

The strategic capacity-building objectives of SAICM incorporate the need for strengthening of partnerships and mechanisms for appropriate and clean technology, maximizing synergies with the Bali Strategic Plan for Technology Support and Capacity Building. SAICM also prioritizes the promotion of scientific research in developing countries, as well as the sharing with developing countries chemical management models and technologies already established by other countries and international organisations.

The United Nations Development Programme provides technical Assistance, Training and Demonstration Programmes on ozone and climate friendly technologies and alternative substances to ODS through practical training and in-field demonstrations designed in alternative substances and processes. Technology transfer on best available technologies allows governments and enterprises to adopt alternative production processes and ozone/climate friendly technologies.

3.4.4 Participation of major groups

Addressing historic imbalances

Historical inequities in South Africa is being addressed and BBBEE is a means to spread wealth among the previously disadvantaged groups. A key example was the massive public response to equity transfer offerings by Sasol (a major petrochemicals company) in 2008, the largest of its kind ever in South Africa. The deal was worth approximately R24-billion, with about 300 000 previously disadvantaged South Africans becoming shareholders of the company.

The Expanded Public Works Programme (EPWP) plays a major role in poverty alleviation, such as through employment of community health workers and through community-based waste management initiatives. The majority of women and youth are employed through the EPWP

projects. The EPWP potentially represents an opportunity for the implementation of community-based awareness regarding chemicals required in terms of the MEAs.

Education

Good progress has been made in South Africa in the elimination of gender inequalities with respect to access to education, with the ratio of girls enrolled at secondary and tertiary level being greater than that of boys. There are programmes aimed at targeting skills development for women in the adult basic education and training sector, higher education sectors, and through learnerships and specific programmes for women in science and technology.

Environmental health

Resulting from the historical apartheid policies that influenced city design, vulnerable groups and the poor often face a legacy of being located near to industrial areas which can pose risks to health. Populations vulnerable to environmental health issues also include groups such as rural women. The policy since the advent of democracy has been dramatically revised by government and incorporates environmental health rights enshrined in the Constitution.

International and regional processes

Country-driven environmental action plans with full participation of stakeholders, in particular the representatives of civil society, including non-governmental organisations, women and youth are promoted through African Ministerial Conference on Environment (AMCEN). One of the spin-offs is implementation of appropriate mechanisms to assist stakeholders to access relevant hazard communication information.

3.4.5 Cooperative frameworks and partnerships

National initiatives

The Chemissa website, which is a collaborative project of the dti, chemical industry roleplayers and trade unions which provides a business information resource for the chemical and allied industry in the SADC region. There are links to health, safety and environmental sites around the world. Implementation of the International Standards Organisation in South Africa is through partnerships including the Department of International Relations and Cooperation, the dti and the SABS. The SADCSTAN is open to national standards bodies of SADC member states, and it promotes regional cooperation for harmonised standards and technical regulations and has been key to implementation of the GHS. Partnerships with government have been undertaking the removal of stockpiles of toxic agricultural pesticides in terms of the ASP.

International initiatives

The BCRC is housed in DEA and will achieve its objectives through cooperation with the United Nations and its bodies, in particular UNEP and the Specialized Agencies, and with other relevant bodies including intergovernmental and non-governmental organizations as well as industry. The Responsible Care® Global Charter and the Global Product Strategy of which the Chemical and Allied Industries Association (CAIA) is the custodian in South Africa. CAIA prioritizes continual improvement in *inter alia* product safety, harmonization for the safe management of chemicals and public health in relation to their operations.

The Global Product Strategy is designed to advance the industry's product stewardship performance, measure that performance, and improve communication and transparency about chemical hazards, risks, and appropriate safe handling along the value chain. It aims to develop tools to address public

concerns regarding chemicals in commerce. It is also designed to support national, regional, and international chemicals management policy expectations.

The public and occupational health initiative WAHSA is a collaborative health research programme participated in by various South African organization. The various projects on pesticides and the informal sector are run by three resource complexes consisting of twinned institutions in different Southern African countries.

3.5 Lessons learned and best practices

Findings on savings realized through cleaner production are being documented in this process, and are to be used as showcase examples to the rest of industry on the benefits of cleaner production. It is further intended to develop cleaner production guidelines based on the information gathered, to be made available to the rest of the industry sector. Aspects assessed cover first and foremost, waste reduction at source, followed by internal recycling and final external recycling.

The NCPC-SA recently embarked on a cleaner production project with an East London based plastic recycler Collectall. This Company was identified and selected through a collaborative effort between the NCPC-SA and Plastics Federation of South Africa and forms part of the NCPC-SA's chemical sector cleaner production programme.

Another initiative is the concerted effort amongst sectors using pesticides to minimize their use such as through integrated pest management including via Global Gap. The Working for Water Programme, an initiative of the DWA which manages and removes invasive alien plant infestations to improve stream flow, is heavily reliant on the use of pesticides and is one of the main users of these products in South Africa. However, there is intensive effort within the Programme to ensure adherence to international best practices relating to the use of pesticides and Policy and set of Guidelines has been developed to this end.

Highly innovative recycling initiatives in the plastics industry include Timber Plastics, which recycles plastic waste such as soft drink bottles, moulding them into structural forms such as poles, planks and beams.

3.6 Challenges and opportunities

Coordinated administration

Although there is relatively comprehensive regulatory framework in place for chemicals management in South Africa, fragmented and overlapping jurisdiction across several ministries presents challenges to seamless implementation and ensuring chemical safety. The situation is further complicated by the wide range of activities in the chemicals sector. More effective communication between departments including DoH, DAFF and DEA in relation to the implementation of MEAs is now being achieved through the NCCM.

Similarly, there are numerous industry associations' representative bodies within the chemicals sector, each with its own constituency. The diversity of the sector makes it difficult for the roleplayers to speak with a common voice and some in the sector feel that industry representation is focused on the interests of major operators to the exclusion and detriment of regional, smaller, more diverse and less influential interests.

Implementation of the MEAs

Although the MEAs provide mechanisms for accessing resources for improving management of chemicals, it is not always simple for developing countries to access the support provided through these instruments. Opportunities for enhanced implementation of the MEAs include review of the regulatory framework and the completion of implementation plans. Further opportunities are presented by a comprehensive and centralized information and administrative systems; transparent decision-making through gazetting; strengthening of capacity within all relevant departments, including port authorities; building of awareness of compliance requirements in the chemicals community, as well as finalization of the integrated import/export permitting system.

Expertise in policy, legal, technical and scientific aspects

Shortages of skills within government in such areas as science, environmental economics and environmental law, as well as expertise for negotiating environmental agreements can hamper progress towards implementation of the MEAs. Furthermore, monitoring and evaluation of pesticides appear to be a challenge in South Africa due to insufficient appropriately capacitated laboratories to undertake analysis. However, there are pockets of excellence with strong technical and research expertise within government and amongst research institutions, the commercial sector and non-governmental sectors. Efficient partnerships need to be fostered to supplement, support and inform the work of government departments in relation to sound chemical management.

Technology transfer, research and development

A relatively weak focus on research and development in South Africa is hampering innovation and product differentiation in the chemicals sector. Many existing downstream companies such as plastic conversion, formulation and synthesis rely upon old technology and practices, with little focus upon employing global best practice in terms of technology and processes. There is thus a clear need to push forward with technology research and development, transfer and dissemination.

Access to information and effective reporting

A centralized chemical information system shared amongst government, researchers, non-governmental organisations and other roleplayers should be developed to focus research effort, to make research findings available and exchange research information. This will help to foster coordinated research effort focussed on filling key information gaps, to include monitoring and evaluation.

Access to emergency information due to poisonings is problematic in South Africa and is a major area in which institutional capacity needs to be built. The three national poisons information centres are operating on a severely under-resourced basis despite their importance in providing support to national and private healthcare services in South Africa and SADC.

Economic challenges

There are several economic challenges facing the world chemical sector, which also impacts on South Africa. These include slower growth in matured markets, linked with high-growth in developing markets, driving up input prices globally; plastics and fibres molecular development are past their pioneering days and has shifted to biochemicals, nano-technological and genetic techniques; R&D expenditure such as for pharmaceuticals and pest control is increasing at a rate that is not rewarded by new chemical successes in the marketplace; the sector is evolving from its heavy dependence on tonnage petrochemicals and inorganics to new business, based more on performance

and service; and environmental and toxicological concerns are slowing down new product introductions (10% of R & D and 15% of capital spending in this area).

Further, while South Africa is among the lowest-cost producers of products such as ethylene and propylene enabled through availability of low-grade coal and process technology, there could thus be tradeoffs for sustainability. These include risks to human health, ecological costs and economic costs such as the pollution of scarce water resources when the full life cycle of products is considered.

Effective education and awareness-raising

The broad application of the ‘polluter pays principle’ still presents a further challenge to the sound management of chemicals in South Africa. Public awareness of global conventions and related sustainable development instruments, in particular as this relates to hazardous chemicals is a challenge, compounded by relatively low literacy levels in the country. An appropriate strategy needs to be put in place to ensure that the public are aware of risks and responsibilities of potential effects on human and environmental health from chemicals or pesticides. This is in line with the Stockholm Convention for which education and awareness-raising on the risks posed by POPs are key components. This also applies to specific sectors such as agriculture where it is crucial that workers administering pesticides should have a sound knowledge of safety precautions and safe handling techniques. Training initiatives could be carried out in tandem with establishment of collection points such as through retailers for hazardous chemicals such as pesticides and CFLs.

Environmental health and safety

Groups particularly vulnerable to health risks associated with chemical exposure include children and pregnant women and it can be argued that there is insufficient understanding of health impacts as well as means of protection of these and other vulnerable groups.

Work with chemicals and application of pesticides requires appropriate skills levels to ensure safe handling and use. Pesticides need to further be applied optimally since they are costly for use in such programmes as Working for Water. Lack of funding is a major constraint across the sector making use of pesticides. Community initiatives such as tendering for work around the control of weeds and alien invasive plants, or sale of chemicals by individuals for the purpose needs very careful control. “Street pesticides” sold in informal markets are a significant problem; they get decanted into common containers, unlabelled and for unregistered uses. Amongst the many issues besetting the management of chemicals is the process of banning and de-registration of banned chemicals (e.g. certain pesticides) which can be slow and inadequate

A further area of concern is application of the ‘precautionary principle’ including as this applies to the potentially harmful chemicals and new chemicals which may affect vulnerable groups such as pregnant women and children. Cumulative and low dose effects of chemicals is a further area of concern requiring improved understanding.

Disposal of hazardous chemicals

South Africa faces a challenge in terms of having sufficient facilities available for disposal of hazardous waste, although there has been a major step forward in policy through the enactment of the NEM:WA which puts in place the requirement for waste prevention at source. The ASP has implemented technical cleanup of the majority of stockpiles (79.6 tons) of pesticides in Limpopo Province. A significant challenge is now faced in the collection of the stockpiles from the other eight provinces in South Africa (estimated at 500-700tons). Through partnerships with appropriately trained private sector organisations, this task can be successfully completed. Arsenic-containing dips

are a particular problem, and the most environmentally sustainable solution for their disposal needs identification and implementation. One option is to dispose of the poisons in stainless steel drums which are then embedded in concrete blocks. A more environmentally sound option would be to process the dip to recover the arsenic, but this is currently uneconomic due to the high sulphur content of the dip.

Garden pesticides and their containers are problematic as there are no facilities present to make it easy for the public to dispose of these substances in a responsible manner. An opportunity exists for large-scale retailers, plant nurseries and hardware businesses to initiate collection points for the public for disposal in line with the NEM:WA. This could be regulated by the relevant authorities.

Contaminated land

The problem of contaminated land presents a challenge to public and environmental health. Remediation of the effects of waste and pollution is the last resort in implementing the waste hierarchy. The NEM:WA provides for the declaration of contaminated land and its remediation. If land is found to be contaminated, the Minister can order urgent remediation measures, stipulate a time-frame within which remediation must be accomplished, or only require that monitoring and risk management be undertaken. A risk-based approach to implementation of the provisions that is sufficiently flexible to accommodate a wide range of scenarios is required. Remediation requirements must be guided by the intended land use after remediation.

3.7 Conclusion

Commitment has been shown by South Africa towards the implementation of JPOI targets 23 and 68 including through ratification of the key MEAs, appointment of Focal Points and development of the national chemicals profile and the implementation of the GHS. A comprehensive legal framework for sound management of chemicals is in place. Through initiatives such as Responsible Care, the chemicals industry has progressed towards achieving their 2020 targets.

Key areas requiring enhancement in South Africa are enforcement and interdepartmental harmonization of the numerous pieces of legislation which pertain to sound chemicals management and the MEAs. Further, an extensive public education system needs to be developed to build knowledge on the imperatives for sound chemicals management in line with requirements of the new NEM:WA. Resources need to be directed to ensuring coordinated and centralized information on research priorities, and improved monitoring, evaluation and reporting and initiatives towards achievement of the JPOI targets for chemicals. Significant opportunities exist for expansion of cleaner production, such as through integrated pest management, to ensure environmentally sound goods and services to niche and mainstream local and international markets.

4 Mining

4.1 Thematic context

Historically, South Africa has been a leading global supplier of minerals and mineral products, and it retains an important role in mining and minerals demonstrated by 55 minerals being produced from some 1113 mines in 2005. Mined product is sourced from open-cast, underground, alluvial, offshore, dune as well as artisanal mining. An estimated 7% direct contribution was made to GDP by mining in 2006 and R140 billion to South African exports in the same year, although when multipliers are accounted for the GDP contribution is closer to 40%. South Africa has the world's largest resources

of platinum-group metals, manganese, chromium, gold and alumino-silicates. Furthermore, it accounts for over 40% of global production of the following: ferrochromium, platinum-group metals and vanadium. It is the leading producer of chrome ore, vermiculite and alumina-silicates, and is among the top three producers of gold, manganese ore, titanium minerals and fluorspar. Gold was previously the keystone to the South African economy, but has diminished in importance with increasing difficulty in mining the deep coal seams.

Off-shore mining in South Africa is also relatively productive. The near shore and shelf environments of the west coast hold rich reserves of minerals, particularly diamonds and in South Africa there is an increasing emphasis on offshore diamond mining operations. At present marine diamonds comprise about 10% of South Africa's total diamond production. The west coast also supports oil mining, although South Africa's exploration for oil is focussed on the south east coast. The Moss gas field is currently in production. For background on sustainable development as this relates to mining in South Africa, please refer to Section 2.

4.2 JPOI targets

The Johannesburg Plan of Implementation (JPOI) set three targets (46a-c) for the mining sector. These include the optimisation of social and economic benefits from mining, the effective long-term management of environmental, social and health impacts (including dealing with the legacy of old mining sites), the extension of participation in mining, the strengthening of governance and institutions, effective beneficiation and ongoing research and technological innovation.

4.3 Progress

4.3.1 Participation in international processes

South Africa is participating in the following processes which are relevant to the achievement of the abovementioned JPOI mining targets:

- The Intergovernmental Forum for Mining, Minerals, Metals and Sustainable Development (IGFMMMSD) which is a global policy forum seeking to promote the contribution of the sector to sustainable development, thereby enhancing capacity for overall governance. This is a partnership initiative launched at the WSSD in 2002 and meets annually to share experiences and information and to make recommendations for consideration by governments and intergovernmental bodies on mining, minerals and sustainable development issues.
- Several companies in the South African extractive sector are members of the International Council for Mining and Metals (ICMM) which is a source of guidance on industry's best practice. The ICMM adopted the Sustainable Development Framework on Mining which incorporates principles for ethical business practice, governance, sustainable development in decision-making, human rights, risk management, health and safety, environmental performance, conservation and biodiversity management, waste recycling and disposal, social and economic development, stakeholder engagement and reporting.
- The Southern African Development Community (SADC) Mining Protocol was ratified in 2000, and further work around the Protocol has produced a framework for the Harmonisation of Mining Policies, Standards, Legislative and Regulatory Framework in Southern Africa. The framework focuses on policy, regulations and administration; geological and mining information

systems; human resources and institutional capacity; safety health and environment; investment promotion; value addition, innovation and research and development; artisanal and small-scale mining, and; social issues as well as gender.

- South Africa, along with Namibia and Angola is a member of the Benguela Current Commission (BCC) which aimed at assisting South Africa, Namibia and Angola to implement an ecosystem approach to managing the Benguela marine system with particular focus to the offshore diamond mining operations.
- In 2008 South Africa participated in the technical taskforce convened by United Nations Economic Commission for Africa (ECA) to draft the new African Mining Vision. The African Mining Vision is informed by the outcomes of several initiatives and efforts made up of sun-regional, continental and global levels to formulate policy and regulatory frameworks to maximize the development outcomes of mineral resources exploitation.

Some of South Africa's bigger mining groups have begun to adopt International Performance standards and benchmarks for their own policy and practice in line with international good practice.

4.3.2 Developments in national policy and legislative framework

Section 1 of the report provides an overview of legislation relevant to all aspects of sustainable development in South Africa. An overview of the policy and legislation as this relates to the sustainability and mining in South Africa is provided in this section.

Policy and legislation for sustainability in mining

A key advancement towards a policy shift in the direction of sustainable development was made following the WSSD. An interrelated shift in South African Mineral law over the last decade has been the recognition of the State as the custodian of the natural resource of the country has brought South Africa in line with other major mineral producing countries in the world and had resulted in the freeing up of unused and privately owned mineral rights which were effectively sterilized.

In 1995, a review of the mining and minerals policy was initiated and was a consultative process, involving representatives from government, business, small-mining sector, labour groups, communities and environmental groups. This review of the legislation culminated in the promulgation of the Minerals and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA). Promulgated in 2002, the MPRDA provides a sound base for South Africa's response to the JPOI targets set for mining by addressing transformation, workers and community rights, economic sustainability of the industry and environmental sustainability. The MPRDA aims to make provision for equitable access to and sustainable development of the nations mineral and petroleum resources, hence ensuring that the exploitation of mineral wealth of South Africa takes into consideration the economics, environmental issues as well as the social matters into consideration.

In response to and accordance with the MPRDA, Regulations have been expanded on and developed into the following policies and guidelines. The *Mining Charter* which is a Broad-Based Socio-Economic Empowerment Charter provides a framework for progressing the empowerment of historically disadvantaged South Africans in the Mining and Minerals Industry in accordance with Section 100 (2)(a) of the MPRDA. The Scorecard for the Broad-Based Socio-Economic Empowerment Charter for the South African Mining Industry was designed to facilitate the

application of the Charter. In addition to the MPRDA, the Mine Health and Safety Act 29 of 1996 promotes rigid health and safety standards in the mining sector.

The MPRDA aims to make provision for equitable access to and sustainable development of the nations mineral and petroleum resources. Transformation of the minerals and mining industry and promotion of equitable access to South Africa's mineral resources is a key focus of the sector and is achieved through socio-economic development and commitment to eradicating all forms of discriminatory practices in the mineral and petroleum industries. Worker and community rights and well-being have been strongly promoted, including through regulations for housing and living conditions. This is closely tied with the need to promote local and rural development and the social upliftment of communities. Social and labour plans have to be submitted as part of the mining rights application, the objectives of which are to promote employment and advance the social and economic welfare of all South Africans.

Economic sustainability of the industry has been promoted through identification of the need for investment in exploration, mining and minerals beneficiation and there is reaffirmation of the State's commitment to guaranteeing security of tenure in respect to prospecting and mining operations. Environmental sustainability of the mining industry has been promoted as this relates to legislation including the overarching. Further, it is confirmed that it is the State's obligation to protect the environment to ensure ecologically sustainable development of resources and to promote social and economic development

The MPRDA sets out the time periods and processes relevant to each category of used and unused old order rights for the conversion of such rights to new order rights. The Act was amended in 2007 with the Minerals and Petroleum resources Amendment Bill (B10, 2007) primarily to harmonise the environmental impact assessment requirements of the National Environmental Management Act, 1998 and to amend the transition arrangements to further afford statutory protection to certain existing old order rights.

Beneficiation Policies

The Department of Minerals Resources (DMR) published "*A Beneficiation Strategy for South Africa's Minerals Industry*" which presents a framework within which South Africa can implement an orderly development of the countries mineral value chains, to support national programmes such as the National Industrial Policy Framework (NPIF).

There are a number of other legislation that have relevance to beneficiation. The *Diamonds Act 56 of 1986* was amended in the form of the *Diamonds Amendment Act 29 of 2005 and the Diamonds Second Amendment Act. 30 of 2005*. The objective of the Amendment are to increase the access to rough diamonds for jewellery making in South Africa; to maintain a supply of rough diamonds to promote the beneficiation industry in South Africa, thus creating jobs; and to increase participation through the diamond value chain. The *Precious Metals Act 37 of 2005* was promulgated to ensure that the precious metal resources of South Africa are exploited and developed in the best interests of the people of the country, to promote equitable access to and local beneficiation of the precious metals, to promote the sound development of precious metals enterprises and to advance the objectives of BBSEE.

South Africa has a natural advantage in mineral deposits such as gold, PGM, manganese, chromium, vanadium, copper, antimony, phosphate rock, uranium, fluor spar and titanium containing heavy minerals; yet most of these are exported in an un-beneficiated form. The unique process developed

by Sasol, based upon the “Fischer Tropsch” technology, results in abundant quantities of propylene. This is converted to primary polypropylene, destined primarily for exports in un-beneficiated form. There are substantial beneficiation opportunities to transform the raw material using local factors (labour and capital) to a more finished product that has a higher value than the sale of the raw material. There are also further potential to recover chemicals from waste products such as copper and aluminium scrap.

Health and Safety Policies

Prior to 1996, health and safety were regulated under the Minerals Act 50 of 1991. In 1996, the *Mine Health and Safety Act 29 of 1996* replaced this in order to promote more rigid health and safety standards in the mining sector. The *Mine Health and Safety Amendment Act* was assented to in April 2009 and came into operation on 30 May 2009. Key Amendment to the Act include the need for training records to be kept; employer investigations to be initiated within 10 days of the incident and a report submitted to the inspectorate within 30 days; permanent committees of the Mining Health and Safety Committees (MHSC); Health and Safety management systems to be in place; administrative fines increased from R200 000-R1million; and offences-applicable to the Employer.

Mine Environmental Management Policies

Environmental Management issues in the mining sector of South Africa are regulated by the Department of Minerals and Energy through the legislation called Minerals and Petroleum Resources Act (MPRDA) of 2002. This piece of legislation was promulgated in 2002, and effective for implementation in 2004. The MPRDA and its regulations marked a shift in the consciousness about the environmental impact management for mining activities as well ensuring that there is a holistic approach towards mine environmental management adopting the cradle-to-grave approach in prospecting and mining activities whilst ensuring a full internalisation of economic, social and environmental costs in order to achieve sustainable development of South Africa’s mineral resources.

Through the enforcement of the environmental requirements in terms of the MPRDA, there has been a significant progress in terms of ensuring best environmental best practices in the mining industry, and also in terms of making sure that the mining industry moves towards achieving environmental sustainability. The mining companies are obliged in terms of the MPRDA to comply with the following:

- Implement the principles of sustainable development as set out in sections 2 of the National Environmental Management Act, (NEMA) 1998, as well as other generally accepted principles of sustainable development by integrating social, economic and environmental factors into planning, implementation, closure and post-closure management of prospecting and mining operations.
- Implement the integrated environmental management and responsibility to remedy as laid down in chapter 5 of NEMA.

- Conduct an environmental impact assessment and submit an environmental management programme, in order for the applicant to identify, mitigate and manage the environmental impacts emanating from prospecting or mining activities.
- Conduct consultation with interested and affected parties as well as consultation with government departments and organs of State at national, provincial and local authority level.
- Make sufficient financial provision for the rehabilitation, remediation for environmental damage and management of negative environmental impacts. The MPRDA regulations prescribe the methods for financial provision and the detailed itemisation of all costs.
- Planning for Mine Closure to ensure environment, social and economic sustainability beyond the life of the mine. Moreover, conduct environmental risk assessment and adopt closure planning approach as an activity that continues throughout the life cycle of a mine, starting with conceptual closure plans prior to production, periodic updates throughout the life of the mine, and a final decommissioning plan.

Minerals and Petroleum Resources Development Act Regulations were promulgated in order to prescribe and provide guidance in terms of the fulfilling the above requirements of the Act. Moreover, the Department of Minerals and Energy has also made strides in terms of developing the best environmental practices guidelines which strengthens the enforcement of the legislation, with a view to ensure environmental stewardship in the mining sector. This includes, amongst others, the guideline document for the evaluation of the quantum of closure-related financial provision provided by a mine for environmental rehabilitation and closure requirements of mining operations the Department of Minerals Energy has published a guide on

Over and above the MPRDA, there are other overarching legislations that governs the mining sector in South Africa, and this include the following;

The *National Environmental Management Act (NEMA 107 of 1998)* and Environmental Impact Assessment (EIA) Regulations which set out lists of identified activities which require basic assessment procedures and scoping and full EIA procedures respectively are pertinent to many of the ancillary activities associated with mining.

The *National Environmental Management: Air Quality Act (NEM: AQA, Act 39 of 2004)* came into effect in September 2005. All water uses on mines must be licensed under the *National Water Act (NWA, Act 36 of 1998)* which serves to ensure that the Nation's water resources are protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner. The NEM:WA was assented to in March 2009.

New and existing mining operations are required to consider South Africa's comprehensive range of legislation applying the social and economic sustainability of the operation including: conservation of agricultural resources; the interim protection and restitution of land rights to those dispossessed of their land; informal as well as communal land rights; the preferential procurement framework; employment equity and skills development as well as legislation applying to competition.

Guidelines

A comprehensive series of guidelines has been produced by organisations including the Chamber of Mines and Coaltech as well as the DMR. These covers key areas essential for implementation of sustainable development though mining including: South Africa's biodiversity status as well as best

practice in relation to mining; best practice guidelines for water resource protection, impact assessment on mining developments; the quantum of closure-related financial provision provided by a mine; possible financial sources for small to junior empowerment companies.

Standards

ISO 26000 is a guideline setting out Principles on Social Responsibility which most of the country's mining houses practices. According to the new work item proposal the standard should assist organisations in addressing their sustainability reporting while respecting cultural, societal, environmental and legal differences and economic development conditions, as well as providing practical guidance related to social responsibility.

Development of administrative structures

Although the DMR is the approval authority, other government departments must be consulted and these departments may enforce acts that provide for the protection of specific environments or require environmental impact assessments. Currently the DMR remains the lead authority for environmental authorisations under the MPRDA, however ancillary activities associated with mining operations are required to be licensed under from other departments. The minister of the DMR will remain the designated competent authority to implement systems related to mining, while the minister of DEA will be the appeal authority for the mining environmental management process. Water uses on mines must be licensed under the NWA for which the lead authority is the DWA.

4.3.3 Actions in response to international and local policy

Integration of sustainability into mining

The Sustainable Development in Mining (SDM) programme has given rise to initiatives vital to enhancing the sustainability of mining in South Africa. See Section 4.5 which showcases the progress which is being made in terms of this programme with respect to closure of derelict mines.

Mine health and safety

South Africa has made progress with the reduction of the number of mine fatalities, but there is some concerns with mining industry roleplayers and authorities regarding the implementation of the Mine Health and Safety Act (MHSA) Amendment Bill, as this is seen to be economically unsustainable by mining representatives, while union representatives see the Bill as a viable and necessary promotion of the safety of workers. Initiatives introduced by the South African mining industry to improve safety in the country's mines, have resulted in a more than 50% reduction in fatalities. A commitment was made to achieve the occupational health and safety targets of zero fatalities. The result of the commitment made to health and safety were a 50 % per annum reductions in the Fatality Frequency Rates (FFR) from 2006 to 2008. Furthermore, silicosis, noise induced hearing loss, tuberculosis and HIV/AIDS are high on the mining industry's agenda with regard to occupational health and sustainable development. Industry targets have been set for the elimination of silicosis and noise induced hearing loss by 2013. The mining industry has adopted a zero harm policy and wellness of the employees as a top priority. In 2008, labour, government and industry developed a Tripartite Leadership Action Plan to achieve the commitment made in 2003. In the action plan, stakeholders commit to strengthen the culture of health and safety, build capacity, promote adoption of leading practices and improve research and development in health and safety.

Transformation

Since the mid-1990s, the government has sought to promote black economic empowerment (BEE) in and through the mining industry which provides a framework for progressing the empowerment of historically disadvantaged South Africans in the Mining and Minerals Industry in accordance with Section 100 (2)(a) of the MPRDA. The process will take time, but black-owned firms are now beginning to play an important role in the mining industry, and several new mining giants have emerged. The Broad-Based Socio-Economic Empowerment Charter (BBSEE) Charter for the South African mining industry has been developed to establish a framework for effecting the introduction of historically disadvantaged South Africans into the mining Industry.

Social and Labour Plans

In order to ensure effective transformation for the mining and production industry, the Social and Labour Plan has been regarded as a prerequisite for the granting of mining or production rights. The MPRD Act requires that any company that wishes to mine to have put in place Social and Labour Plan in order to get official permission to do so. The Social and Labour Plan requires applicants for mining and production rights to develop and implement comprehensive Human Resources Development Programmes including Employment Equity Plans, Local Economic Development Programmes and processes to save jobs and manage downscaling and/or closure. The above programmes are aimed at promoting employment and advancement of the social and economic welfare of all South Africans whilst ensuring economic growth and socio-economic development. To this effect the Department deemed it appropriate to provide guidelines for the development of the Social and Labour Plan in tandem with the objectives of the MPRDA and the National Social Plan.

Framework for Sustainable Development in Mining

The DMR, in response to the WSSD commenced with the development of a strategic framework for implementing sustainable development in the South African Minerals sector, focusing on developing sustainable development policy and meeting reporting commitments. The framework aims at; developing a common vision for sustainable development through mining among stakeholders; identifying and prioritize derelict and ownerless mines for rehabilitation as well as facilitating capacity building, community projects as well as the promotion of women in mining.

Small-scale mining

Government is striving to legalise the current small scale mining operations and to assist in making them economically viable in such a way that is relevant, understandable and affordable to the small scale miners. The government has established the Small Scale Mining administrative structure and a Small-Scale Mining Board to develop and address the challenges faced by the small scale mining sector. The structure focuses in providing aid to small scale miners with legal requirements, provide guidance towards the identification of mineral deposits, compliance with environmental requirements, as well as provide assistance with mining feasibility and market assessment. Up to November 2008, 38 small scale mining companies were fully operational and it is expected that for the 2009/10 financial year an additional 17 new small scale mining projects will be added to the operational projects.

Mine Rehabilitation

The DMR in co-operation with the Council for Geoscience have further undertaken the development of a National Strategy for the management of derelict and ownerless (DO) mines. The strategy includes the following components: the development of a national database of derelict and ownerless mines which is now complete; ranking of the mines in terms of their potential impact, which is an

ongoing process; the implementation of a programme to address the impacts of the derelict and ownerless mines needs to be instituted. On a smaller scale, such as sealing localised shafts and remediation of mine residue deposits can be carried out in a short space of time and with the involvement of local contractors and communities. On a larger scale, regional impacts with a longer duration require research and development into more complex technologies. These projects will require significant funding and are likely to require long-term monitoring to ensure sustainability.

Work in Progress

- Development of a strategic framework for implementing sustainable development in the South African Minerals sector, focusing on developing sustainable development policy and meeting reporting commitments is at its final stage.
- The Broad-Based Socio-Economic Empowerment Charter (BBSEE) Charter for the South African mining industry has been developed and is being implemented to establish a framework for effecting the introduction of historically disadvantaged South Africans into the mining Industry.
- South Africa government implementing a National Strategy for the management, including rehabilitation of derelict and ownerless mines.
- Mechanisms to address acid mine drainage are being undertaken at national level.
- Regulations to balance environmental, social and economic aspects of mining have been promulgated. Alignment of these regulations including the EIAs is currently under way.

4.3.4 Monitoring and evaluation

The Chamber of Mines issued a Transformation and Sustainability report for 2007/2008 that reported on progress in the mining industry with regards to sustainability issues and indicators, such as environment, occupational health, safety, HIV/AIDs, cooperate governance, corporate social investment, waste and transformation. Many private companies now issue annual sustainability reports. These companies include Anglo American, BHP Billiton, Goldfields, Lonmin, Rio Tinto, Exxaro, Harmony and Implats. Targets set by the Mine Health and Safety Council for occupational health include occupational health limit for respirable crystalline silica, protection of hearing and prevention of silicosis.

The COM produced a sustainability report for 2006 and it addressed the progress against government and industry targets in various areas on mining sector activity. The table below summarises some of the key performance indicators:

Table 1-1: Performance of the mining industry according to selected indicators

Indicator	Objective	Progress	
		2005	2006
Women in mining	10% by 2009	3.5%	4.1%
HDSA in mining	40% by 2009		28%
Adult education and training	6869 per annum	1530	3361
Learnerships	800 per annum	1078	1137
Energy efficiency	15% reduction 2004-2014	Not available	Not available
Dust samples > limit (%)	<5% by 2008	6.4%	6%
HIV+ employees on wellness	100% by 2011	29%	32%

programme						
Fatality reduction since 2003	frequency	rate	(%)	20% reduction per annum	13%	12%

A CSIR study of the ecological status of rivers and wetlands in the Waterberg aims to minimize the potentially adverse consequences of new power stations and mining in the area. This will be the first study of its kind conducted prior to the establishment of large infrastructural developments such as the Medupi power plant, which is being built close to Lephalala in the fish and invertebrates.

A series of bio-indicators has been identified and baseline studies conducted which can be used to monitor pollution from mining including phytoplankton, benthic algae, macro-invertebrates and fish radioisotope studies can be done to determine accumulation of heavy metals in fish and invertebrates.

4.4 Means of implementation

4.4.1 Capacity-building, education, training and awareness-raising

There has been an increase from 3.7% to 4.5% of payroll spent on training each year, which exceeds the international benchmark of 3% of payroll. This expenditure excludes social responsibility spending on education and training. Capacity-building and training initiatives relevant to the JPOI targets include:

- Mining industry collaboration with structures such as the Joint Initiative for Priority Skills Acquisition (JIPSA) and the Mining Education Trust Fund (METF) to promote skills development and the training of learners, artisans and ensuring a sustainable supply of engineers. The METF contributes on average R8 million per annum.
- National Skills Development Strategy (NSDS) and the extent to which the targets of the NSDS are met through the Mining Qualifications Authority. Furthermore, encouragement of participation of mine staff in Adult Basic Education and Training programmes in the mining sector is promoted.
- Mintek was appointed by the Department of Labour as an Employment and Skills Development Agency and the offer training services within the mining sector.

DST has proposed the development of a national research institute focused on high level beneficiation skills and technology, and will operate as a virtual institute and be a collaborative effort between universities, other research foundations and the private sector on mining and minerals issues.

4.4.2 Mobilisation of finance

The Nedcor Securities Junior Mining and Exploration Index (NSJME) is an investment vehicle that provides exposure for South Africa's Junior Mining and exploration sector. It has shown continued growth in the market capitalisation of the junior mining and exploration sector, which exceeded R120 billion in 2007. Furthermore, the METF contributes on average R8 million per annum for skills development and training in the mining sector.

4.4.3 Technology development, transfer and dissemination

The Advanced Metals Initiative (AMI) was established by the DST and is implemented by the CSIR, Mintek and Nuclear Energy Corporation of South Africa (NECSA). The purpose of the AMI is to research, develop and innovate across the advanced metals value chain, whilst reducing the energy requirements of producing metals, increasing asset productivity, developing low-cost manufacturing technologies and reducing the environmental impact of the full life cycle. Three technology networks exist within the AMI, namely: the Light Metals Development Network which focuses on lighter functional alloy materials for the automotive and aerospace industries; the Precious Metals Development Network which focuses on the value addition of platinum group metals; and the New Metals Development Network that focuses on the beneficiation of nuclear materials for use in nuclear reactors.

4.4.4 Participation of major groups

Initiatives to strengthen small miners have included the South African Mining Development Association (SAMDA) set up by junior and BEE mining companies and the South African Small-Scale Mining Chamber established by government. The objectives of the Mining Charter are as follows: to promote equitable access to the nation's mineral resources to all the people of South Africa; to substantially and meaningfully expand communities for HDSA's, including women, to enter the mining and minerals industry and benefit from its activities; to advance employment and social and economic welfare of mining communities and major labour sending areas; and to promote beneficiation of the South Africa's mineral commodities.

There has been increased emphasis in the involvement of local communities and in particular women in decision-making and implementation in the mining and minerals sector due to the requirement of the MPRDA and Mining Charter. Section 56 of the Regulations GN R385 under NEMA has increased requirements for public participation during the environmental impact assessment process in comparison to previous legislation. The MPRDA also provides for consultation with interested and affected parties during the impact assessment process. Increasingly, the issues of communities surrounding mining projects are influencing the mine development and planning process.

4.4.5 Cooperative frameworks and partnerships

Following the WSSD in 2002, DMR established a multi-faceted programme called Sustainable Development through Mining. The programme has been fully operational for two years. It embraces international and national policies and initiatives relating to sustainable development in mining, including the JPOI targets. Active sub-programmes include: Sustainable Development Strategy; Human Resources and Skills Development; Derelict and Ownerless Mines Rehabilitation; and Enforcement and Compliance.

The Chamber of Mines is the key engagement mechanism between the public and private sectors in mining and has been instrumental in steering the private sectors sustainability journey. The Chamber has continued to play a key role as an organisation representing mining employers.

The South African Mining and Biodiversity Forum provide an opportunity for cross-sectoral interaction and co-operation with the aim of improving biodiversity conservation and performance in alignment with international best practice.

South African Mining Development Association (SAMDA) was initiated in 2000 as the Junior Mining Initiative by a group of people associated with junior mining and empowerment mining

companies with the intention of creating an enabling environment for capital raising, skills development, practising responsible environmental management and sustainable development and the maintenance of standards of goods practice.

Sectorally based organisations include the SAMDA, the Aluminium Federation of South Africa, the South African Copper Development Association, the Engineering Industries Federation of South Africa, the South African Stainless Steel Development Association, the Aggregate and Sand Producers Association of South Africa and the Small Scale Mining Board.

4.5 Lessons learned and best practices

Sustainable mining practice

The SDM project is a key first step forward towards implementing sustainable mining for South Africa. The document summarizes a platform structure to pursue sustainable development. The vital role of partnerships with industry and stakeholder representatives is seen as central to the approach of sustainable mining. The document articulates a vision (see Section 4.1) and a number of goals for sustainable mining, including the way these link to other programmes such as the NFSD. The goals include: achieving balanced and informed decision-making regarding abstraction and use of mineral resources; enabling of measurement and assessment of progress towards sustainable development; minimizing impacts and risks (including improved health and safety); developing tools and mechanisms for improved compliance and regulating capacity; increasing poverty alleviation and improving growth and competitiveness so as to close the gap between first and second economies in South Africa. The SDM process is consultative and is being developed through an iterative process.

Closure of unsafe mines

Unsafe mine openings, rehabilitation of old mined areas and prevention of water ingress into derelict mines is being undertaken through two programmes run in partnership between the DMR and the Council for Geoscience.

Rewarding of best mine practice

In recent years, many mining houses have received awards in recognition of their contribution towards sustainable development. The following rewards were received: Green Mining Award for Sustainability, South African National Productivity Improvement Award, Businessmap/Business Report, Global Business Coalition Commendation for excellence in HIV/AIDS Counselling and Green Mining Socio economic Award. The aforementioned award system promotes the incorporation and practice of the three dimension of sustainable development in the mining sector.

Royal Bafokeng Holdings (Pty) Limited

Land where the Royal Bafokeng tribe reside is rich in minerals ranging from asbestos to vanadium, the most important of which is platinum. Mining companies may utilise the underground rights of the land, but the surface rights belong to the Bafokeng. The mines have to pay royalties to the tribe and provide job opportunities. Royal Bafokeng Holdings (Pty) Limited (RBH) is responsible for the management and development of the commercial assets of the Royal Bafokeng Nation, with the overall business objective of maximising returns to enable the RBN to deliver sustainable benefits to the community.

Emalahleni Water Treatment Plant

A joint venture between Anglo Coal South Africa and BHP Billiton Energy Coal South Africa (BECSA) that treats 23 megalitres of mine water from three operational coal mines and one defunct coal mine. Eighteen megalitres is pumped to the Emalahleni municipality constituting 20% of their daily water requirements and of the remaining water, some is pumped to surrounding mines for use in mining activities and coal processing, alleviating the demand on the municipality and a small proportion is bottled by an empowerment company for the local bottled water market. The construction of the plant created 650 – 700 temporary jobs and the operation of the plant has created 40 permanent jobs, 91% of which are people from the local area. The plant aims to be a zero waste facility, with significant investment being made into research and development projects focuses on 100% use of the by-products from the treatment plant.

The Plant won two categories of the *Mail & Guardian's* Greening the Future Awards (Innovative environmental strategies that improve business performance and Water care) and the sustainability category of Nedbank Capital's Green Mining Awards.

Anglo Coal Isibonello Wetland Offset

Wetlands are a key resource for the maintenance of stream flows and water quality, and they are afforded protection in South Africa through the NWA and regulatory framework. Thus protection of wetlands needs to remain a high priority, and the precedent for destruction of wetlands needs to be avoided. However, offset projects can be considered as one means of reducing the ecological footprint of mining developments. The first wetland offset project in South Africa is the Isibonello Colliery, an Anglo Coal opencast coal mining operation in the Upper Olifants River Catchment in Mpumalanga. Anglo Coal recognised that part of the Steenkoolspruit wetland would be destroyed by the mining operations. As such, Anglo Coal worked in collaboration with DWA, DEA, Mpumalanga Parks Board, the Mondi Working for Wetlands Project and specialists from Wetland Consulting Services to rehabilitate a wetland of similar function and scale in another part of the Upper Olifants River Catchment as a mitigation measure for the destruction of part of the Steenkoolspruit wetland. Ongoing monitoring of the wetland rehabilitation and its effect on the surrounding wetlands continues and Anglo Coal has committed to the ongoing maintenance of these sites.

4.6 Challenges and opportunities

South Africa has one of the most competitive economies on the continent of Africa, but it still has to overcome many obstacles in order to be competitive on a global scale. The country ranks among the top five countries in Africa on the basis of comparisons of government competence, quality of public institutions and respect for contract law, and access to technology.

Occupational health

The high incidence of Tuberculosis in the mining industry is linked to the HIV/AIDS epidemic and the incidence of silicosis. The Tuberculosis programme launched by the mining industry in South Africa surpasses the World Health Organisation best practice in many aspects, however, the rates of Tuberculosis infection remains high.

HIV/AIDS in South Africa is now both a health and development crisis. Over 5 million people in the country are HIV positive, approximately 1 000 people die of AIDS-related illnesses on a daily basis and about 500 000 people are infected annually. The implications of this are far reaching, affecting loss of life, productivity, education, skill and training and increased pressure on health care facilities,

orphanages and funeral homes. A challenge with regards to noise induced hearing loss and silicosis is that these risks are measured in terms of lag indicators, i.e. indicators that show the incidence after exposure to the risk. Measurable lead indicators have been developed. The COM committed R 42 million over 6 years and is implementing a tripartite project which aims to improve access to compensation for occupational diseases for ex mine workers. Enhancing competitiveness during the financial downturn

Enhancing competitiveness during the financial downturn

The 2008/2009 international economic downturn as well as the local inflationary pressures resulting from higher oil prices and higher food prices has pulled the market into a recession. The severity of the recession as the demand for and prices of commodities drop will determine sector shrinkage in terms of job and revenue loss.

Cost-effective technology for deep-lying deposits

The relative contribution to the South African economy from mining of ore has declined since the 1980's due to increasing difficulty in accessing the deep-lying ore deposits. Advances in technologies to ensure cost-effective mining which is at the same time socially and environmentally sustainable remains a challenge for the country.

Broadening the transformation agenda

Transformation in South Africa is a key challenge with many associated opportunities. In the minerals sector, the MPRDA which includes a requirement for social and labour plans and the Mining Charter provide the basis on which transformation is occurring.

Water

South Africa represents a critical resource for a wide range of minerals that drive the world economy. The country has a long history of mining and has limited natural water resources, leading to a situation where it also has a number of significant mine-water related challenges. Acid Mine Drainage (AMD) is a one of the challenges in this theme.

Retaining the focus on legacy issues

The legacy of derelict and ownerless mines that have not been rehabilitated and for which, historically, no financial provision was made. These mines, in terms of section 46(1) of the MPRDA may become the responsibility of the DMR. The challenge of derelict and ownerless mines in South Africa has repercussions for surface and groundwater contamination; air pollution from windblown dust and spontaneous combustion in the case of coal mines; and health and safety issues where shafts have not been sealed or slopes on dumps are not stable, open pits have not been rehabilitated and features and abandoned mine infrastructure have collapsed. The roll-out of the National Strategy for the Management of Derelict and Ownerless Mines in South Africa plays a critical role in addressing these challenges.

Maintaining a role in the climate change agenda

South Africa is dependent on coal for energy. Ninety three percent of the electricity produced in South Africa is from coal mined locally, with 43.7 million tons of coal being used for the manufacture of synthetic fuels - accounting for about 37% of the liquid fuel production in the country. The implication of proposed carbon taxes on the cost of electricity has far reaching implications for the minerals industry, particularly with regards to energy intensive mineral beneficiation. The South African National Energy Research Initiative has been instrumental in driving research into carbon capture and storage.

Expanding and entrenching good governance in mining

It is important that mining imperatives be integrated with regional and local community needs. For example, the integration of social and labour plans with municipal Integrated Development Plans (IDPs), Spatial Development Frameworks and Local Economic Development Plans (LEDs) is very important. The Extractive Industries Transparency Initiative is an initiative that aims to strengthen governance by improving transparency and accountability.

Mine fatalities

South Africa has made strong progress with the reduction of the number of mine fatalities, but there is some tension between mining industry roleplayers and authorities regarding the implementation of the MHSA Amendment Bill, as this is seen to be economically unsustainable by mining representatives, while union representatives see the Bill as a viable and necessary promotion of the safety of workers.

Mine Closure

Although mine closure is well regulated and documented, there have not as yet been any mine closures achieved in South Africa. This relates to insufficient finance and forward planning to ensure setting aside of finances and plans to cover the costs and other requirements of closure. Further, the sustainability of practices after mines cease operation is of major concern. Communities which have become dependent on the operational mines have been left without economic and livelihood opportunities after the mine cease operation. Methods exist to rehabilitate the surface and ameliorate pollution post-mining, however the long term success of these methods is dependent on the post-mining land use. Regional closure strategies need to provide a framework in which mines can develop closure plans that address broader development priorities, as well as possible cumulative impacts of the activities of a number of mines taking into consideration socio-economic and environmental issues on a regional basis. Factors which will be key to the success of a regional closure strategy are buy-in from stakeholders, trade-offs, stakeholder engagement, setting-up of completion criteria (balanced scorecard for regional mine closure), targeted research and data management

Infrastructure

The new challenge for South Africa when doing trading especially when exporting raw material will be to provide an adequate level of infrastructure investment while boosting the level of private investment. The country has major infrastructure problems in its ports and railway system which inhibit the export of commodities such as coal. Private investment also suffered during the early years of the country's political transition given uncertainty about how the new government would approach economic development. As the government's macroeconomic policy has been responsible, South Africa's credit ratings have improved and there is a higher level of business confidence in the economy than ever before.

4.7 Conclusion

There has been significant change in the mining, minerals and metals sector since the WSSD and establishment of the JPOI targets. Substantial changes to mining legislation have occurred and policies and guidelines have been developed in response to the changes in the legislation. Mining companies are taking initiative in their sustainability policies and reporting. The mining, minerals and metals industry still faces numerous challenges and targets to meet, with regards to transformation, health and safety and the environment.

5 Transport

5.1 Thematic context

Transport systems form the backbone of South Africa's socio-economic activities by enabling the movement of people and products. Apartheid planning has left a legacy of poorly integrated transport networks, and the majority of citizens live far from places of work. Many people still do not have access to an existing and extensive formal railway and road infrastructure, and live in areas where there is no reliable transport.

South Africa has about 750 000km of roads and approximately 7.2 million licensed South African drivers on the roads. Roads are the principal means of transporting commuters and freight, including minerals. The limit for heavy goods vehicles is substantially higher than around the world. South Africa has the 10th longest rail network in the world and connects with many networks in the sub-Saharan region. Large parts of the network are underutilised with 42% considered as light density (non-core network) and approximately 15% of the network providing no service or decommissioned, closed or leased lines. Even though rail is cheaper, there has over the past thirty years been a substantial reduction in rail freight in favour of road freight. Rural and peri-urban communities have limited access to the rail network. The country has 20 airports of national importance of which 10 are classified as international airports. Africa's busiest airport, O. R. Tambo, has about 9 million departing passengers a year. More than fifty airlines, making around 280 000 aircraft landings and carrying about 33 million passengers a year, move through South Africa's principal airports. South Africa has approximately 4.4million arriving international air passengers a year with less than 1% of total passenger air movement from local and private airfields. However, airports handle less than 1% of the annual national and international freight. There are 18 ports including 8 multi-purpose commercial ports including purpose-built ports for coal and iron ore export. Maritime transport is of significance to South Africa with respect to freight transport but South Africa has no navigable inland water ways. It is estimated that 90 percent of all SADC trade passes through South African ports.

Petroleum products and gas are transported via a pipeline network transporting approximately 17 billion litres of petroleum products per year and 14 million gigajoules of gas, representing 50% of South Africa's consumption. Pipelines servicing the inland regions are old and run at full capacity, and are thus unable to meet the inland demand for liquid fuel, which is also being transported by rail and road. Several new pipeline projects are underway or in the planning stages. South Africa also has an extensive network of pipelines which supply water for agricultural, domestic and industrial uses.

The South African public transport system comprises state-sponsored public bus and rail commuter services. This is supplemented by privately run minibus taxis. Minibus taxis account for 65% of 'public' transport with buses at 20% and rail 15%. Since the 1970's, the majority of commuters switched from the bus and rail modes to minibus taxis given their ease of access and coverage. Given that subsidies apply to state rail and bus services, these travellers (many of whom are poor) do not experience the benefit. Further, the loosely-regulated minibus taxi industry often relies on poorly maintained, un-roadworthy vehicles and poorly trained drivers. The bulk of relatively affluent commuters rely on private cars for their transport.

5.2 JPOI targets

The transport targets 7 (i); 20 (b); 21 (a; b); 35; 47 (c) and 62 (l) outlined in the JPOI can be summarized as follows:

- Build basic rural infrastructure and improve transportation and access to markets, market information and credit for the rural poor for sustainable development;
- Integrate energy considerations, including energy efficiency, affordability and accessibility, into socio-economic programmes;
- Promote an integrated approach to policy-making at the national, regional and local levels for transport services and systems to promote sustainable development;
- Implement transport strategies for sustainable development to improve the affordability and efficiency of transportation, for improved air quality and health;
- Promote investment and partnerships for the development of sustainable energy efficient multi-modal transportation systems;
- Protecting and managing the natural resource base of economic and social development;
- Encourage governments to improve measures and internationally agreed regulations regarding safety, relevant to international maritime transportation and other transboundary movement of radioactive material;
- Enhance the capacities of developing countries to benefit from liberalized trade opportunities;
- Support African efforts to develop affordable transport systems and infrastructure that promote sustainable development and connectivity in Africa.

5.3 Progress

5.3.1 Participation in international processes

South Africa is Party to a number of multilateral treaties, conventions and declarations relevant to transport. The African Civil Aviation Commission provides for coordination and cooperation of civil aviation authorities of member states. Maritime agreements include the African Maritime Transport Charter which seeks to harmonise shipping policies, a Trilateral Agreement, as well as ratification of Annexes from the International Convention for the Prevention of Pollution from Ships. There is reported inadequacy of South Africa's port waste reception facilities (PRF) and the requirement for ships to pay the fees for use of these PRFs. DEA has recommended that the "no-special-fee" system should be introduced in all South African ports, and that this be actively promoted as a standard international requirement.

Within the sub-region, SADC has a Protocol on Transport, Communication and Meteorology to achieve economic growth and development, and trade facilitation via strategic transport corridors which ensure regional connectivity.

5.3.2 Developments in policy framework

There are numerous acts, policies, discussion papers, plans, and reviews that impact on the transport system. JPOI Target 21 focuses on the implementation of an integrated policy making approach for

transport services and systems. Policy and guidelines that have been developed on transport at varying levels includes the White Paper on National Transport Planning which contributed towards the integration of transport planning and preceded the enactment of legislation dealing with land transport and allocation of functions within government. Strategic frameworks embody the overarching plans and foundation for land transport and infrastructure. Aspects include: road maintenance and improvements; efficient coordination and service delivery; funding sustainability and labour intensive skills development and job creation. The Draft National Non-Motorised Transport (NMT) Policy outlines the Department of Transport (DoT) objectives for mainstreaming this mode of transport at the provincial and local level. Provinces and municipalities are required to produce integrated five year transport plans.

5.3.3 Actions in response to international and local policy

This section presents some of the key actions that have been undertaken in response to international and local policy aimed at strengthening transport for sustainable development.

Transport Planning

Government endorsed the decision to prepare the *National Transport Master Plan 2050* (NATMAP) which spans from 2005 to 2050. NATMAP responds to JPOI Target 21 in that it facilitates sustainable socio-economic growth and integrated development planning at a macro project scale. NATMAP provides a framework for multimodal transportation systems implementation and monitoring.

Rural transport delivery

Rural South Africa is characterised by poor infrastructure, large distances, dispersed demand and low incomes. The Rural Transport Strategy for South Africa (RTSSA) highlights the plight of the rural poor and the need for transport infrastructure and services to catalyse access to social services and poverty alleviation. The strategy promotes coordinated rural nodal and linkage development, and outlines the need for demand-responsive and sustainable rural transport. The RTSSA moves beyond roads and explores sustainable and innovative interventions to address rural access and mobility. The Department of Transport (DoT) has initiated pilot demonstration projects including the National Freight Logistics Strategy in response to the failure of the freight system, and to target the second economy which is largely rural. The Expanded Public Works Programme (EPWP) is a government initiative focussed on reducing unemployment and enhancing skills development. The focus of the programme has largely been on road construction, thus providing new roads in many rural areas.

Energy efficient and accessible modes of transport

The NMT has highlighted the bicycle as a low-cost and sustainable form of transport via the Shova Kalula Programme. The focus of this programme is on young people and those walking long distances. Rural areas, townships and medium sized cities have been identified as starting points for use of bicycles. At present South Africa is targeting some 800 000 primary and secondary school children that walk more than 3km per day and an estimated 573000 and 472000 urban and rural workers currently walking more than 20 minutes to work each day. Implementation of the subsidy policy pertaining to the programme has proved to be a challenge.

Public commuter transport

The Public Transport Strategy for South Africa aims to radically accelerate the improvement in public transport through modal upgrading and establishment of Integrated Rapid Public Transport

Networks (IRPTN) via Priority Rail Corridors and Bus Rapid Transit (BRT) in metropolitan areas. The action plan focuses on incremental implementation of passenger transportation services and fast tracks implementation in the 2010 FIFA World Cup cities. Passenger rail is prioritised to assist with achieving integrated planning. The majority of cities have chosen a Bus Rapid Transit (BRT) system, proven in developing countries worldwide to be the most cost effective and flexible mass mover. This is aimed at achieving congestion and improving the quality of public transport.

Improvements in transport infrastructure

Significant strides have been taken recently in the improvement of urban transport infrastructure. The National Overload Control Strategy (NOCS) is enabling the prevention of overloading through strategically placed weighbridges and the extension of liability for overloading. The economic hub of South Africa is Gauteng where the Gauteng Freeway Improvement Project (GFIP) is intended to address congestion and time spent in traffic. Rail is being used as an alternative for long distance passenger and tourist transport which alleviates road congestion during peak periods. Further, a five-year capital expenditure programme for airports is being rolled out to accommodate new generation aircraft and growing passenger numbers.

A deepwater port complex has recently been commissioned for Coega. The industrial development zone is already well-serviced by transportation networks, a skilled labour force and utility services, including inter-modal transportation linkages and cost-effective bulk services.

Taxi industry

The taxi industry remains relatively unregulated and taxi fares are not subsidised by the government. Taxis are thus relatively expensive and in many cases are not profitable if replacement of the vehicle is factored into the cost structure. The South African government has a taxi recapitalisation programme (TRP), the key objectives of which are to improve commuter safety and stimulate empowerment through transport. Through the TRP, old taxis are replaced by new roadworthy vehicles.

2010 FIFA World Cup

The 2010 FIFA World Cup has accelerated city transport planning and construction in the host cities and has offered a unique opportunity to significantly upgrade the public and non-motorized transport infrastructure. Associated construction projects are contributing significantly to the provision of additional land based and public transport capacity.

Fuel and energy efficiency

The DMR and the DEA have collaborated in a joint strategy dealing with control of Exhaust Emissions from Road Going Vehicles. Although this primarily has dealt with the removal of lead from petrol and reduced sulphur in diesel, other undesirable components have also been removed from the fuels. The strategy also has a roadmap for government, the oil industry and the vehicle manufacturing industry for achieving improved air quality through the control of vehicle emissions. The National Climate Change Response Strategy further highlights the effect that sectors including transport have on climate change via greenhouse gas emissions. Mitigation measures include addressing emissions from the freight and commercial transport sector and travel demand management initiatives for private cars. The DoT has highlighted the BRT, Gautrain, GFIP, Consolidation of Rail transport, the Taxi Recapitalisation Programme and the NMT programme as initiatives addressing GHG emissions.

Work in progress

- Key projects that fall under the NATMAP include Gautrain, 2010 FIFA World Cup infrastructure construction programme, Taxi Recapitalisation and the Freight Databank which are currently underway. Planned enhancements to the core network are envisaged which will improve efficiency of the rail network and reduce pressure on the road network.
- Upgrading and establishment of Integrated Rapid Public Transport Networks (IRPTN) via Priority Rail Corridors and Bus Rapid Transit (BRT) in metropolitan areas is being implemented.
- In order to improve capacity and efficiency of South Africa's ports, Transnet has initiated a capital investment programme. It is anticipated that improvements including the deepening of Durban harbour and new cranes at Cape Town will address congestion from the inefficiency of the rail system
- The department of transport has commenced with the development of the energy efficiency framework for transport sector as well as green house gas inventory to promote energy efficiency and reduce carbon emission.

5.3.4 Monitoring and evaluation

Monitoring and evaluation of transport related issues is conducted by a range of organisations, including the DoT, dti and Transnet, and reported on in their respective technical and annual reports. Transport is also featuring in the state of environment reports undertaken by national, provincial and local government using indicators such as the modal split of passenger transport and that of freight transport. Supplementary technical information pertaining to transport is provided by Statistics South Africa, Department of Energy and the Development Bank of Southern Africa. The National Household Travel Survey is South Africa's first representative nationwide household travel survey. The Survey provides strategic insight into the travel patterns and transport problems of the people of South Africa. In analysing the survey results, access to transport, affordability of transport and safety are highlighted.

5.4 Means of implementation

5.4.1 Capacity-building, education, training and awareness-raising

At the regional level, South Africa participates in capacity building and training initiatives within the Nepad framework. One of the foci of these training programmes is to strengthen the capacity of African countries to implement regional seas conventions and related regional and global programmes of action. At a national level, the country has a number of cooperative relationships with development partners on capacity building, as well as research and development. Cooperation agreements include intelligent transport systems such as electronic toll collection, integrated traffic management and incident detection and emergency response, road infrastructure and automotive research. Science and technology partnerships also include alternative fuels, vehicle production and design and public transport systems specifically buses.

The DoT, South African National Roads Agency Limited and provincial transport authorities offer transport career exhibitions and road shows as a means to attracting young people and skills into the sectors.

5.4.2 Mobilisation of finance

Poorly integrated transport planning and development has left South Africa with a transport system that does not facilitate the easy movement of people and goods. Rapid economic growth since the mid-1990s has placed additional pressure on the country's transport system, notably public transport. However, Government investment in public transport has increased significantly to address these challenges. Funds for infrastructure and transport are obtained from a variety of fragmented sources and distributed to a large number of entities for the implementation and management of transport in South Africa. At present South Africa is under-spending relative to international statistics with respect to road infrastructure, spending 3% rather than 5% of GDP on this purpose. There is considerable debate in South Africa around use of tax and revenue to support investment, as well as the potential opportunities that Public-Private Partnerships (PPP) may offer.

Funding mechanisms in government include the Annual Infrastructure Grant to provinces and the Municipal Infrastructure Grant, 15% of which is allocated for public transport infrastructure. The Municipal Income Grant supplements capital finance for basic municipal infrastructure for poor households, micro enterprises and social institutions. Provinces and municipalities also have their own revenue sources by way of motor vehicle licence fees and road tolls. Provincial taxes and national transfers contribute more than 95% of total provincial revenue.

The Public Transport Infrastructure and Systems Grant (PTIF) provides for accelerated planning and implementation of public and non-motorised transport. PTIF grants provide for transport modes such as bus and rail, as well as integrated urban transport management. The Government has allocated more than R9 billion for municipal transport, precinct upgrading, roads and rail services to directly support 2010. This is on top of wider general investment in public transport and ports of entry, and investment by other spheres of government and the private sector. Government has further made resolutions on aligning budget for development of rural transport to meet the current Medium Term Expenditure Framework (MTEF) Cycle. The focus is on non-motorised transport projects, coordination of rural transport operations and strengthening of rural freight and logistical services. Transport subsidies are paid in the form of bus subsidies, rail subsidies and special grants, but the amount is not keeping pace with inflation.

At the SADC level, a Protocol on Transport, Communications and Meteorology commits countries to implement road funding policies and harmonised national road user charging systems, as well as harmonised cross-border road user charging systems. A Regional Cross Border Road User Charges Collection Association is contemplated by the SADC countries in order to harmonise Road User Charges in the region.

5.4.3 Technology development, transfer and dissemination

Science, engineering, technology and associated research and development are central to sustainable infrastructure for South Africa. The Department of Science and Technology (DST), dti and DoT promote research and development in the sector. Transport-related research is undertaken by institutions such as the CSIR and is applied by engineering companies and professionals in the practice, design and construction methods in infrastructural projects. The large number of infrastructural projects has necessitated the sourcing of engineering and construction expertise from elsewhere in the world, allowing for a transfer and dissemination of new transport techniques and technologies. There has been significant effort focused on development of electric and hybrid vehicles, notably the 'Joule' which uses 20% of the energy of a normal car.

5.4.4 Participation of major groups

A South African Network of Women in Transport (SANWIT) was officially launched in 2007/2008 and institutionalised as an organisation to empower and mainstream women in transport opportunities. The objective of SANWIT is to support and develop women owned and operated transport enterprises. The Rea Vaya public participation process is cited as an example of participation of major stakeholder groups in the development of a public transport project. Key stakeholders include the taxi and bus industry, scholars, the disabled and unions. The public participation process for Rea Vaya BRT culminated in a Public Transport Summit on 15 August 2009 and the development of a Public Transport Declaration in which 1300 stakeholder voted to uphold the BRT.

5.4.5 Cooperative frameworks and partnerships

NATMAP provides a framework for cooperation and partnership in the transport sector. It provides the platform for roleplayers to proactively address the linkages with transport, energy, environment and sustainability, although the ramifications of these have to date not been explicitly and /or extensively addressed within the NATMAP. The NATMAP Project Management has decided that a Working Group specifically for Energy and Environment be constituted as soon as possible. Given the extent of the transport sector issues pertaining to energy, environment and sustainability will cut across the entire scope of NATMAP and will play an important role in shaping policy.

5.5 Lessons learned and best practices

The *Gautrain Rapid Rail Link* and *Bus Rapid Transit* projects are considered to be examples of best practice in the transport sector.

BRT

Rea Vaya, the BRT in Johannesburg, represents the single largest climate change initiative ever undertaken by the City of Johannesburg replacing poor quality buses and implementing low-sulphur diesel usage. The articulated buses make use of advanced pollution reduction equipment. The City of Johannesburg has estimated an expected saving of 382,940 tons of CO² equivalent emissions as a result of the implementation of the Rea Vaya system by 2010, and by 2020 would save about 1.6 million tons of CO² equivalent emissions. The DoT is assisting 7 other South African cities in planning and implementing similar plans.

Gautrain Rapid Rail Link

The *Gautrain Rapid Rail Link* has catalysed a new and innovative standard for public transport and is facilitating the movement of commuters travelling between the administrative and commercial centres of Gauteng Province. It incorporates 80km of rail and 10 stations opening up access on a north-south axis which once operational will potentially remove large numbers of private vehicles off the roads. The project is multimodal transport and relies on other forms of transport such as taxis, BRT and NMT to support the overall transport network. Other regions of South Africa have selected rail commuter transport projects as the main “flagship” projects. The Moloto Rail Corridor project is one example, and will link rural communities in Mpumalanga with Gauteng.

The ‘Joule’

The locally developed ‘Joule’ is Africa's first all-electric car. This zero-emission vehicle is a six-

seater multi-purpose vehicle sets out to provide efficient use of energy and reduction of climate change, using only 20% of the energy needed by a conventional car. Technology which has enabled the development of the vehicle includes the dramatic improvement in lithium ion battery price, life and performance. A further advantage is that the batteries do not make use of heavy metals. It will take approximately seven hours to recharge the car's battery pack for a 200 kilometre driving range, with the two battery packs providing 400 kilometres in total. Independent analysis of Eskom has confirmed that the South African grid has existing capacity for recharging millions of cars at night without affecting its customer base. It is expected that the local content of the Joule will be more than 50%, and has been designed with the international market in mind. The vehicle is anticipated to become available towards the end of 2010.

5.6 Challenges and opportunities

Despite solid progress in addressing the transport issues outlined in the JPOI, South Africa is still faced with a number of challenges that need to be addressed. In many instances these challenges present opportunities for strengthening transport systems in the country.

Transport legacy

In the past, the transportation sector has been considered to have a poor track record of policy formulation and implementation. The transport sector has also been criticised for ineffectual regulatory enforcement for issues such as overloading, vehicle roadworthiness and licensing which in turn has an impact on commuter safety, condition of roads and access to transportation, and a failure to observe sector responsibilities which may create confusion in implementation phases of new transportation infrastructure. Thus South Africa's transport system has poor integration and connectivity.

Given the large capital cost of infrastructural development it will take time to change this situation. Integrated transport planning and investment in public transport are essential elements for a more efficient transport system. The 2010 FIFA World Cup has served to both elevate public transportation, and has fast-tracked investment plans into this sector. It is now necessary to consolidate these efforts, such as through the RTSSA which also looks at the development of rural rail branch lines or low and light density lines as an opportunity to facilitate penetration into the rural areas.

Maintenance of infrastructure

Substantial disinvestment in road infrastructure since the 1980's combined with rapid increases in traffic volumes as well as deregulation of freighting, have contributed to a decline in safety and quality of the road network. This has serious implications for vehicle emission levels, economic development and safety. The concessioning of portions of national road has assisted in maintaining a portion of the road network. However here is an urgent need for government to continue to invest in maintenance and renewal of transport infrastructure, as there is generally insufficient budget allocation for infrastructure maintenance at all levels of government. The EPWP offers the opportunity to expand job creation and skills development projects in favour of construction and infrastructure maintenance projects.

Technical skills

South Africa is facing a number of challenges with respect to the availability of technical and civil engineering skills required to provide service delivery in infrastructure and transportation, especially

at the local level. This presents tertiary education institutions with opportunities to respond to this shortage by encouraging graduates and matriculants into the civil engineering field. Partnerships are needed to ensure appropriate targeting of training, through skills development and job creation programmes that focus on technology solutions to construction and maintenance of infrastructure.

Research and development

There is very little investment on transport-related research and technology development in South Africa. The current 2% spending of GDP on road infrastructure is less than half what is required for a country at its stage of development. The poor state of infrastructure and inadequately skilled professionals in the infrastructure sector impacts on research and development, and requires urgent focus on the development of new knowledge, engineering technologies and skilled human resources.

Sustainable fuel sources

The transport sector is the most rapidly growing source of greenhouse gas emissions in South Africa, and accounted for about 19% of South Africa's greenhouse gas (GHG) emissions in 2000. Road transport is the highest energy user in the transport sector by mode. There is a need to carry out ongoing review of fuel specifications towards cleaner vehicle technology in order to improve urban air quality in South Africa. The South African industry has embarked on a process of gathering information for future fuel specifications through a multi-stakeholder process based on review of impact of vehicle emissions on air quality.

Coordination

Fragmentation and multiple roleplayers in the transportation sector present a challenge to coordinated planning and implementation, as well as management of funding. This leads to *ad hoc* and unequal implementation of infrastructure projects. It also contributes to a mismatch between economic development and transport capacity. There is a need to align policies, as well as roles and mandates within the transport sector.

5.7 Conclusion

Substantial progress has been made towards the JPOI targets in the development of policies, strategies and programmes for the transport sector in South Africa. Transport delivery projects currently underway are comprehensive and address all areas of transportation needs to various levels of detail. Priority areas of intervention include:

- public transport infrastructure and service delivery
- road expansion projects to deliver improved capacity and reduce congestion
- non-motorised transport programmes, rural roads and infrastructure development.

To a large extent the 2010 FIFA World Cup has presented a significant stimulus to the transport sector and service delivery especially with respect to public transport projects. As a result South Africa is witnessing the most significant infrastructure construction and expenditure programme since the early 1980s. However, the public transport focus remains largely on the urban area and substantial work is still required to improve rural access and mobility.

6 Waste Management

6.1 Thematic context

South Africa has a relatively high rate of waste generation compared to other developing countries, with a disproportionate amount of this waste being generated by the affluent. The typical municipal waste composition for higher income urban areas shows greater percentage by mass of recyclables and greater per capita waste generation than for lower income areas where organic, rubble, soil and ash form a relatively higher percentage. Only approximately 44% of the 1280 known landfills in the country are authorised, and there is an overall low level of auditing and compliance monitoring

There are positive trends in waste management, with the chemicals sector reporting a reduction in total generation of hazardous waste 2004 to 2006. However, the intensively growing industrial and manufacturing economy of South Africa is resulting in overall waste increasing at about 2% to 3% annually. E-waste is becoming an increasingly big issue for South Africa as some categories of electronic goods become obsolete. Radioactive material including from medical sources is a further important contributor to hazardous waste in South Africa. A further contributor to waste volumes is untreated or poorly incinerated health care risk waste (HCRW) which is often disposed of on uncontrolled waste disposal sites. There are about 36 permitted purpose-built and lined hazardous waste sites in South Africa, generally for the disposal of hazardous industrial waste.

Municipalities are the primary structures responsible for the provision of domestic waste management services in terms of the Constitution. The private sector also plays a key role in the management of waste in South Africa, with the two largest waste firms in South Africa being listed on the Johannesburg Stock Exchange. There are large backlogs in the waste collection services, with the General Household Survey of 2007 indicating that 39% of households are receiving a regular waste collection service. Backlogs are highest in areas of rapid urbanization, placing significant pressure on these municipalities.

Although the current main means of disposal of general and hazardous waste is through landfill, South Africa has seen a policy shift via the National Environmental Management: Waste Act (NEM:WA) away from landfill sites to waste reduction and minimization. This is being implemented through plans and programmes for integrated waste management. The approach is based on a waste hierarchy includes promotion of cleaner production, waste minimisation, reuse, recycling and waste treatment with disposal seen as a last resort in the management of waste.

6.2 JPOI targets

The key JPOI targets relevant to waste management (Target 22 (a) and (b) and 23 (a-g)) can be summarized as follows:

- Prevent and minimize waste and maximize reuse, recycling and use of environmentally friendly alternative materials, with the highest priority placed on waste prevention and minimization, reuse and recycling, and environmentally sound disposal facilities. Encourage production of reusable consumer goods and biodegradable products and developing the infrastructure required.
- Renew commitment to sound management of chemicals and hazardous wastes throughout their life cycle for sustainable development and protection of human health and the environment,

including through:

- Ratification and implementation of relevant international instruments on chemicals and hazardous waste;
- Developing a strategic approach to international chemicals management;
- Implementing the new globally harmonized system for the classification and labeling of chemicals as soon as possible;
- Encouraging partnerships to promote activities aimed at enhancing environmentally sound management of chemicals and hazardous wastes;
- Promoting efforts to prevent international illegal trafficking of hazardous chemicals and hazardous wastes and to prevent damage resulting from the transboundary movement and disposal of hazardous wastes;
- Promoting reduction of the risks posed by heavy metals that are harmful to human health and the environment.

6.3 Progress

6.3.1 Participation in international processes

South Africa has ratified the four key international Multilateral Environmental Agreements (MEAs), namely the Rotterdam, Basel, Stockholm and Montreal MEAs (see Section 3.3 for further details on the MEAs). Participation in the international processes around sustainable waste management by South Africa includes the following:

- Annual reports on waste in terms of the Secretariat's requirements for the Basel Convention. The report covers issues such as export and imports of hazardous waste as well as the transboundary movement and disposal of hazardous wastes and other waste.
- Compliance with obligations set out by the Joint Convention on Radioactive Waste Management and Spent Fuel Management including compilation of South Africa's first National Report by the National Nuclear Regulator (NNR) submitted to the International Atomic Energy Agency (IAEA) in 2008.
- Hosting of the International Nuclear Regulatory Conference in December 2009 by the South African government.

6.3.2 Developments in policy and legislative framework

National policy and legislation

The introductory section provided an overview of the South African sustainable development policy and legislative framework. Further to this framework, there has been strong policy and legislation progress specifically towards the sound management of waste in South Africa. Development of the National Waste Management Strategy in terms of the recently enacted NEM:WA is central to implementation of sustainable waste management. Further policy and legislation includes the White Paper on Pollution and Waste Management and the Mineral and Petroleum Resource Development

Act. The NEM:WA and related regulations provide overarching guidance on measures for waste management as outlined below.

The NEM:WA which came into effect in July of 2009 is wide-ranging and intends to address fragmentation in South Africa's waste legislation. It aims to give effect to the Constitutional right to health, well-being and the protection of the environment while promoting justifiable economic development. The Act determines the hierarchy for waste management, and prioritizes waste prevention, reuse, recycling and recovery, followed by thermal treatment and landfill only to be used as a last resort. Effective waste services are covered in the Act, as are the remediation of contamination and the achievement of integrated waste management and reporting.

Cost-effective and sustainable treatment and disposal of health care risk waste (HCRW) has been piloted in parts of South Africa. Other legislation relevant to the sound management of waste in South Africa covers the management of hazardous substances, health municipal structures and systems, service delivery as well as standards.

International obligations

The NEM:WA and its associated legislative framework are central to South Africa's response to the World Summit of Sustainable development, in that it provides a framework for achieving the summit's goals. The NEM:WA requires for the National Waste Management Strategy (NWMS) to establish measures to give effect to obligations in terms of relevant international agreements which South Africa has ratified including the Basel Convention, the Montreal Protocol, Rotterdam Convention and Stockholm Convention, as well as various conventions dealing with dumping of waste at sea (see Section 3.3 for a brief overview of the MEAs).

Compliance and enforcement

Capacity for compliance and enforcement on environmental rights entrenched in the Constitution and other legislation has been strengthened through regulatory services such as the Environmental Management Inspectorate (EMIs or 'Green Scorpions') which collaborate with other government departments such as the South African Police Service, the National Prosecuting Authority falling under the Department of Justice. The 'Blue Scorpions' are a unit established in DWA empowered in terms of NEMA to undertake enforcement with respect to sustainable water management, including waste impacts on water. There were already about 940 designated EMIs by 2008, of which about 140 are dedicated to industrial issues.

6.3.3 Actions in response to international and local policy

Approach and strategy

Actions towards the development and implementation of approach and strategy for sustainable waste management include:

National policy and legislation which entrenches the principles of waste prevention and minimization and encourages such initiatives as community-based waste recycling projects, first and foremost via the NEM:WA

Information and guidelines

Information and guidelines for the sustainable management of waste have been developed for the management, use and disposal of commercial products containing sludge. Although sludge is excluded from the NEM:WA, its sound management is important for health, safety and

environmental considerations. DEA have established an internet-based information system which supports the collection of waste data.

Regulation

Key national regulations which deal with waste management include: asbestos regulations banning the use, manufacturing, import and export of asbestos; requirements for EIA for activities such as waste recycling or storage; Clean Development Mechanisms (CDMs) regulations; Plastic Bag Regulations which restrict production of non-reusable plastic bags, and unnecessary use of disposable thin plastic packaging and waste tyre regulations imposing requirements including reuse, recycling and recovery of tyres. Government is investigating further regulations to deal with other waste streams.

Efficient use of resources

Significant progress towards improved resource use efficiency is being made in South Africa through implementation of the waste hierarchy. The voluntary Environmental Goods and Services Forum is aimed at stimulating clean and resource-efficient processes, products and materials. The waste sub-sector currently comprises the biggest portion of the environmental goods and services sector. There are also about 25 Waste Minimisation Clubs operating in South Africa made up of about 272 companies implementing cleaner production and principles embodied in the NEM:WA.

Waste recycling highlights include the tonnage of plastic and aluminium cans recycled per annum. Polyethylene Terephthalate (PET) plastic recycling received a major boost through a private sector initiative, PETCO, which implemented recycling identification logos on plastic containers. Buyisa-e-Bag is the non-profit company which encourages the collection, re-use and recycling of plastic carrier bags in line with the plastic bag regulations. They receive government funds for its recycling activities. Car batteries which contain lead are recycled under the management of battery manufacturers, and 'penlight' batteries as well compact fluorescent light bulbs are being collected at certain retailers for safe disposal. E-waste is being recycled by a number of roleplayers in South Africa and is being facilitated by organisations including the E-waste Association of South Africa (eWASA) and the International Technology Association. Glass recycling has taken major steps forward in South Africa with a tripling in the amount of cullet used in the remanufacturing process from 2002 to 2009. Metal recycling is carried out by steel manufacturers at their processing sites, and there is a steady market for scrap steel collected in South Africa with about 80% of all scrap metal in South Africa being recycled. Retailing companies are also beginning to address waste management in a comprehensive way through sound management of their own waste.

Work in progress

- Review of the South African Hazardous Waste Classification System currently in progress, expected to be completed late in 2010.
- Development of the National Waste Management Strategy (NWMS) anticipated to be in place by 2011 will, *inter alia*, provide measures for giving effect to South Africa's obligations in terms of international agreements including the MEAs.
- Government is investigating further regulations to deal with all waste streams.
- The variety of norms and standards such as the remediation of contaminated land are being developed.
- Policy on free basic refuse removal is being developed.

6.3.4 Monitoring and evaluation

The South African Waste Information System (SAWIS) is publicly available and captures routine data on the tonnages of waste generated, recycled and disposed of in South Africa on a monthly and annual basis. Information including maps showing the location of contaminated land in South Africa at national and provincial level is presented on the SAWIS website. There are significant initiatives in place to improve the sustainability of South African Cities to be reinforced by the NWMS. Initiatives for sustainable waste management at the city level include monitoring standards for implementation of free basic refuse removal for indigent households, budget allocation for cleanups and the complaints register for domestic waste collection as per the Domestic Waste Collection Standards.

Monitoring of radioactive materials in the environment is carried out through a continuous environmental monitoring programme under the auspices of NECSA. Management of radioactive waste falls under the authority of the South Africa National Nuclear Regulator (NNR).

The National Energy Response Team is a national inter-government initiative that has been set up to deal with the energy challenges being faced by the country. In line with international practice, government through the provisions of the NEM:WA will ensure that Producer Responsibility applies to this waste stream and that the industry is tasked to develop this strategy.

6.4 Means of implementation

6.4.1 Capacity-building, education, training and awareness-raising

The NEM:WA requires that awareness-raising measures be put in place on the impact of waste on health and the environment, to ensure that people are aware of the impacts of waste on their health, well-being and the environment, as well as to give effect to section 24 of the Constitution to secure an environment that is not harmful to health and well-being. Important initiatives in South Africa building knowledge of the sector include: Environmental Capacity Building Unit in government which runs with projects including “Working with Waste”. Guidelines have been developed to provide practical, easy to follow steps to implement sound waste management.

The Waste Research Network aims to establish a ‘one stop shop’ database of all pollution and waste research papers in SA, in order to direct waste research to contribute to government’s goals and objectives and to limit duplication, as well as maximize efficiency and reach. Post research comments, and research topics or suggestions and debate are elicited through the Network. Several non-governmental organisations provide information to stakeholders on industrial pollution and the state of environmental justice, made accessible to people’s organisations and decision makers.

A status report to indicate compliance of South Africa, 952 waste eater treatment plants has been developed by the Department of Water Affairs as a means of intervention. The National Sanitation Programme has initiated a programme of training and capacitating waste water treatment plant operators.

6.4.2 Mobilisation of financial resources

Mobilization of financial resources is a challenge to providing municipal waste management services, with one of the factors being budget allocations which do not always reflect waste management as a priority service. They thus tend to be lower than for other services. The situation is exacerbated by challenges including: tariffs not being ring-fenced; low collection and enforcement rates; insufficient waste services in rural areas; and growing urban populations needing access to municipal services.

The total annual expenditure on solid waste management in South Africa is approximately R10 billion per annum, with expenditure being predominantly through the public sector at local level where the main responsibility for waste management is located and 30% from the private sector; data on the contribution from the informal industry in South Africa is not readily available. Since the advent of democracy, there has been significant donor funding of government programmes on integrated waste management which has assisted with the development of waste policy and legislation. Department of Water Affairs has set aside R200m to address those plants which need critical attention.

Regulatory instruments

Regulatory instruments for waste management can be broadly grouped into control and command and economic instruments. Research commissioned by the government argues that traditional control and command instruments should be complemented by the use of carefully researched economic instruments which should also be informed by the National Treasury Environmental Fiscal Reform policy framework. Economic instruments are not necessarily easily implemented in a developing country, as there needs to be sufficient capacity to ensure implementation. Means of generating financial resources for waste management under evaluation for implementation include financial “guarantees” as part of the licensing of high environmental risk projects or activities, standards used to ensure that funds obtained from waste services are ring-fenced for waste management services, as well as tariffs for the use of waste management infrastructure or facilities.

Infrastructural programmes

In-situ upgrades to services, including waste infrastructure and provision of waste services, have been undertaken in poor communities through the Expanded Public Works Programme. The Municipal Income Grant is a funding arrangement for municipalities which combines all existing capital grants for municipal infrastructure into a consolidated grant, providing cost effective planning and integrated service delivery. Financial support for free basic services is generated via Municipal Income Grants and equitable share grants, thus limiting the subsidy burden on the municipal fiscus. The Municipal Income Grant, however, does not fund capital investments such as vehicles.

Funding of recycling

Community-based recycling initiatives are one of the means considered by the government to provide basic waste management services. At the same time these can provide basic income to participants via the EPWP. Although there is some debate regarding community-based recycling as an appropriate approach to waste recycling, there are numerous up and running centres bringing benefit to local communities. Support to improve sustainability of initiatives includes buy-back facilities, subsidies for transport of recycling and tax incentives for use of recycled materials.

Funding mechanisms for industry-wide recycling remain a challenge. The commissioning of a recycling plant requires major capital investment and recycling requires high collection volumes generating economies of scale. A unique levy system has secured voluntary buy-in by industry players via a PET levy collected at source by the resin manufacturers.

6.4.3 Technology development, transfer and dissemination

DST has the mandate to deal with technology transfer and research. Research on waste minimisation methods and technologies is addressing reduction, reuse, recycling and the recovery of waste. Relevant research is used to inform policy making around waste minimisation methods and technologies. The DST is further responsible for the management of the Technical Co-operation Programme which helps to transfer nuclear and related technologies for peaceful uses to countries throughout the world. The Environmental Goods and Services (EGS) Sector Forum in partnership with the Department of Trade and Industry (dti) and key government partners is using technology programmes such as the Support Programme for Industrial Innovation and the Technology and Human Resources for Industry Programme to foster implementation of EGS initiatives. DWA is assisting with control of the medical waste stream in South Africa which includes exploring the acceptability of alternative technologies to incineration.

6.4.4 Participation of major groups

The participation of major groups in waste management in South Africa has progressed via BBBEE including through restructuring of the largest private sector roleplayers. Transport and municipal sector unions are dominant amongst unionized workers in the waste sector. The recycling industry is the major employer in the sector, although there are significant numbers of informal and semi-formal workers in this sector. Besides SME development and job creation, the growth of community-based recycling is fast-tracking improved environmental health in unserved communities. NGOs are assisting industrial pollution-affected communities through its 'bucket brigade' system of air quality monitoring.

6.4.5 Cooperative frameworks and partnerships

Examples of cooperative frameworks and partnerships include: the Waste Services Delivery Project conducted by the DEA in partnership with the CSIR to develop affordable and cost-effective standards for waste delivery services, as well the Guideline on Waste Collection in High Density and Unserved Areas which was a collaborative effort between government, donors and numerous organisations involved with waste management. Supplementation of waste removal services is occurring through partnerships to provide top-up services in commercial and industrial areas, as well as some other strategic areas.

6.5 Lessons learned and best practices

Municipal best practice

With its focus on the 2010 FIFA World Cup, the City of Johannesburg's waste-management agency, Pikitup, is leading the way towards sustainable waste management through its Clean City campaign to encourage residents and businesses to change behaviour regarding waste. Pikitup serves approximately 660 000 households, 182 informal settlements and 12 000 businesses. The city is under great pressure for landfill space as there is insufficient airspace and it is essential to reduce the

quantities of waste going to landfill to increase the lifespan of these sites. The private sector has been requested to propose alternatives, which include generating energy from waste, gasification and separation to recycling and manufacture of products such as roofing insulation or using waste as a fuel – for example in kilns during cement production. Waste is now regarded as a resource, and this closed-cycle approach will result in a reduction to 20% of the city's waste. A key part of this programme is communication which is now gearing up to get stakeholders aware of the urgency and need to make recycling a culture. Recycling is also regarded as a potential revenue stream for Pickitup such as through composting of "green" waste which is then sold to the landscaping and gardening industry. Waste separation at source at household level is also now being piloted by Pickitup in Johannesburg included the use of large underground bins. This initiative can be replicated in other municipalities should the programme be a success.

Industrial best practice

Industrial best practice via cleaner production is being led by the NCPC-SA. Assessments conducted by the NCPC-SA as part of the cleaner production methodology make use of reduction at source as the primary and preferred option, since effective cleaner production is best achieved by preventing the generation of unnecessary waste in the first place. The process includes identification of where waste is generated and introduces options to reduce or eliminate it. This Municipal Income Grant includes products modification, good housekeeping, and choice of materials as well as technological changes to avoid and minimize waste. Internal recycling looks at recovering existing waste streams and reintroducing these streams back into the originating process. External recycling: is the lowest level of cleaner production and should only be considered once all higher options have been exhausted. This option looks at reusing a waste stream as a raw feed material for an alternate offsite process. Examples of this could include use of slag materials as aggregate in road building or brick manufacturing, biogenous cycles such as composting or methane generation for electricity generation.

Community-based waste management

SME based, labour intensive domestic refuse collection programmes have been shown to be an effective approach to dealing with the waste collection challenges in Republic of South Africa. This is true particularly in the extensive and generally low income urban, peri-urban and dense rural unserved communities in Municipalities throughout Republic of South Africa. Community-based waste management provides direct benefits to communities through recycling centres funded by the EPWP. A comprehensive guideline on recycling of waste in community recycling centres has been developed by government. Recycling drop-off and buy-back centres, scrap metal buy-in shops and garden waste drop-off centres provide containers for the collection of recyclables in several cities. The public can deposit their separated waste into different waste streams free of charge. Various models of recycling centres have been implemented through contractors, cooperatives, NGOs and/or other forms of CBOs. A dominant theme has been that SMEs need to be properly constituted as a legal entity to facilitate contracting by municipalities. Success has also depended on diligent planning, procurement and programme administration processes.

In Kwazulu Natal province an award winning Habitable Environments Partnership has been running successfully over the past four years. The programme now renders services and support to about 4 500 low-income households and involves a partnership between communities, an NGO and local government. The programme includes household refuse collection and has created employment opportunities for local residents, especially women from families where there are dependents and no

breadwinner. The programme has also helped to forge a co-operative relationship between local government and the community.

6.6 Challenges and opportunities

South Africa has some way to go before cleaner production, and waste avoidance and minimization is mainstreamed. Key challenges to sustainable waste management for South Africa include the need to break the link between economic development and the environmental impacts of waste; reduction of waste generation; integrating waste recycling into waste management systems; encouraging waste separation at source; and finding alternative waste treatment technologies to reduce the need for disposal at landfill. A need has been identified for regulation of separation of waste at source, and stronger requirements for remediation as well as duty of care. Further challenges and opportunities for waste management are outlined below.

Waste disposal facilities

Municipal waste is a major challenge for South Africa, as there is often limited capacity at local government level to ensure compliance and planning of sufficient landfill sites, and to prevent pollution of groundwater resources. Waste is frequently burned in the streets by impatient communities awaiting service delivery or in waste sites, which can result in the release of harmful substances such as dioxins and furans. The problems of unpermitted and insufficient landfill sites highlights that major progress needs to be made with regards to the management of landfill sites and waste streams. However, implementation of the policy away from landfill to more sustainable approaches for waste management including reuse and recycling will go some way to addressing the waste volume problem and at the same time provide economic opportunity for generating business from 'waste'.

Challenges at the municipal level are contributed to by institutional change and difficulty with meeting nationally-set objectives. Most municipalities require additional assistance with clarifying and operationalizing their sustainable development mandates. Inadequate integrated waste management plans and sustainability plans in many municipalities also remains a problem. Model by-laws that can be adapted to the local context could be useful in assisting local municipalities in putting required systems in place.

Capacity for waste service delivery

There are challenges associated with waste management services in most municipalities in South Africa, with technological solutions to waste management problems only offering part of the solution to the provision of sustainable waste services to all South Africans. The cost of provision of waste services remains an ongoing problem contributed to by inadequate direct financial recovery of certain waste services such as removal of litter and illegal dumping. Income for municipalities is mainly derived from revenue from service delivery, the equitable share and the Municipal Income Grant. However, municipalities serving relatively large numbers of poor households cannot collect sufficient revenue to support delivery of a wide spectrum of services. Thus revenue often relies on the sales of a few profitable services like electricity and water, and questions have been posed on whether this approach is sustainable. There is a call to review equitable share provided by the National Treasury to municipalities to take into account the number of indigents and higher needs in rural environments.

Capacity at the municipal level can be built through measures including the refinement and roll-out of the Integrated Development Plan environmental toolkits coordinated by government. Capacity building needs for local government need to be prioritized, and waste service delivery can be improved through: gearing up of community involvement; improvement of the information base used by cities to make decisions; recognition of the fluidity of population movements in search of work opportunities; and assistance by authorities with transforming urban Municipal Income Grants to urban citizens invested in their environment. Aligned to these requirements for service delivery is the need to move away from the apartheid urban form.

Opportunities for best practice can be maximised such as through partnerships, sharing ideas, learning experiences and up-scaling of small-scale successes. Identification of potential of outside funding agencies and improved efficiency in use of available funds such as the Municipal Income Grant further presents opportunities for improved waste management.

Maximizing private sector initiatives

The cooperation of major roleplayers including the mining sector is vital, given that cleaner production requires investment. Recycling presents a major opportunity for economic development and job creation, in line with the waste hierarchy policy. As such the restructuring of the recycling sector, which is currently dominated by a couple of large-scale recycling businesses, is necessary to ensure inclusion of BBBEE operators and informal sector role players. Adoption by business of the Cleaner Production Strategy and separation of municipal waste at source present opportunities for including energy production from methane. Through fiscal reform, incentives outlined in the NEM:WA can be implemented and business opportunities from waste can be geared up through the environmental goods and services sector.

Hazardous waste

A growing challenge relating to management of hazardous waste is the donation and sale to South Africa of electronic goods nearing the end of their productive life cycle. This can be equated with the import of E-waste that places a burden on compliance and enforcement for imports and local processing. E-waste does have economic potential through processing and recovery of metals but this needs strong regulation by the government considering the economic potential which it offers. Close regulation is also required for working and recycling of radioactively contaminated materials for further use such as NECSA's sale of uranium enrichment plant tails for re-enrichment and sale of contaminated fuel fabrication plant components.

The new policy on treatment of general and hazardous waste presents an opportunity for cement production plants located across South Africa to treat wastes through co-processing, in line with international trends. It further contributes to South Africa meeting its international commitments in terms of the Stockholm and Basel Conventions. There is a concern amongst civil society that the burning of hazardous waste in cement kilns may increase the burning of hazardous waste in cement plants in the rest of Africa.

A further need is the provision of facilities required for the disposal of fluorescent lighting and for 'penlight' batteries, garden pesticides and other hazardous household wastes. Municipalities can drive the process for retailing companies to adopt the 'cradle-to-grave' approach and take responsibility to ensure reuse, recycling, and as a last resort safe disposal.

Compliance and enforcement

Non-compliances including by local authorities remain a challenge compounded by human resource capacity. Many illegal waste disposal sites have developed for reasons including delayed collection services, long transport distances to formal disposal sites, the refusal by the public or industry to pay landfill fees, an indifference to the environmental consequence of poor waste handling and disposal and the lack of waste education and awareness. Metal recycling in South Africa has also resulted in serious challenges through metal buy-in shops purchasing property made out of metal stolen from government and the private sector.

6.7 Conclusion

There has been good progress towards the implementation of JPOI targets 22 and 23 which are pertinent to waste management. Of relevance is the ratification of international MEAs as these relate to waste management (see Section 3 which deals with aspects related to chemicals). Of particular importance for South Africa has been the development of policy and legislation, culminating in the recent enactment of the NEM:WA with far-reaching ramifications for implementation of environmentally sound waste management. Application of a hierarchy of waste management which focuses on waste avoidance and minimization rather than disposal is central to the approach being implemented.

Improvements in provision of waste services include the right to free basic services including waste removal. The dynamic nature of the location of much of the population in South Africa is proving a challenge to ensure that this system is in place. Compliance and enforcement have been given a boost through the empowerment of the 'Green', as well as 'Blue Scorpions', and now further resources need to be allocated to ensuring that the policy and legislation is translated into the regulatory framework. Opportunities for economic instruments which can provide incentives for waste avoidance and minimization need to be encouraged. Cleaner production which has now been initiated on a pilot scale now amongst industries needs to be applied on a far larger scale, a particular challenge for the mining industry which is the largest generator of waste in South Africa. Resources also need to be directed to change in behaviour of the public towards waste avoidance, minimization and recycling needs to become entrenched in the day-to-day behaviour of the public. Expansion of community-based recycling and waste management, in tandem with structuring initiatives in the waste industry towards improved BBBEE compliance represents a key opportunity for sustainable management of waste.

7 Sustainable Production and Consumption Patterns

7.1 Thematic context

Sustainable Consumption and Production (SCP) is broadly defined as a holistic approach to minimizing negative environmental impacts from production and consumption in society and it can be considered as a practical implementation strategy to achieve sustainable development. It involves the production and use of goods and services that address basic needs and improve quality of life, while minimising the use of natural resources, toxic materials and release of wastes over the life cycle of the activity. The main objective of SCP is to promote social and economic development within the carrying capacity of ecosystems and to de-couple economic growth from environmental

degradation. At the WSSD in 2002 the global community undertook to take action to change unsustainable consumption and productions patterns, reinforcing the commitments to Agenda 21. Furthermore, countries agreed to encourage and promote the development of a 10-year framework of programmes (10YFP) in support of SCP.

SCP is relevant in the South African context given the resource intensive nature of its economy, which is energy intensive due to the low cost of coal and the historical dominance of primary sectoral activities such as mining, mineral processing, metal smelting and synthetic fuel production. South Africa has also witnessed the dramatic growth in the consumption of natural resources. The agricultural, manufacturing and industrial processes consume large quantities of the country's available water resources. Pollution arising from economic activities, including domestic use, has resulted in a decline in the quality of surface water resources posing direct and indirect threats to humans as well as ecological functioning.

Increasing global attention on SCP coupled with the growing scarcity of resources and cost of treating and managing waste in South Africa, has contributed to greater receptiveness by government, business and citizens to change unsustainable patterns of consumption and production. For background on sustainable development as this relates to SCP in South Africa refer to Section 2.

7.2 JPOI targets

Chapter 3 of the JPOI presents the targets (15-23) for changing unsustainable patterns of consumption and production. These can be summarized as follows:

- Adoption and implementation of policies and measures promoting SCP;
- Integrate SCP into sustainable development policies, programmes and strategies, poverty reduction and national development priorities;
- Integrate energy considerations, including energy efficiency, affordability and accessibility, into socio-economic programmes, especially policies of major energy consuming sectors, and into planning, operation and maintenance of energy consuming infrastructures, such as public sector, transport, industry, agriculture, urban land use, tourism and construction;
- Diversify energy supply by developing advanced, cleaner, more efficient & affordable and cost effective energy technologies;

- Inclusion of measures and policies to improve environmental and social impacts of products (e.g. life cycle analysis, energy efficiency standards, internalization of environmental and social costs);
- Promotion of Corporate Social and Environmental Responsibility and eco-efficiency and eco-design programmes;
- Policies and/or infrastructure to support citizens' choices for responsible consumption of products, including consumer information tools.

7.3 Progress

7.3.1 Participation in international processes

South Africa has actively participated in a number of international processes that aim at furthering SCP objectives globally, regionally and nationally. The South African Government signed the JPOI which commits governments to changing unsustainable patterns of consumption and production by means of a 10-year framework of programmes (10YFP) on SCP. The Marrakech Process was launched in 2003 as a global process to support the elaboration of a 10YFP. South Africa participates actively in the Marrakech processes. The African Roundtable on Sustainable

Consumption and Production (ARSCP) was set up following its endorsement at the AMCEN in March 2005 of which South Africa was actively involved.

The African 10YFP on SCP was developed in the context of the Nepad and in close consultation with the 4th ARSCP and AMCEN, and launched in May 2006. ARSCP-5 was held in South Africa, Johannesburg in June 2008 and was part of the Marrakech process focussed on development of SCP programmes, eco-labelling, businesses and SCP and mainstreaming sustainability in universities. The overarching priorities of the African 10YFP on SCP included energy, water, sanitation, habitat and urban development and renewable resource based industries. South Africa in collaboration with UN agencies hosted a national roundtable on SCP with the view of identifying key SCP priorities for the country. The key priorities identified included the sector of energy and climate change, integrated waste management, sustainable procurement, sustainable construction and building.

Several multilateral agreements have been signed and/or ratified and/or acceded to by South Africa that embed principles, programmes and/or plans that address issues pertaining to consumption and production. These include the Stockholm Convention on Persistent Organic Pollutants, the Basel Convention on Control of Transboundary Movement of Hazardous Waste and the Rotterdam on Prior Informed Consent. South Africa is also signatory to both the United Nations Framework Convention on Climate Change and the Kyoto Protocol. As such, the country recognises the grave risks posed to our planet by global warming and is committed to playing its part to take necessary action to respond to the challenge of climate change. In particular South Africa finds itself in a situation in which it is both a high emitter of greenhouse gases, as well as a country predicted to experience the impacts of climate change in a severe manner. Several South African researchers and scientists contributed to the Intergovernmental Panel on Climate Change's Fourth Assessment Report.

Cleaner production is being used as a means to encourage and promote SCP. South Africa has participated on bilateral programmes with international cooperation partners to create awareness, build institutional capacity and demonstrate the benefits of cleaner production in projects in the fishing, metal finishing and textile industry sectors. In 2003 the NCPC-SA was set up to accelerate the dissemination of the cleaner production concept.

7.3.2 Developments in national policy and legislative framework

The objective of SCP as set out by the JPOI target has been strengthened by a progressive Constitution and range of laws and policies, which are listed below.

Environmental management

Section 24 of the *Constitution of the Republic of South Africa, Act 108 of 1996* provides that everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: 'prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.' The *White Paper on Environmental Management Policy for South Africa (1998)* sets a number of objectives for integrated pollution and waste management, including the setting up of information systems on chemical hazards and toxic releases and ensuring the protection and proactive management of human health problems related to the environment in all forms of economic activity. It identifies eco-labelling, eco-accounting and the reporting and publication of information as some of the ways of

promoting accessibility of information. This policy informed the development of the *National Environmental Management Act 107 of 1998* (NEMA). South Africa's framework environmental statute, the NEMA, provides for environmental management principles including resource efficiency, waste minimisation and sustainable procurement, which are important from a SCP perspective. Section 28(1) of NEMA states that: 'every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, ...to minimise and rectify such pollution or degradation'.

NEMA set in motion a process of environmental law reform which culminated in the enactment of statutes and regulations addressing air quality and waste management which are central to the promotion of SCP in South Africa. South Africa has promulgated EIA Regulations in terms of NEMA to ensure that environmental considerations of development proposals are explicitly addressed and incorporated into decision-making hence advancing sustainable development.

Energy

The *White Paper on Energy Policy* (1998) aimed to ensure that the energy sector contributes nationally to economic growth and job creation, responds to competitive energy markets and promotes renewable energy sources to reduce emissions from energy generation. It promotes the investment of an equitable level of national resources in renewable technologies, given their potential and compared to investments in other energy supply options. The *White Paper on the Renewable Energy Policy (2004)* supplements the White Paper on Energy Policy by recognising that the medium and long-term potential of renewable energy is significant. The policy's target of 10 000GWh renewable energy contribution to final energy consumption by 2013 was confirmed to be economically viable with subsidies and carbon financing.

Responding to the White Paper on Energy Policy to achieve energy security and diversify primary energy sources, the *Nuclear Energy Policy* (2008) serves as the Government's commitment to the further development and expansion of the existing nuclear energy sector in a coordinated approach. The goal is to have between 20 to 25% of electricity generated by nuclear power compared to about 6% today. The *National Energy Act 34 of 2008* provides for wider access to energy services whilst ensuring that the environmental impacts of energy conversion and use are minimised as far as possible. The Act mandates the establishment of an integrated energy plan every five years that incorporates sustainable development, effective management and use of natural resources and balancing energy supply and demand. The *Electricity Regulation Act (Act 4 of 2006 as amended)* makes provision for regulations to be promulgated to ensure that incentives and penalties are legislated in order to implement the Power Conservation Programme.

Water management

The *White Paper on a National Water Policy* for South Africa was adopted in 1995. It set out the policy of government for the management of both quality and quantity of our scarce water resources and laid the foundation for the establishment of the National Water Act. The promulgation of the *National Water Act 36 of 1998* gave effect to Section 27 (1) b of the Constitution that states that "Everyone has the right to have access to sufficient water". In addition to repealing over 100 Acts dealing with water into one consolidated Act, it set out the South African vision for managing water resources. Of relevance to SCP, the purpose of the National Water Act ensures that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst others; 'promoting the efficient, sustainable and beneficial use of water in

the public interest; facilitating social and economic development; reducing and preventing pollution and degradation of water resources; and meeting international obligations'. The Act established the framework for the development of a national strategy for water management aimed at strengthening governance of water resources, including the authorisation of water use.

Cleaner production

Cleaner production is not specifically legislated in South Africa at present. However the country has developed a Cleaner Production Strategy in 2005 and as well as progressive environmental, water and waste laws and overarching policies aimed at sustainable development and sound environmental management which promote waste minimization through avoidance, reduction and adoption of cleaner production approaches. Some laws have begun to apply economic instruments to promote electricity and water conservation. The Cleaner Production was further entrenched in national strategies through the Integrated Manufacturing Strategy and National Research and Development Strategy of government.

Sustainable public procurement

The *Green Paper on Public Sector Procurement Reform* released in 1997 states that "Organs of State can encourage their suppliers, service providers and contractors to behave in an environmentally friendly way by integrating environmental concerns within their procurement activities. Government is tasked to implement policy to 'influence the behaviour of vendors to: comply with all environmental legislation; offer less environmentally damaging products and services; and develop products from recycled materials'. Laws dealing with preferential procurement serve the purpose of the social component of sustainable public procurement, which is an important consideration in SCP. The *Public Finance Management Act (Act 1 of 1999 as amended by Act No. 29 of 1999)* requires that all government departments maintain a 'fair, equitable, transparent, competitive and cost effective' procurement system. The *Local Government: Municipal Finance Management Act 56 of 2003* covers the supply chain management functions of local government. Other key legislation influencing this function includes *Preferential Procurement Policy Framework Act (2000)*, *Preferential Procurement Framework Regulations (2001)* and the *National Treasury Regulations (2005)*. Moreover, the Black Economic Empowerment Codes of Good Practice, which were released by the dti in 2007, have begun to impact on supply chain management.

Corporate social and environmental responsibility

Following the successful and internationally respected King I and II codes of corporate governance, the third King report, King III Code of Governance Principles was released in August 2009. Following King II, the Johannesburg Securities Exchange required listed companies to include in their annual report a narrative statement as to how they had complied with the principles set out in King II. South African listed companies are regarded by foreign institutional investors as being among the best governed in the world's emerging economies and King III aims to maintain that high ranking. King III is also a non-legislated code that operates on a '*comply or explain*' basis, as opposed to other codes that operate on a '*comply or else*' basis. King III has made considerable progress in mainstreaming sustainability issues into the governance framework of companies.

Consumer protection and awareness

Consumer protection and awareness measures are scattered in a number of policies, statutes, among others, the Bill of Rights in the *Constitution Act 108 of 1996*, which entrenches the fundamental rights of citizens of South Africa. These rights include, but are not limited to the right to education (section 29) (consumers have the right to education that will empower them to make informed and confident choices about goods and services). The *Consumer Protection Act 68 of 2008*, which comes

into effect on 29 October 2010, integrated the principles of SCP by recognising that it is desirable to promote an economic environment that supports and strengthens a culture of socially responsible use of environmental resources. Drawing on the framework provided by the *Draft Green Paper on the Consumer Policy Framework (2004)*, the Act aims to advance the social and economic welfare of consumers in South Africa by improving consumer awareness and information and encouraging responsible and informed consumer choice and behaviour. By means of the Act, consumer education, including education concerning the environmental, social and economic effects of consumer choices will be promoted and provided for.

7.3.3 Actions in response to international and local policy

This section presents some of the key actions that have been undertaken in response to international and local policy aimed at promoting SCP.

Energy

The Energy Efficiency Strategy (2005) was the first consolidated governmental document geared towards the development and implementation of energy efficiency practices in South Africa. The strategy provides clear and practical guidelines for the implementation of efficient practices within South Africa's economy, which includes the setting of governance structures for activity development, promotion and coordination. While the strategy aims to contribute towards affordable energy for all, it is also focused on minimising the negative effects of energy usage upon human health and the environment. The strategy proposes a final energy demand reduction of 12% by 2015 for South Africa. Some key initiatives being undertaken in support of this target include: the Electricity Conservation Programme instituted by the Government following the release of the National Response to South Africa's Electricity Shortage; electricity rationing being implemented by the National Energy Regulator of South Africa (NERSA) in terms of the Electricity Regulation Act of 2006 as amended; Eskom and Local Government programmes aimed at customer behavioural change such as projects rolling-out the use of incandescent lights in the domestic and commercial buildings. Through its Integrated Energy Plan the government promotes the diversification of energy mix and a move towards alternative energy sources such as nuclear power and natural gas, as well as various forms of renewable energy.

Climate change

The National Climate Change Response Strategy (2004) was government's first formal provision of policy direction for national climate change responses. The initiation of a dedicated climate change response policy development process took place at the National Climate Change Conference in 2005. The conference provided a detailed list of climate change interventions to be implemented by government, business and industry, scientists and non-governmental organisations. Through this consultative process, the government committed itself to the participatory development of a comprehensive, integrated, coherent and cohesive National Climate Change Response Policy. In March 2006 government mandated a national process of building scenarios of possible greenhouse gas emission futures informed by the best available research and information. The Long-Term Mitigation Scenario (LTMS) was borne out of this process. The broad policy themes encapsulated in the LTMS include the following; GHG emission reduction and limits, build on strengthening and/or scale up current initiatives, implementing the business unusual call for action, preparing for the future, vulnerability and adaptation and alignment coordination and cooperation.

A number of national government departments, parastatal institutions and provincial authorities have initiated processes to develop climate change response plans. While South Africa is a participant in

the Clean Development Mechanism (CDM) under the Kyoto Protocol it has approximately 15 projects registered with the CDM. A number of CDM projects have been initiated in the private industry with financial benefits which will generate huge flows of funds for investments in low carbon infrastructure in South Africa.

Waste management

The National NEM:WA provides for the introduction of Extended Producer Responsibility (EPR) as a mechanism for bringing about waste reduction in South Africa, through the minimisation, reuse and recycling of waste products. The National Waste Management Strategy of 1999 set in motion a process to implement the most realistic and practical approaches to apply EPR. There are a number of mandatory initiatives in South Africa that aim to promote the reduction, reuse and recycling materials such as plastic and tyres. Many voluntary Product Stewardship and EPR initiatives exist, and are at various stages of development or implementation. Research indicates that these initiatives run in parallel on a voluntary and subsidised basis in glass, plastics, paper, packaging, steel and tin, oil, pesticides, E-waste and chemical industry sectors. In almost all cases, they are aimed at post-consumer waste streams, and it has taken many years to develop systems as well as achieve sufficient buy-in from stakeholders as well as to develop markets for the products or recyclables.

In South Africa E-waste (Electronic waste) is a significant contributor to hazardous waste disposal and includes computers, entertainment electronics, mobile phones and other items that have been discarded by their original users. An E-waste Association (eWASA) has been established by a group of concerned individuals to ensure the environmentally sound management of E-waste in South Africa. Coordinating bodies such as the Information Technology Association also play a vital role in promoting proper E-waste disposal. In 2007 the association held a conference to identify the key role players in the E-waste sector in South Africa.

Integrated water resources management

The 2004 National Water Resource Strategy set out several mechanisms to manage South Africa's water resources in an integrated manner. The proposed mechanisms are broadly divided into 'resource' and 'source-directed' controls. Resource-directed measures focus on the overall health or condition of an aquatic ecosystem that provides the abstracted water, and they assess its ecological status. The latter takes into account the user requirements and the biological, chemical and physical attributes of a resource. Specific actions in terms of resource-directed measures that are receiving attention at national level in respect of water quality management include the following: formulating objectives for managing sources of pollution and associated single-source interventions; benchmarking water-resource quality; identifying emerging threats to water resource and prioritizing action; and establishing priorities in relation to issues such as the remediation of water resources and degraded land, as a focus for regulation using source-directed controls. Source-directed controls focus on the use of the water resource and are intended to achieve the desired level of protection. The government uses water use licencing (through regulation), water use associations, water conservation and demand management (benchmarking of efficient water use, sector specific plans and control of invasive alien plants) and water pricing (water use charges, combined with financial assistance) as a means to control the use of water at source.

The Water Research Commission has funded research and published reports on many aspects of water resource management. One notable strategic initiative is the Water Resources of South Africa

2005 Project through which hydrological, meteorological, geohydrological (groundwater), and some water chemical data are being updated for catchments in South Africa.

Cleaner production

In 2003 the NCPC-SA was established to facilitate industrial development through energy, water and materials efficiency, which results in waste minimisation. Over the subsequent years, the Centre has spearheaded cleaner production demonstration projects in agro-processing, chemical, automotive and clothing and textiles sectors. In 2004 the DEA released the draft National Cleaner Production Strategy with the vision 'to enable South African society and industry to develop its long term full potential, by adopting the recommendations of Chapter 3 of the JPOI on sustainable consumption and production'. The strategy was revised in 2006 to recognise the South African Environmental Goods and Services sector. Cleaner production implementation at a company/business level is guided by the NCPC-SA's 5 Year Strategic Plan that commenced in April 2009. It is envisaged that this strategy will be further elaborated to encompass all areas of the economy as well as the consumption elements.

Eco-labelling

In a move towards addressing the broader eco-labelling framework, South Africa has been selected as a pilot country for UNEP's initiative to promote eco-labelling in African countries. Being undertaken by the NCPC-SA, the Eco-labelling Project utilizes the Clothing and Textile Industry as its pilot and laboratory for the development of a broader and overall encompassing eco-labelling system in South Africa.

The National Eco-label Initiative (NELI) is a public-private partnership involving many actors in the country such as NCPC-SA, Council for Organic Development (SACODAS-SA) and Sustainability, Green Choice, Proudly South Africa and Indalo Yethu, an independent trust of the DEA endorsing brand promoting eco-friendly lifestyles. NELI builds on the experiences and lessons learnt of other labelling initiatives in the country.

Corporate social and environmental responsibility

South African business participates in a number of initiatives working towards growth and sustainable development and promotes SCP. The *National Business Initiative* (NBI) is a voluntary group of leading national and multi-national companies that aims to advance development in South Africa through partnerships, practical programmes and policy engagement. The NBI is one of close to 60 global regional partners to the World Business Council for Sustainable Development, and provides a platform for business leadership and a vision of how companies can contribute to a sustainable society. The NBI became the focal point of the United Nations Global Compact in South Africa in 2007. These initiatives link indirectly to SCP and more direct linkages include the NBI spearheading the *Energy Efficiency Accord* as well as corporate South Africa's involvement in the Carbon Disclosure Project.

South African companies have participated in the Carbon Disclosure Project since 2007, with 74% of the top 40 Johannesburg Securities Exchange (JSE) listed companies participating in the production of a Carbon Disclosure Project report in 2008. South Africa is the only African country participating among 30 other countries and disclosure levels indicate growing levels of company awareness of and responses to climate change.

Largely due to the influence of the King II Code of Corporate Governance which recommended sustainability reporting and was a listing requirement for the JSE, 86% of the largest companies produced sustainability reports in 2007-2008. The quality of reports and the number of third party assured reports is increasing and many are being compiled using the Global Reporting Initiative's (GRI) G3 Guidelines. In 2008, 48 companies had registered their reports with the GRI. The new King III Code on Governance Principles requires the GRI guidelines to be used as the sustainability reporting framework. In addition to the King codes, the JSE's Socially Responsible Investment Index (SRI), requires substantial disclosure of sustainability related performance from index-listed companies (refer below for further details of the SRI).

Corporate South Africa's participation in Responsible Care is also increasing. The Chemical and Allied Industries' Association (CAIA), the custodian of Responsible Care in South Africa has 191 members, of which 160 are members of Responsible Care. CAIA has fully implemented third party verification of Responsible Care. The first round of verification audits of mature Responsible Care signatory members was in 2007 with re-verification required every 2 years. CAIA is a signatory to the Energy Efficiency Accord and has been collecting energy consumption data from Responsible Care signatories since 2003. Data indicates that energy efficiency has improved by 13% over the intervening years. CAIA also collects and reports on water usage, waste production, air emissions and carbon emissions in Responsible Care signatories.

In the mining sector there is considerable increase in participation by South African companies and other organisations in corporate social and environmental responsibly programmes. The South African banking industry is also increasing its participation in international initiatives. Three of the four large commercial banks in South Africa are signatories to the Equator Principles (EPs) and several are involved in the United Nations Environment Programme's Finance Initiative, the African chapter of which is co-chaired by the Banking Association of South Africa and Nedbank.

Sustainable public procurement

In 2007, the South African Government initiated a joint process with National Treasury which will lead to National Budget interventions which support sustainable development, with a long term view of making an economic case for the environment. Sustainable public procurement policies have been adopted and implemented across various institutions in both the public and private sectors. While sustainable public procurement is still a relatively new concept in South Africa, environmental criteria have, to a certain extent, started playing a role in public procurement decisions. For larger development projects, all state entities in South Africa already consider environmental criteria through environmental impact assessments that are required by national law.

Furthermore, economic instruments have been used in the past to promote the development of certain markets and initiatives and green procurement is seen in the same light.

Green buildings

The adoption of green buildings in South Africa has grown intensely with various awareness campaigns and projects. The Green Buildings for Africa Initiative was developed by the CSIR in 2001 with the objective of drafting of guidelines for green buildings and the promotion of these guidelines amongst the building and construction industry. The Green Building Council of South Africa (GBCSA) was formed in 2007 to drive the adoption of green building practices in the South African property industry, and move the industry towards sustainability. The Council promotes the adoption of green building principles by creating awareness and knowledge transfer and making

resources available. It is also in the process of setting up a rating system for green buildings. This process has been given impetus with the adoption of green building guidelines for use by local municipalities.

Infrastructure efficiency

Public transport is a useful indicator of urban sustainability: good public transport makes cities more accessible and reduces the need for private transport. Between 2003 and 2006 the use of public transport, including trains, buses and taxis, increased both as a share and in absolute terms. This is being addressed by large public-private investments such as the Rapid Bus Transit System and the Gautrain. Some city municipalities have responded by developing strategies to place greater emphasis on improved billing, streamlined procurement, infrastructure upgrades and maintenance and public transport integration.

Work in progress

- The Solar Water Heating Programme is being implemented by Eskom which aims to install 1 million solar water heaters over the next three years. Eskom's Supply Side Management Strategy for power generation aimed at reducing by 3 000MW by March 2011 and a further 5000MW by March 2026.
- The DEA is currently investigating the establishment of green procurement guidelines for the 2010 Football World Cup; piloting green procurement internally with certain quick win product areas.
- The country is in the process of setting up infrastructure for green technology.
- Improvement of municipal recycling facilities is currently underway.
- The South African Government has developed a Framework for Sustainable Development which aims to strengthen the alignment in management, funding and implementation for sustainable development in South Africa. The Action Plan, which is presently under development, will identify specific activities, tools, policies, measures and monitoring and assessment measures, including where appropriate, life cycle analysis and national indicators for measuring progress.

7.3.4 Monitoring and evaluation

Monitoring and evaluation (M&E) are key areas requiring urgent attention at all levels, in order to improve the governance framework for sustainable development. Although formal policy assessment programmes for this purpose exist in most governmental agencies, systematic and co-ordinated implementation of these programmes has not happened to date. Currently, various cross-sectoral policy assessment initiatives exist in national departments and other agencies, including the National Monitoring System of the Public Services Commission, the National Provincial and Local Government Monitoring and Evaluation System; the National Environmental Monitoring System of the Department of Environmental Affairs; and the National Statistics System of StatsSA. While relatively few departments have specialised M&E units, most have introduced some kind of quantitative monitoring and many still rely on staff reports of varying quality. More effective co-ordination between the abovementioned initiatives and all other government departments and agencies is crucial.

The Government-wide M&E System (GWM&ES) is an attempt by the public sector to monitor internal government performance and evaluate the nature of external outcomes and impacts on South

African society. This system will monitor and coordinate progress with the implementation of government policies and improve effectiveness and efficiency in government operations by ensuring that strategic governmental policy goals are directly linked to departmental operational action plans and to the national budget. At a sectoral level, there are a number of information systems that aim to establish a sound benchmark for monitoring change, including the Water Services National Information System and the South African Waste Information System.

South Africa has witnessed the development of a series of sustainability-oriented reports, which includes the development of over 25 state of the environment reports between 1998 and 2006, completing the second national State of Environment report, as well as state of the environment reports for the majority of the provinces and the largest cities. A growing number of local authorities have recently initiated reports. In addition, several national status quo reports have been developed on the State of Rivers, State of Coasts and State of Cities.

M&E in the private sector is being undertaken by a number of means. Two notable initiatives are the Socially Responsible Index (SRI) run by the JSE Securities Exchange and the Sustainability and Transformation Report prepared by the Chamber of Mines. The mining sector has recently developed its first Sustainability and Transformation Report for the South African Mining Industry based on both the reporting guidelines of the Global Reporting Initiative (GRI) as well as the Mining Charter scorecard. In terms of the King codes on corporate governance, the JSE requires listed companies to include in their annual report a narrative statement as to how they had complied with the principles set out in King II.

Organisations dealing with consumer protection and awareness often undertake surveys to ascertain the consumer perceptions and practices. The dti regularly conducts research amongst South African consumers and community surveys are also conducted by Statistics South Africa on a regular basis.

7.4 Means of implementation

7.4.1 Capacity-building, education, training and awareness-raising

South Africa, like other developing countries in a rapidly globalising world, needs to develop a literate and technically skilled population. Trends however show that there is a mismatch between South Africa's current skills base and the skills needed for the country to be globally competitive. The majority of South African's are employed in elementary occupations in labour-intensive economic sectors such as agriculture and mining which tend to be sensitive to fluctuations in national and global markets. A number of initiatives are being implemented to address the limited skills base. The DST has developed the Youth into Science Strategy and is in the process of finalising the SET Human Capital Development Strategy which aims to address the low rates of academic achievement in Mathematics and Science in the country, and to increase the number of African learners studying these subjects. The National Skills Development Strategy (NSDS) set up by the Department of Labour in support of the 1998 National Skills Development Act provides a useful mechanism to better direct and coordinate skills development initiatives in the country.

The DST established two research hubs for energy efficiency and renewable energy that are currently doing both research work and postgraduate training. Research chairs focusing on second and third generation biofuels, nuclear energy, and clean coal technologies have been established. Human capital challenges in the nuclear power sector are being addressed through the South African Nuclear Human Asset Research Programme, which funds over 160 South African students for

studies related to nuclear energy. DST has established three Centres of Excellence to undertake competitive research and development in the fields of hydrogen and fuel cell technologies. The 'Centres of Excellence' programme within the higher education sector has been internationally peer rated for its research excellence, and covers areas of biodiversity, strong materials, chemical analysts and post-genomic research.

The training and awareness raising on issues that pertain to SCP is provided by a range of organisations, including professional institutes such as the Green Building Council, the NCPC-SA. Awareness raising is a tool used by a range of organisations in the public as well as private sector. The objective of these initiatives are to convey information to the South African public, consumers and clients that has a bearing on them and/or which they need to respond by changing their behaviour. These campaigns are directed via the media as well as a range of publications. Noteworthy examples include campaigns aimed at encouraging consumers to conserve electricity and water and minimize and recycling waste. In support of the Consumer Protection Act, the dti has embarked on a national wide consumer protection campaign. The aim of the campaign is to educate consumers about their rights and responsibilities.

7.4.2 Mobilisation of financial resources

The mobilisation of financial resources is critical to the success of SCP. A key source of funding is government budgets although there are a range of competing priorities for these funds.

There is an increasing focus on environmental economic instruments (e.g. taxes, levies, charges, fees and incentives) for natural resource management and environmental protection. New legislation such as the National Environmental Management: Air Quality Act 39 of 2004 allows for the use of charges and taxes in pursuit of environmental management objectives.

Extended Producer Responsibility (EPR) mechanisms are also a source of funding. The range of mechanisms comprise a mix of voluntary and mandatory schemes, and focus on take-back programmes with the inclusion of recycling and re-use targets. To date, a number of these instruments have been more commonly applied. Packaging and labelling schemes, for example, have been widely applied whereas leasing or servicing agreements have found less favour amongst authorities and private entities. A number of sectors, notably in the glass, paper and metals industries, have set up Section 21 companies to champion take-back and recycling initiatives.

7.4.3 Technology development, transfer and dissemination

Technology development, transfer and dissemination are key elements to the advancement of SCP. In South Africa government mandate on this aspect is spearheaded by DST. Although constrained by limited funding for R&D, technology development is being promoted through a number of initiatives. In 2006, DST launched a Ten-Year Innovation Plan (2008-2018) to help drive the country's transformation towards a knowledge-based economy, in which the production and dissemination of knowledge leads to economic benefits and enriches all fields of human endeavour. While the country's science and technology system has taken important strides forward, there is a tremendous gap between South Africa and those countries identified as knowledge driven economies. Grand challenges include clean coal technologies and embracing renewable energy (less than 1% (40 000 MW) of SA energy requirements comes from renewable. Clean coal technologies are being promoted to improve low quality coal, and uses large quantities of discard coal for economic and energy purposes through beneficiation. Three Centres of Excellence established by DST to undertake competitive R&D in the fields of hydrogen and fuel cell technologies.

During 2005 and 2007, there were the nominal, once-off capital subsidies to assist project developers in implementing economically sound projects based on natural resource availability, and that are readily funded by financial institutions. These technologies include: sugar-cane bagasse for cogeneration; Landfill gas extraction; Mini-hydroelectric schemes; and commercial and domestic solar water heaters.

The NCPC-SA has focused on industry sectors and associations requiring assistance regarding compliance with existing and proposed local and international regulations. The NCPC-SA acts as a platform for advice and information on Best Available Technologies (BAT) for specific environmentally sound production technologies in a number of sectors. This has fostered substitution and elimination of hazardous chemicals and processes leading to Cleaner Production interventions along the supply-chains. Rural innovation, in agriculture, dairy farming, mining, forestry and fisheries are still vibrant traditions in many regions and must to be fostered by strategic Cleaner Production interventions. There are also innovations made in recycling and reuse of wastes in urban areas, particularly in the informal sector that warrant some attention.

In order to advance energy security and leverage the country's automotive capabilities, the DST funded the development of an electric vehicle designed in South Africa called the Joule. A working prototype of the Joule was launched in Cape Town and at the Paris Motor Show, France, in October 2008. Through stakeholder engagement, the Department is now initiating the industrialisation of this innovation.

7.4.4 Participation of major groups

SCP initiatives aim to encourage the participation of major groups, including women, youth and local communities in decision making and participation. Government involves major groups in the preparation and roll out of sectoral programmes and projects that focus on implementing the energy efficiency, recycling and sustainable housing. Government initiatives and processes where participation formed a strong component include the 'Basa Njengo Magogo Project' which aims to develop and manufacture cleaner fuels for use in conventional coal stoves and design houses to require less space heating by means of insulation and ceilings. The Youth in Housing Programme of the Department of Human Settlements empowers youth through technical skills training by National Home Builders Registration Council (NHBRC) and life skills training. Government's Expanded Public Works Programme (EPWP) is actively used to create work opportunities for major groups, including women, youth and people with disabilities on infrastructural projects.

7.5 Lessons learned and best practices

The implementation of initiatives aimed at promoting SCP has highlighted a series of lessons as follows.

- It has taken time for government to institute economic instruments to promote SCP activities. These measures have been taken in response to the rising cost resources, decline in quality and challenges associated with managing the disposal and treatment of waste.
- The energy crisis in South Africa has resulted in a massive promotion of energy efficiency practices and of investment in renewable energy technologies.
- Inadequate awareness about the benefits of SCP has meant that industries need

assistance to implement measures aimed at reducing the use of resources and promoting the minimising, reuse and recycling of waste. General environmental awareness levels are expected to grow in the near future following enactment of legislation aimed at consumer protection and awareness.

- While socially sustainable procurement has been a focus for several years already, most companies are only beginning to understand the importance of the procurement leverage they hold to improve the overall environmental impact of their business operations.

Activities contributing to the SCP in South Africa have led to a host of **best practices** especially as it relates to energy efficiency, water conservation, waste management, social responsible investment and consumer awareness.

- **Energy efficiency:** In 2008 a number of mines were nominated for the mining category of the eta (Greek symbol for efficiency) Awards which reward exceptional effort in the more efficient use of energy by individuals, students, companies or other institutions, and improve business competitiveness. In support of the Energy Efficiency Accord, Xstrata-Merafe Chrome Venture invested massively in World Class Energy Efficient furnaces. The company invested R2.4 billion in projects to save approximately 12.7% on energy consumption. The energy saving pellets produced by the Bokamoso project achieve a total saving of 452,000 megawatt hours per annum when the smelters it supplies are in full production.
- **Water conservation:** In an effort to reduce water losses and wastage, the City of Cape Town has started installing water management devices in high water consumption areas that offer real benefits for the city's poorer citizens. The water management device is a meter which replaces the existing meter and it is programmed to dispense a pre-agreed amount of water each day. This amount can be set to just the free 6kl (200 litres/day) that indigent households qualify for or to any amount the household can afford to pay.
- **Waste minimisation:** Since 2006 clubs were established to influence inputs and outputs of processes and businesses, including utility use (water, electricity, coal, steam etc.), raw materials, consumables (items used in the process), packaging, liquid wastes, solid wastes and air emissions. By minimising the use of the inputs to the process, the wastes produced will be reduced. There has been a total of 28 Waste Minimisation Clubs initiatives in South Africa.
- **Social Responsibility:** The Johannesburg Stock Exchange (JSE) has developed criteria to measure the triple bottom line performance of those companies in the FTSE/JSE All Share Index that choose to participate. In this regard, the JSE launched the first emerging market index, the Socially Responsible Investment (SRI) Index in May 2004. The SRI index is built on four pillars of sustainability, namely corporate governance, the economy, the environment and society. There are 61 companies currently listed on the SRI index.
- **Consumer awareness:** The advent of the partnership initiative, the Southern African Sustainable Seafood Initiative comes at a time where international consumer awareness has become a current topic. This initiative provides accurate and relevant information and widely publicising seafood issues, local consumers will be able to field similarly

awkward questions, and that restaurateurs will be able to answer them satisfactorily.

7.6 Challenges and opportunities

Although South Africa has progressed well in encouraging and promoting SCP there are a number of challenges that need to be addressed. In many instances the challenges presented below present opportunities for strengthening SCP efforts in the country.

Information

Gaps in environmental data remain, which greatly hamper efforts to make better policy decisions. There is also a general need to improve the availability of quantified data on the environmental, economic and social costs and benefits of implementing cleaner production practices. There is a move to fill gaps through initiatives such as the South African Waste Information System and National Greenhouse Gas Inventory. The NCPC-SA has done much to raise the awareness and practice of cleaner production in South Africa. The NFSD process offers an opportunity to integrate sustainability indicators into the Government Wide Monitoring and Evaluation System.

Resource efficiency

The low cost of resources such as water and electricity has in the past contributed to patterns of production and consumption that are wasteful and inefficient. This situation has been exacerbated by the generation and treatment of waste which are costly from a financial and health perspective. These unsustainable patterns have been mirrored by consumers especially those in more affluent communities. The energy demand crisis in 2008 resulting in inadequate power led to concerns about the impact of energy on economic development as well as presenting the opportunity for improved integration of clean energy into the South African energy mix. It has given significant impetus to the search for safe, clean, affordable and reliable energy supplies to meet South Africa's medium-term energy supply requirements while innovating for the long term in clean coal technologies, nuclear energy, renewable energy and the promise of the hydrogen economy.

Skills and research and development

South Africa is faced with low rates of academic achievement in mathematics and science and a severe shortage of entrepreneurial and technology transfer skills and mechanisms. It is particularly necessary to increase these skills as they will strongly influence the country's ability to improve the skills needed for research and development and technological innovation. This skills shortage has been compounded by weak cohesion in research programmes, shortage of market-focused research and a relatively low tendency among academics to commercialize research. Government and business need to do more to ensure that young people are attracted to careers in science and technology and that programmes are adequately financed. Public-private partnerships will be an important means to increasing and targeting funding. In addition, technical training is required to build capacity amongst local authorities on how to practically implement and enforce cleaner production practices and techniques. There is merit in developing focused cleaner production for government officials; these should build on and be co-ordinated with similar initiatives.

Coordination and fragmentation

The success of SCP activities is heavily reliant on coordination efforts between all sectors. SCP initiatives therefore remain fragmented. This is especially pertinent with respect to cleaner production where integration and co-ordination of these issues remains insufficient. Weak co-ordination in government departments regarding the triple bottom line for sustainable development

means that there is lack holistic approaches to the entire production and consumption cycles. There is an opportunity to establish a SCP Strategy that gives overall direction to government activities. The Cleaner Production Strategy for South Africa offers a key starting point for this approach as there is heightened awareness of the practices and benefits of cleaner technology. The NFSD can be used as a vehicle to harmonize policies that aim to encourage and promote more sustainable consumption and production patterns.

Enforcement

Inadequate enforcement of legislation and implementation of policy is a key constraint to promoting SCP in South Africa. The permitting and authorisation processes aimed at improving resource use and minimising waste has been constrained by limited capacity within provincial and local government. Although positive strides have been made in implementing the legal provisions for the efficient use and management of resources, there is scope for wider and more intensive effort. There is potential for the development of partnerships and voluntary agreements to assist the process, as well as a greater focus on technical training and capacity building activities.

Funding

Limited funding through government revenue structures as well as a lack of appropriate incentives such as economic instruments has constrained the implementation of SCP related projects. There is a need to remove disincentives, e.g. procedures which discourage capital investment in efficient technologies, to local authorities promoting cleaner production. There is a need to ensure the provision of SCP and cleaner production considerations with resource pricing and taxation policies at national and local level and to identify and remove potentially conflicting subsidies. The economic instruments being used to encourage energy conservation and efficiency and waste minimisation provide the basis for the establishment of a comprehensive and integrated framework for the resourcing of initiatives that promote SCP. There is significant scope for improving understanding and practical application of full cost accounting practices relating to SCP issues.

Consumer awareness

Inadequate education about energy efficiency and waste minimisation and recycling, to name just two key SCP objectives, has resulted in high rates of consumption by consumers. Poor planning and urban sprawl has meant that many poor communities reside at a distance from places of work. Inadequate public transport has resulted in a dominance of taxis and private vehicles. The lack of incentives and penalties has meant that unsustainable patterns of consumption have been encouraged. There is scope for raising consumer awareness on environmentally preferable products and services; while many companies are able to meet European Union eco-label criteria at reasonable cost, there is currently insufficient demand to do so. Related to this, there is seen to be scope for more active participation of key sectors that have an important potential influence on the supply chain, for example the retail sector, through their procurement practices, or the financial sector through their lending and investment.

Sustainable public procurement

While certain government bodies seem to have progressed in developing green procurement policies, the implementation of these policies appears to be less than complete. Where other government policies exist that support green public procurement, these have not been explicitly developed for the purpose of sustainable public procurement. This suggests that the process of developing and implementing sustainable procurement criteria has either been postponed or has not been effectively

rolled out within the mentioned government bodies. Although sustainable public procurement is currently largely being driven by environmental departments without much involvement or contribution from treasury or financial departments, there have been significant strides made in promoting supply chain management.

7.7 Conclusion

South Africa has made significant progress towards the development of a framework for the promotion of sustainable development. A key aspect is the effort made in shifting unsustainable patterns of consumption and production. Key progress made by South Africa regarding SCP includes: the development of policy and legislation; initiatives to save energy; enabling environments for renewable energy; major move towards cleaner production piloted and implemented through industry; establishment of mechanisms for funding and sustainable procurement; and increased consumer protection and awareness.

Although South Africa has made significant strides in moving its society towards consumption and production patterns that are more sustainable, the country still faces significant challenges in bridging the gap between the first and second economies, eradicating poverty and improving the quality of life of poor South Africans. Stronger policy alignment is required to maximise the use of funds, capacity and tools that have been dedicated to SCP implementation. The development of a SCP strategy will greatly assist this process. More still needs to be done to inform the choices of consumers and in so doing change their behaviour in a manner that promotes sustainable development.

8 Cross-cutting issues and interlinkages

It was highlighted in the introductory section that social and economic development are dependent on sustainable use and protection of natural resources, and practices resulting in inefficient use of natural and manufactured resources put the attainment of sustainable development in jeopardy. This section of the report outlines the cross-cutting issues and inter-linkages of the thematic areas under review.

8.1 Socio-economic issues

8.1.1 Poverty and environmental health

Prior to democratization of South Africa, the poor and most vulnerable communities were frequently located in situations which could be harmful to their health due to close proximity to industries, including chemical industries. The impact of inadequate pollution and waste management practices has thus by and large been disproportionately borne by the poor, contributed to the historic South Africa legacy of the apartheid city design. Mining also historically attracted labour from far afield which resulted in the establishment of informal settlements in or adjacent to mining towns. Although mining made a contribution via the income the workers earned, the mining industry did not necessarily contribute significantly to rural development or economic benefits in the Municipal Income Grant areas. Life in close proximity to industrial and mining developments and the waste they generate can have serious implications for people's health, including silicosis from mine dust and direct exposure to wastes that are harmful to health such as toxic and otherwise hazardous substances.

There are still major challenges to be faced in South Africa in overcoming past patterns to ensure protection of communities from pollution and exposure to harmful chemicals and pesticides. Insufficient refuse removal services in poverty stricken areas and rural areas results in accumulation of waste, and other environmental health risks. Environmental health problems in poor communities are added to by poisonings from pesticides used to control pest infestations exacerbated by inadequate waste removal (see Section 3 which provides an outline of problems associated with pesticide poisonings). Strong policy including the Constitution and the OHS Act have put in place the framework to ensure the right of the public to an environment not harmful to health and well-being, including from industry and mining. The OHS Act also provides protection to workers in factories and mines, who are generally drawn from poor communities. Initiatives such as Responsible Care applied by the chemicals sector, and the MPRDA which sets out requirements for social and labour plans for the mining sector, go a long way to preventing environmental health risks for communities and workers. DEA is in the process of reviewing comprehensive waste policy and has reviewed air emission standards on thermal treatment facilities to ensure the protection of public health and the environment.

Section 8.1.1 above pointed to health challenges posed by overstretched waste management services. Inadequate refuse removal also detracts from the aesthetic appeal of the environment, thus impacting on peoples' well-being and sense of place in their surroundings. Further, access to basic sanitation and drinking water in South Africa is of major concern to human health due to potential spread of disease caused by contamination of drinking water sources. The government has major initiatives underway to provide free basic sanitation and safe drinking water to South Africa's population by 2014. However, municipalities are generally struggling to keep up with requirements. The demand for sanitation facilities dependent on water is outweighing the present infrastructural capacity, and many municipalities are faced with sewage spillages due to inadequate and insufficient wastewater treatment plants. The Department of Cooperate Governance and Traditional Affairs (COGTA) is in the process of developing socio-economic profiles of all the 283 Municipalities in the country which will give a holistic view of the full capacity, backlogs and critical areas requiring attention in each municipality. DWA has developed a compliance status report of 952 WWTP. A programme to train plant operators has been initiated

The DEA have been developing a strategy for labour- intensive solid waste collection service to assist with poverty alleviation and job creation, with recycling having been identified as an important employment-generator.

8.2 Protection and managing the natural resource base

8.2.1 Efficient use of resources

There has been a strong shift in focus to cleaner production and energy efficiency in South Africa and best available technology, accelerated by energy shortages. Energy efficiency is also critical since South Africa is ranked high in the world for generation of carbon dioxide from fossil fuels per capita by country. Looming water shortages combined with water quality issues in many of South Africa's inland water sources has also prompted greater emphasis on production efficiency, including within the Chemical Industry Sector. Furthermore, sustainable management of waste constitutes a priority for cleaner production initiatives. These areas of progress are in line with the national strategy priorities for Cleaner Production, with agencies such as the National Cleaner Production Center providing case studies to encourage best practice incorporating waste

minimization, waste recycling and reuse. The chemicals industry through Responsible Care is exploring increased use of CDM to support energy efficiency investment, with six pilot projects being run through the National Cleaner Production Centre almost complete. Initiatives include innovations for energy efficiency and prevention of fugitive emissions. Three CDM projects in the chemicals industry have been registered to reduce nitrous oxide. A water conservation accord with government is being explored. For further information on Cleaner Production, see Section 7.

8.2.2 Water, soil and marine systems

South Africa is a water stressed country, and thus pollution of the limited freshwater resources is a priority concern for South Africa. The problem is compounded by activities including intensive mining which makes relatively little use of recycled water while using about 60% of the available water in South Africa. Acid mine drainage from operational and abandoned coal and gold mines such as in the highveld and Witwatersrand is a particular threat to surface and groundwater quality, as well as ecosystem health. Furthermore, almost 50% of South Africa's water is used for agriculture, with about 1.3-million hectares under irrigation, contributing to changes in water quality. Other influences from agriculture are from stock production and processing of products, fertilizer run-off from fields and pesticides that enter into water, air or soils. Water resources are further stressed by pollutants from dump and landfill sites, industrial effluents, domestic and commercial sewage and litter, with the leachates entering ground and surface water systems.

Solutions to these and similar problems are a priority, given issues including the high cost of treatment of chemically polluted water, downstream impacts on marine resources as well as South Africa's responsibilities to downstream neighbours. Obligations on shared rivers are incorporated *inter alia* in the Protocol on Shared Watercourses in the SADC Region, concluded in 1995. The importance of understanding how pollutants interact in the environment was brought sharply into focus by events such as the recent deaths of crocodiles in the Olifants River system resulting from toxicological effects, attributed by toxicologists to result from a combination of mining pollution and pesticides. To minimize the risk of water pollution, municipal landfill sites are now constructed with measures including liners, and careful siting away from surface and groundwater sources. All the commercial hazardous waste disposal sites in South Africa are now being controlled via permits, and a programme for the remediation of contaminated land is currently underway under the leadership of the DWA. There has been increasing collaboration in compliance and enforcement between the newly realigned DEA and DWA, especially at the provincial and local levels as well as ongoing criminal investigations.

8.2.3 Air quality and climate change

Mining and mineral beneficiation are energy demanding activities. Mineral beneficiation alone is responsible for 60% of South Africa's total industrial greenhouse gas emissions, with 97% of total fugitive methane emissions being from coal mines. With climate change at the forefront of international priorities and a shift towards low-carbon economies taking place globally, South Africa's dependence on coal-based power is a risk, both economically and environmentally. Most mining companies signed the Energy Efficiency Accord which is a voluntary initiative of the DMR, committing to energy savings and reduction in energy use without compromising growth. The Department of Energy is currently developing a Climate Change and Energy status quo for South Africa. Energy supply to mines was an issue in 2008. Eskom reduced the power supply to mines to 50% for a week, which meant that many mines had to stop operations for that period due to the

implications of power supply on safety of the mines. Power supply was gradually increased to 90% of the normal demand, but the power crisis had serious repercussions for an industry that is responsible for roughly 50% of South Africa's foreign exchange earnings.

Landfill and dump sites generate greenhouse gases that contribute to global warming and climate change. These gases mainly comprise methane and carbon dioxide, with methane being a particular cause for concern due to its significant contribution to the greenhouse effect but also because of its explosive nature when mixed with oxygen at certain concentrations. Methane nevertheless can also provide a valuable source of alternative energy if the landfill is set up to collect it, and there has been some action for harnessing of energy from landfill sites. This also presents a strategic opportunity for South Africa to reduce reliance on coal resources while maximising resource use efficiency.

8.2.4 Biodiversity

Biodiversity in South Africa has been negatively impacted through air, water and soil pollution including from mining and industry. Influences include acid mine drainage, siltation of rivers and water bodies. Mining has further resulted in the transformation of over 200 000 ha of natural habitat in South Africa. SANParks is leading an initiative called the Consortium for the Restoration of the Olifants Catchment which includes representatives from DWA, DEA, universities, research organisations, independent consultants and the Water Research Commission to deal with the impact of mining and other activities on water quality. Commercially important west coast fisheries dependent on natural fish stocks of the Benguela Current are also susceptible to disruption from off-shore mining activities including diamonds, oil and gas. The Benguela Current Commission, a trilateral agreement between South Africa, Angola and Namibia sets out to ensure the sound management of the Benguela ecosystem.

8.2.5 Sustainable consumption patterns

There are a number of cross-cutting issues and interlinkages that have relevance to SCP. Governance, information and financial matters are among the most important cross cutting issues as they influence initiatives aimed at SCP implementation. Given the scope of activities pertaining to SCP, it is necessary to take cognisance of linkages between resource use and patterns of production as well as societal attitudes and consumption. Consideration should also be given to the cumulative effects of unsustainable resource use. Increased urbanization is associated with greater consumption of household chemicals and industrial products, and the manufacturing and use of chemicals can contribute to climate change. One of the ways in which this can be addressed is through implementation of cleaner production guided through organisations including the ICCA through their Responsible Care programme.

At present implementation is undertaken at various levels and through various roleplayers, and agencies under the auspices of the DoT as well as other Departments. The DoT, through its Environmental Analysis unit is responsible for addressing environmental protection and has been involved in issues such as vehicle emissions, encouraging improvements in public transport, encouraging and promoting the use of pipelines for fuel transport. The DoT is in the process of establishing a Transport Committee on Environment, which will have representatives from all nine provinces as well as from the various agencies responsible for transportation implementation and will focus on improving coordination and communication with respect to environment and transport.

9 Conclusions

South Africa has made significant progress towards the implementation of sustainable development for all of the thematic areas under discussion at the CSD-18. This has been supported through a strong enabling framework that provides a platform for promoting sustainable development. However, significant challenges still need to be addressed to make progress. These include:

- Capacity for implementation of policy, plans and programmes through all tiers of government, to be addressed through drawing on centres of expertise and the building of public and private partnerships.
- Limited access to financial resources which restricts the implementation of strategies, as well as research and development contributing to innovation. Efficient allocation of resources through clear definition of roles and responsibilities, as well as appropriate application of economic instruments that encourage waste avoidance and minimization and better use of raw materials can address this.
- Difficulty in ensuring inter-governmental coordination, indicating the requirement for areas of strategic intervention and action.
- The skills shortage which limits sustainable development which results in a mismatch between economic goals and human resources. This can be addressed by continued and enhanced support for skills development programmes and better accessing existing skills bases.
- Availability and reliability of indicators, information-gathering and databases, upon which to strategize and base decision-making to ensure sustainability. This points to the need for concerted effort to ensure alignment and integration of the existing initiatives.

The response to these challenges will determine the extent to which the country can substantively and conclusively shift behaviour and attitudes to more sustainable production and consumption patterns.

10 Bibliography

About Expanded Public Works Programme (EPWP), <http://www.epwp.gov.za/index.asp>

Adams, R.J. (undated) Petroleum Liquid Fuel Transport: A Health, Safety and Environmental Risk Comparative Overview of Land Based Transport Modes. Unpublished.

Africa Roundtable on Sustainable Consumption and Production (executive summary), Africa Review Report on SCP, Second Draft Report (April 2009).

African Ministerial Conference on the Environment (2002). Submission by the President of AMCEN to Conference Of The Parties To The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Sixth meeting, Geneva, 9-13 December 2002

African Ministerial Conference on the Environment (2008). Subregional environmental action plans and the Nepad national action plans on the environment – an introductory account -Twelfth session Johannesburg, 7–12 June 2008

Andrea Rother, pers. comm. School of Public and Family Health, Medical Faculty, at University of Cape Town

Bain, Julie (2009) Chamber of mines Credit crunch blues, <http://www.bullion.org.za/Publications/mining%20downloads/March-May-09.pdf>

Buyisa-e-Bag Website - <http://www.buyisaebag.co.za/aboutus.aspx>

Chamber of Mines (2007) Climate change: Mining and the Clean Development Mechanism, Chamber of Mines, May 2007).

- City of Cape Town (2003). City of Cape Town Energy Strategy Draft. Cape Town, October 2003.
- DAFF (2009) TIPWG Approved Pesticides List for (Plantations. DAFF 2009.s)
- Danida (2003) Evaluation of cleaner production activities in South Africa (with specific focus on Danida supported initiatives), Evaluation Mission Report, July 2003 and Status Quo report.
- Refer to De La Harpe. S. (2008) Green Public Procurement – An Option for South Africa? Article awaiting publishing and .
- DEA (2003) Johannesburg Plan of Implementation Response Strategy, DEA (2003)
- DEA (2003) National Chemicals Profile http://www.DEA.gov.za/Documents/Documents/2003Jun9_1/
- DEA (2004) Assessment of SQ in Cleaner Production in SA.
- DEA (2004) Assessment of the Status Quo of Cleaner Production in South Africa, Draft Two Report, 11 June 2004.
- DEA (2004) Assessment of the Status Quo of Cleaner Production in South Africa
- DEA (2005) Central Registry Version 1 South African Waste Information System Version 1: Users Manual.
- DEA (2005) Waste Management Strategy Implementation - South Africa: Report Number: 2.1 -Waste information system: framework document. Report Number: 12/ 9/ 6, Pretoria.
- DEA (2005) Waste Management Strategy Implementation - South Africa: Annexure F - national recycling extended producer responsibility: status quo report Report Number: 12/ 9/ 6, Pretoria.
- DEA (2005) Waste Management Strategy Implementation - South Africa: Annexure G Recycling - review of industrial waste exchange Report Number: 12/ 9/ 6, Pretoria.
- DEA (2006) South Africa Environment Outlook: A report on the state of the environment, DEA, Pretoria. 317pp.
- DEA (2007) Greening the 2008 Budget: Building a Fiscal Framework for Sustainable Development (draft); DEA, October 2007.
- Department of Environmental Affairs and Tourism (2008) A National Framework for Sustainable Development in South Africa. Department of Environmental Affairs and Tourism, Pretoria.
- DEA (2008) Government Regulations Gazette No 30904 R. 341 Environment Conservation Act (73/1989): Regulations for the prohibition of the use, manufacturing, import and export of asbestos and asbestos containing materials 28 March 2008
- DEA (2009) Executive Summary: National Consultation To Identify Elements of A National Action Plan Or Strategy For The Implementation Of The Rotterdam Convention For South Africa Held In Durban, South Africa. 23 -27 February, 2009
- DEA (2009) Draft Work Programme for NCCM/MCCM 2009-2010. Received by e-mail from DEA 18 September 2009.
- DEA (2009) Greenhouse gas Inventory South Africa 1990 to 2000 National Inventory Report. May 2009. Pretoria. <http://www.pmg.org.za/files/docs/090812greenhouseinventory.pdf>
- DEA (2009) home page: <http://www.environment.gov.za>: Deputy Minister of Environmental Affairs and Tourism, Ms Rejoice Mabudafhasi during workshop on the effective implementation of the Rotterdam Convention on Prior Informed Consent (PIC) procedure for banned and restricted chemicals and pesticides in South Africa . February 2009.
- DEA (2009) Macroeconomic trends, targets & economic instruments, written by Mike Goldblatt, PDG August 2009.
- DEA (2009) National Waste Management Strategy- Phase 2 Research : Regulation, compliance and enforcement in implementing the Waste Act, 2008 August, 2009. Pretoria
- DEA (2009) National Waste Management Strategy- Phase 2 Research Regulation, compliance and enforcement in implementing the Waste Act, 2008
- DEA (2009) Waste Tyre Regulations 2009
- DEA (undated) home page: <http://www.DEA.gov.za/Documents/Documents/thor-chemicals>
- DEA (undated) Working with Waste: Guideline on Waste Collection n High Density & Unserviced Areas. Department of Environmental Affairs and Tourism, Pretoria
- DEA and DMR (2003). Joint Implementation Strategy for the Control of Exhaust Emissions from Road Going Vehicles in the Republic Of South Africa Final Draft Version 4 November 2003. Pretoria.
- DEA and United Nations Development Programme (South Africa) (2004). Ten days in Johannesburg A negotiation of hope. DEA and UNDP, Pretoria.
- DEA (2004) A National Climate Change Response Strategy for South Africa. September 2004. Pretoria.
- Department of Energy (2009) Quoted in Government Notice 580 of 2009 on Energy Efficiency EE Strategy for South Africa, March 2005, reviewed October 2008, 22 May 2009

- DEA (2003) Compilation of the South African National Chemicals Profile Draft Report Chapter 12: Chemical Management Resources April 2003
- DEA (2009) Addressing Challenges with Waste Service Provision in South Africa National Policy on Free Basic Refuse Removal Final Draft August 2009
- Department of International Relations and Cooperation: African Multilateral Organisations, Treaties, Conventions and Declarations. <http://www.dfa.gov.za/foreign/Multilateral/africa/index.html#T>
- Dlist-Benguela homepage: <http://www.dlist-benguela.org/index.php>
- DMR (2000) Digest of South Africa Energy Statistics, 2000 (DMR)
- DMR (2004), N513/2004, Government Gazette 26169 of 14 May 2004 at 29 to 42.
- DMR (2005) Energy Efficiency Strategy of Republic of South Africa SA, , DMR, March 2005.
- DMR (2009) Beneficiation economics, http://www.DMR.gov.za/minerals/min_ben_economics.stm
- DMR (2009) Drawn from the Strategic Framework for Implementing Sustainable Development in the South African Minerals Sector: Towards developing sustainable development policy and meeting reporting commitments, Discussion Document 2nd Draft (August 2009)A Framework for Responsible Exploration, www.e3mining.com
- DMR home page website http://www.DMR.gov.za/energy/app_labelling.stm.
- DMR (Undated) Social and Labour Plan guidelines for the mining and production industries. DMR, Pretoria., document prepared by S
- DoH home page: http://www.doh.gov.za/department/clus_nonpersonal.html
- DoH home page: <http://www.doh.gov.za/docs/misc/emp.pdf>
- DoLhome page: <http://www.labour.gov.za/legislation/acts/occupational-health-and-safety/read-online/amended-occupational-health-and-safety-act-1>
- Donald Sehaswana, pers. comm., Department of Environment Affairs and Tourism
- DoT (2005) National Freight Logistics Strategy. National Department of Transport, Pretoria. September 2005.
- DoT (2006) Road Infrastructure Strategic Framework for South Africa. National Department of Transport, Pretoria. October 2006.
- DoT (2006). Transport Action Plan for 2010 Version Year 2006 – Action Plan for ensuring the operational success and establishing a legacy of improvement from the investment towards the 2010 FIFA World Cup. Pretoria.
- DoT (2007). Rural Transport Strategy for South Africa. National Department of Transport, Pretoria.
- National Department of Transport. (2008:3) Annual Report 2007/2008. National Department of Transport, Pretoria.
- DoT (2009). Managerial Transport Planning Guidelines First Edition. National Department of Transport, Pretoria. February 2009.
- DoT: Road to Safety 2001 – 2005 <http://www.transport.gov.za/projects/rts/setting.html>
- DoT homepage: http://www.transport.gov.za/comm-centre/qanda/questions/2001/01assem_oral303.html
- DoT (2007). Rural Transport Strategy for South Africa. National Department of Transport, Pretoria.
- DoT (2008) Draft National Non-Motorised Transport Policy December 2008. National Department of Transport Pretoria.
- DoT (2008) National Transport Master Plan NATMAP 2005 – 2050 National Volume Status Quo Report Version 1: July 2008. Department of Transport. Pretoria.
- Dplg (2008). Discussion paper on the role of local government in the implementation of sustainable development. Paper drafted by SRK Consulting (Pty) Ltd
- Dplg homepage: http://www.thedplg.gov.za/index.php?option=com_content&task=view&id=528&Itemid=30
- Dr Gerhard Verdoorn, AVCASA pers. comm.
- Dti, 2004. Draft Green Paper on the Consumer Policy Framework, 2004.
- Draft NFSD (2006). People - Planet - Prosperity: A Strategic Framework for Sustainable Development in South Africa.NFSD 2006
- DST (2005) National Survey of Research and Experimental Development (R&D) 2003/2004 Fiscal Year. DST, Pretoria.
- DST (2007) Innovation towards a knowledge-based economy.DST, 2007.
- DST (2008) Ten-year plan for Science and Technology. DSTDepartment of Science and Technology, Pretoria
- DST (2009) Corporate Strategy 2009/10 (<http://www.dst.gov.za/publications-policies/strategies-reports/DST%20CORPORATE%20STRATEGY%202009-10.pdf>).

- DST (2009) Global Change Grand Challenge – National Research Plan, South Africa October 2009
- DST home page: <http://www.dst.gov.za/media-room/speeches/address-by-minister-mosibudi-mangena-at-the-launch-of-the-fluorochemical-expansion-initiative>
- DST home page: <http://www.dst.gov.za/media-room/press-releases/sa-iaea-sign-cooperation-agreement>
- DST National Advanced Manufacturing Technology Strategy (AMTS) for South Africa.
- DST Tax Incentives for Research and Development in South Africa (<http://www.dst.gov.za/r-d/Tax%20Incentive%20Brochure%20for%20R-D.pdf>)
- Dti (2004) Dr M J Mashimbye (Department of Science and Technology): E-mail received by SRK on 6 October 2009
- Dti (2009) Government Gazette 32186 29 April 2009 Government has promulgated the Consumer Protection Act (the CPA) 68 of 2008 as per Government Gazette notice published on 29 April 2009.
- Dti homepage: <http://www.thedti.gov.za/bee/2ExecutiveSummary.pdf>
- Dti homepage: <http://www.thedti.gov.za/publications/chemicals.htm>
- DWA home page: <http://www.dwa.gov.za/results.asp?cx=015893374753511728209%3An8mbortm0sk&cof=FORID%3A11&q=blue+scorpions&sa=Search#1504>
- DWA (1998) Guideline for the minimum requirements for waste disposal by landfill. Department of Water Affairs and Forestry Second Edition, Pretoria, Republic of South Africa.
- DWA (2003) Towards a strategy for waste discharge system. Water quality management series. DWA, Pretoria.
- DWA (2006) Guidelines for the Utilisation and Disposal of Wastewater Sludge. Department of Water Affairs and Forestry, March 2006. ISBN Set No 1-77005-420-0
- DWA (Undated) Generic Guidelines for Job Creation Funding by Municipalities. Department of Water Affairs and Forestry, Pretoria.
- DWA home page: <http://www.dwa.gov.za/events/MunicipalIndaba/Regulatory/Presentations/BlueScorpions.pdf>
- DWA homepage: http://www.dwaf.gov.za/Dir_WQM/wqm_wasteDispLand.htm
- DWA(1998) Guideline for the Handling, Classification and Disposal of Hazardous Waste. DWA Second Edition, Pretoria, Republic of South Africa.
- DWA (1998) Minimum requirements for water monitoring at waste management facilities. Department of Water Affairs and Forestry Second Edition, Pretoria, Republic of South Africa
- DWA: http://www.dwa.gov.za/iwqs/water_quality/ntmp/index.htm
- Engineering News (2009): <http://www.engineeringnews.co.za/article/bbbee-not-to-be-taken-lightly-2009-09-11>
- Engineering News (2009): <http://www.engineeringnews.co.za/article/sa-chemicals-association-prepares-for-geneva-conference-2009-03-20>
- Enviropaedia Rethinking Reality http://www.enviropaedia.com/news/article/default.php?pk_news_type_id=3&pk_news_id=104&pg=9.
- Eskom (2009) Annual Report, 2009.
- Eskom homepage: www.eskom.co.za/content/NU%200002NucWastRev2.doc.
- European Union-South Africa Joint Statement and Action Plan on Cooperation in Surface Transport R&D, (http://www.esastap.org.za/esastap/pdfs/joint_statement_rd_surface_trans.pdf).
- European Union-South Africa. (2007). European Union-South Africa Joint Statement and Action Plan on Cooperation in Surface Transport R&D. 12 July 2007. Pretoria. (http://www.esastap.org.za/esastap/pdfs/joint_statement_rd_surface_trans.pdf).
- e-WASA homepage: <http://www.ngopulse.org/article/E-waste-south-africa>
- Expanded Public Works Programme: <http://www.epwp.gov.za/index.asp?c=About>
- Extractive Industries Transparency Initiatives, <http://eitransparency.org/>
- Gauteng Provincial Government (2004). Sustainable Health Care Waste Management Strategy for Gauteng. Government of the Province of Gauteng.
- Global Goods Agricultural Practices website: <http://www.za.sgs.com/eurepgap?serviceId=10169&lobId=10044012>
- Government of the Republic of South Africa (2004). National Cleaner Production Strategy, 8 November 2004.

- Green Building Conference (2009) Green Building Conference in Sandton in July 2009 (refer to Green Building Council website). Green Building Handbook
- Green Building Council <http://www.gbcsa.org.za/greenstar/greenstar.php>.
- GroundWork home page: <http://www.groundwork.org.za/AirQuality/AirMonitoringReport2003.pdf>
- GroundWork home page: <http://www.groundwork.org.za/Projects/Projects.asp#Air%20Quality>
- Hale, David (2006) China's economic takeoff, implication for Africa. http://www.thebrenthurstfoundation.com/Files/Brenthurst_Commissioned_Reports/BD0601_Chinas_Econ_Takeoff.pdf
- Hanks, J., Davies, H. and Perera, O. (2008). SPP in SA, IIED.
- Harald Winkler (Undated) Comment by Associate Prof Harald Winkler at Energy Research Centre at UCT, on Eskom webpage entitled Responding to Climate Change
<http://commdev.org/content/document/detail/727>.
<http://www.polity.org.za/article/radebe-briefing-on-taxi-recapitalisation-programme-rollout-strategy-25072005-2005-07-25>.
- http://www.proudlysa.co.za/section/about.asp?include=../area/about_us/about.html&title=../gfx/pages/about.jpg.
- Human Sciences Research Council (2009) State of the Nation, South Africa 2008. HSRC Press, Cape Town.
- ICCA (2009) Input From Business & Industry Major Group (Submitted by ICCA) to Secretary-General's State Of Implementation Report On Chemicals
- International Technology Association homepage: www.ita.org.za/eWaste.htm
- Lawless, A. (2009). Numbers and Needs in Local Government. Addressing civil engineering - the critical profession for service delivery. South African Institution of Civil Engineering. Johannesburg.
- Lees et al (2009) Producer responsibility and consumer awareness, Sustainability Services, KPMG Services (Pty) Ltd August 2009.
- Limpopo MEC for Transport (2003) Careers in transport explored, http://www.buffalocity.gov.za/news2007/oct/oct2_harbour.stm
SPEECH BY THE LIMPOPO MEC FOR TRANSPORT, DR TS FARISANI, DURING THE TRANSPORT CAPACITY BUILDING ROAD SHOW, Manenu Traffic College, 7 March 2003,
- Mail and Guardian homepage: <http://www.mg.co.za/article/2009-06-03-illegal-mining-we-need-to-target-the-syndicates>
- Mail and Guardian Online: <http://www.mg.co.za/article/2009-08-30-taximen-fret-over-launch-of-brt>
- Masangane, P.C. Presentation entitled "Energy Research in South Africa, Saneri, Part of ESA STAP
- Mashiri, M. Letshwiti, V. Mpondo, B. (undated) Shova Kalula National Bicycle Project: Assessment of Phase I. CSIR Transportek. Unpublished document.
- Mine safety a threat to South African economy, <http://www.miningmx.com/news/archive/179999.htm>
- Mining and minerals in South Africa, <http://www.southafrica.info/business/economy/sectors/mining.htm#>, accessed October 2009.
- Minister Radebe (2005). Minister of Transport Radebe: Briefing on Taxi Recapitalisation Programme rollout strategy (25/07/2005),
- Muger, S. (2009) Climate Change Summit 2009: The Transport Sector Impact and Mitigation. Department of Transport PowerPoint presentation to the Climate Change Summit 4 March 2009, Midrand South Africa. Department of Transport.
- National Biodiversity Institute homepage: www.nbi.org.za
- National Cleaner Production Centre home page: <http://www.ncpc.co.za/wmc/wmcs.html>
- National Cleaner Production Centre, South Africa (2009) Management Report (2007-2008)
- National Environmental Management: Waste Act (2008) Act No. 59 of 2008: Government Printer, Cape Town.
- National Policy on the Thermal Treatment of General and Hazardous Waste (2009) (Gazette No 32432) Management, Government Printer .
- National Policy on the Thermal Treatment of General and Hazardous Waste (2009) (Gazette No 32432) Management, Government Printer .
- National Roundtable on Sustainable Consumption and Production: http://www.nrscp.co.za/documents/Fred_Goede-Chem_Industry_view_Sust_Cons_and_Production.pdf
- National Transport Master Plan. <http://www.transport.gov.za/Natmap/Background.asp>
- National Transport Master Plan. Participants. <http://www.transport.gov.za/Natmap/NationalProjects.asp>.

- National Treasury (2006) A Framework for considering market-based instruments to support environmental fiscal reform in South Africa. National Treasury, Pretoria.
- NCCM (2009) 10th September 2009 Progress Report: Meeting Briefing Document: Studies on Mercury. Compiled by: S Costley Presentation of the study on technical assistance needs
- NCPC (2008) South Africa Management Report 2007-2008
- NCPC-SA (2009) NCPC-SA Management Report 2007-2008, the dti and NCPC-SA
- NCPC-SA webpage on Eco-labelling textiles in South Africa.
- NFSD (2008) National Framework for Sustainable Development <http://www.environment.gov.za/HotIssues/2008/nfsd/nfsd.html> July 2008.
- OAU (2001) The New Partnership for Africa's Development (Nepad). Adopted at the 37th meeting of the OAU. October 2001.
- Overview of the United Nations Global Compact, <http://www.unglobalcompact.org/abouttheGC/index.html>
- Parliamentary Monitoring Group homepage: <http://www.pmg.org.za/files/docs/090713pollution-edit.pdf>
- Parliamentary Monitoring Group homepage: [http://www.pmg.org.za/print/11173National Environmental Laws A/B \[B35-2007\]; Africa Institute for Environmentally Sound Management of Hazardous & Other Wastes Agreement: briefing](http://www.pmg.org.za/print/11173National%20Environmental%20Laws%20A/B%20[B35-2007];%20Africa%20Institute%20for%20Environmentally%20Sound%20Management%20of%20Hazardous%20&%20Other%20Wastes%20Agreement%20briefing)
- PET Recycling Company (Pty) Limited home page: <http://www.petco.co.za/index.cfm?ActionID=17>
- Philip Ninene, personal communication, DEA
- Polity: Radebe Briefing on Taxi Recapitalisation Programme <http://www.polity.org.za/article/radebe-briefing-on-taxi-recapitalisation-programme-rollout-strategy-25072005-2005-07-25>
- Prof Henk Bouwman, North-West University, Free State. Telephonic communication on 21 September 2009
- Rea Vaya Johannesburg. <http://www.reavaya.org.za/about-brt>
- Rea Vaya Johannesburg. <http://www.reavaya.org.za/about-brt/47-environmental-aspects>
- Reinforcing confidence in the diamond and gold supply chain, <http://www.responsiblejewellery.com>
- Resource Endowment initiative: Phase 3 update, (<http://www.icmm.com/page/2097/resource-endowment-initiative-phase-3-update>)
- Rotterdam Convention Home Page <http://www.pic.int/home.php?type=t&id=5&sid=16>
- Royal Baofokeng Holdings homepage: <http://www.bafokengholdings.com/a/profile.asp>
- SABC News (2009). China to help SA's transport sector. August 20, 2009. <http://www.sabcnews.com/portal/site/SABCNews/menuitem.5c4f8fe7ee929f602ea12ea1674daeb9/?vgnnextoid=a8c625091a833210VgnVCM10000077d4ea9bRCRD&vgnnextfmt=default>
- SADCSTAN: Brochure <http://www.sadcstan.co.za/pdf/SADCSTAN%20Brochure.pdf>
- SAMA (2009) <http://www.waternet.co.za/samercury/index.html>
- Setting the scene: The Statistics, the Safety Problem, the Key Contributory Factors, <http://www.transport.gov.za/projects/rts/setting.html>
- Solveig Crompton, personal communication, DEA. E-mail received by SRK 7 October 2009
- South Africa info homepage: <http://www.southafrica.info/business/trends/newbusiness/joule-061008.htm>
- South African Air Quality Information System home page: <http://www.saaqis.org.za/>
- South African Cities Network (2006) State of the Cities Report. Published 2006.
- South African Environmental Goods and Services Forum. www.egsf.org.za/index.php/About-Us/
- South African Government Information. Transport Capacity Building Road Show. <http://www.info.gov.za/speeches/2003/03031113461004.htm>
- South African Guideline of Cyanide Management for Gold Mining,
- South African Waste Information Centre home page: <http://www.sawic.org.za/?menu=77>
- South African Waste Policy homepage: http://www.wastepolicy.co.za/wastecollection/sites/www.wastepolicy.co.za/wastecollection/files/Draft_Waste_Sector_Targets_and_Indicators.pdf
- Specialists unite to save Olifants River system after massive croc kill, <http://www.wrc.org.za/News/Pages/press-Article2-03April09.aspx>

- Study into the implications of the Globally Harmonised System: www.caia.co.za/newsletters/GHS%20Exec%20Summary.doc Study into the Implications of Implementing the Globally Harmonised System of Classification and Labelling of Chemicals and Development of an Implementation Strategy for South Africa
- Sustainable development through mining website: <http://www.sdmining.co.za/>
- Sustainable Public Procurement in South Africa 31
- Taximen fret over launch of BRT, <http://www.mg.co.za/article/2009-08-30-taximen-fret-over-launch-of-brt>.
- Ten-Year Plan for South Africa (2008 – 2018), Department of Science and Technology.
- Terms of reference for the establishment of the interdepartmental Committee on sound management of chemicals (undated). E-mail received from DEA on 18 September 2009.
- The Electricity Governance Initiative South Africa (<http://electricitygovernancewri.org>) led by Idasa.
- The National Framework for Sustainable Development, <http://www.environment.gov.za/HotIssues/2008/nfsd/nfsd.html>.
- The National Waste Management Strategy home page: <http://www.wastepolicy.co.za/nwms/>
- The South African Constitution (Act No 108 of 1996)
- The South African National Nuclear Regulator: <http://www.nnr.co.za/>
- The South African Nuclear Energy Corporation home page: <http://www.necsa.co.za/Research-and-Conference/Nuclear-Waste-429.aspx>
- The South African Nuclear Energy Corporation home page:<http://www.necsa.co.za/Environment/Environmental-Monitoring-421.aspx>
- The South African Taxi Industry,
- The South African Taxi Industry: http://www.compcom.co.za/resources/CompComIssue11/pages/04_taxi.htm
- Transport Funding. South Africa 2010 FIFA World Cup: <http://www.sa2010.gov.za/node/531>
- Transport Month launched. Careers in transport explored. http://www.buffalocity.gov.za/news2007/oct/oct2_harbour.stm
- Transport: Funding, <http://www.sa2010.gov.za/node/531>
- UNDP outline on Montreal Protocol: <http://www.undp.org/chemicals/montrealprotocol.htm>
- UNEP (2006) Strategic Approach to International Chemicals Management. Resolutions of the International Conference on Chemicals Management . SAICM texts and resolutions of the International Conference on Chemicals Management. United Nations Environment Programme.
- UNEP (2008) African Ministerial Conference on the Environment. Twelfth session. Johannesburg, 7–12 June 2008.
- United Nation Conference on Trade and Development, www.unctad.org.
- United Nations (2004) Intergovernmental Negotiating Committee for an International Legally Binding Instrument for the Application of the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade Eleventh session Geneva, 18 September 2004 Item 6 of the provisional agenda*
- United Nations (2007) Indicators of Sustainable Development Guidelines and Methodologies October 2007 Third Edition. United Nations. New York
- United Nations (2007). Indicators of sustainable development: guidelines and methodologies. Report prepared by the Department of Economic and Social Affairs of the United Nations Secretariat. 3rd edition. October 2007. New York
- United Nations (2009) Towards Achieving Sustainable Growth and Development through Vision 2014. The United Nations Development Assistance Framework for South Africa 2007-2010 <http://www.un.org.za/wp-content/docs/undaf.pdf> Accessed 25 September 2009
- United Nations home page: <http://www.un.org/esa/dsd/susdevtopics/>
- University of the Witwatersrand : <http://web.wits.ac.za/NR/rdonlyres/04C91B97-E2A0-48F0-A982-70525CDBC71/0/MMSDBiophysicalPart2.ppt>
- Urban Environmental Management Programme (UEMP) http://www.uemp.org.za/uemp_docs/03_Street_Pesticides.pdf
- Urban Green File homepage: <http://www.urbangreen.co.za/current/features/14-3wastewaste.htm>
- Van Zyl, Dr Hugo (2009) Specialist Report produced for SRK Consulting: Environmental Management Framework and Strategic Environmental Management Plan for the Msukaligwa and Albert Luthuli Local Municipalities Resource Economics May 2009.
- White Paper on the Energy Policy of the Republic of South Africa, DMR, Dec 1998.
- White Paper on the RE policy of the Republic of South Africa, Nov 2003 (GG26169 14 May 2009).
- Working for Water (2004). The Revised Policy on the Use of Herbicides for the Control of Alien Vegetation. Revised 25 October 2004

Working for Water (undated) Guidelines of the Completion and Interpretation of the Operating Standards and Assessments Document on Application of Pesticides