

21. SOUTH AFRICA

21.1 Energy Policies and Actions

South Africa has abundant energy resources such as fossil fuels and gas. The resources provide the necessary infrastructural economic base as an attractive host for foreign investments in the energy sector. Biomass forms the main energy source in the rural domestic sector, while other renewable energy development opportunities are already being explored in the fields of solar power, wind power, pumped storage and in hydropower schemes.³⁶⁷

South Africa has a large off-grid electrification programme. The National Electrification Programme was firstly implemented between 1994 and 1999. Its objective was to electrify rural and urban low-income households which had been deprived of access to electricity during the apartheid period. The Programme expected that newly electrified households would switch from using fuelwood, candles and batteries to using electricity for their household needs.³⁶⁸

In December 1998, the Energy White Paper of South Africa³⁶⁹ was issued to clarify government policy regarding the supply and consumption of energy for the next decade. The White Paper recognised national energy and economic demands, while accepting the international energy agenda and the need to identify appropriate energy supply and use. The five policy objectives are as follows:

- Increase access to affordable energy services
- Improve energy governance – clarifying the relative roles and functions of various energy institutions in the context of accountability, transparency and inclusive membership, particularly participation by the previously disadvantaged
- Stimulate economic development – encouraging competition within energy markets
- Manage energy-related environmental and health effects – promoting access to basic energy services for poor households while reducing negative health impacts arising from energy activities
- Secure supply through diversity – promoting increased opportunities for energy trade, particularly within the Southern African region, and diversity of both supply sources and primary energy carriers.³⁷⁰

At the end of 2003, an Integrated Energy Plan (IEP)³⁷¹ was published. This plan provided a framework for taking decisions on energy policy and for the development of different energy sources and energy technologies in the country. The IEP was based on energy reserves, energy demand, and consumption up to 2020, using different scenarios of the South African economy. These scenarios show future energy use from

³⁶⁷ Referenced to the website of the Department of Minerals and Energy, White Paper on the Energy Policy of the Republic of South Africa, http://www.dme.gov.za/pdfs/energy/planning/wp_energy_policy_1998.pdf, page 2

³⁶⁸ Extracted from the Energy policies for sustainable development in South Africa: Options for the future report, http://www.iaea.org/OurWork/ST/NE/Pess/assets/South_Africa_Report_May06.pdf

³⁶⁹ Full Energy White Paper 1998 can be referred to http://www.dme.gov.za/pdfs/energy/planning/wp_energy_policy_1998.pdf

³⁷⁰ Extracted from the Energy policies for sustainable development in South Africa: Options for the future report, http://www.iaea.org/OurWork/ST/NE/Pess/assets/South_Africa_Report_May06.pdf

³⁷¹ Integrated Energy Plan, http://www.dme.gov.za/pdfs/energy/planning/integrated_energy_plan_dec03.pdf

different energy sources, and evaluate the associated pollution, including emissions of greenhouse gases.

Energy Efficiency and Conservation

In 2005, the Energy Efficiency Strategy was published and has a national target for energy efficiency improvement of 12% by 2015. The strategy aims to encourage sustainable energy sector development and energy use through efficient practices thereby minimising the undesirable impacts of energy usage upon health and the environment, and contributing towards secure and affordable energy for all.³⁷²

Promotion of Renewable energy

The government considers the use of renewable energy as a contribution to sustainable development. Most of the sources are indigenous and naturally available in South Africa, and the use of renewals therefore strengthens energy security because it is not subject to disruption by international crisis. In 2003, a White Paper on renewable energy was published. It supplements the White Paper on Energy Policy and contains four key strategic areas, i.e. financial instruments, legal instruments, technology development, and awareness raising, capacity building and education.³⁷³ The White Paper sets a target of 4% of projected electricity demand for 2013. A strategy for implementing this target needs to be formulated, focusing on specific projects and their financing.

In late 2005, the Renewable Energy Finance and Subsidy Office was established. The Office's mandate includes the management of renewable energy subsidies and provision of advice to developers and other stakeholders on renewable energy finance and subsidies, including size of awards, eligibility, and procedural requirements.³⁷⁴



Wind generators in South Africa³⁷⁵



A shop sells clean energy in South Africa³⁷⁶

³⁷² Referenced to the Energy Efficiency Strategy, http://www.dme.gov.za/pdfs/energy/efficiency/ee_strategy_05.pdf

³⁷³ White Paper on renewable energy <http://www.info.gov.za/whitepapers/2002/rewp220802.pdf>

³⁷⁴ Referenced to the Energy policies for sustainable development in South Africa: Options for the future report, http://www.iaea.org/OurWork/ST/NE/Pess/assets/South_Africa_Report_May06.pdf

³⁷⁵ Source: http://www.dme.gov.za/energy/renew_hybrid.stm

³⁷⁶ Source: <http://www.dme.gov.za/energy/planning.stm>

21.2 Environmental Evaluation/SEA in South Africa

In South Africa, the use of SEA is a non-statutory requirement and it is still in an evolving process. The National Environmental Management Act (NEMA) makes provision for the development of assessment procedures that aim to ensure that the environmental consequences of policies, plans and programmes are considered.³⁷⁷ It stipulates a range of Integrated Environmental Management (EM) tools. These tools include SEA used for the proactive integration of environmental issues at the policy and planning level, Environmental Impact Assessment (EIA) used for the assessment of project specific developments and Environmental Management Systems (EMS) used for the day-to-day management of projects.³⁷⁸

Council for Scientific and Industrial Research (CSIR)³⁷⁹ and Department of Environmental Affairs and Tourism (DEAT) published a guideline document, Integrated Environmental Management on SEA in South Africa in February 2000.³⁸⁰ In conjunction with the production of these documents, a number of SEA processes were undertaken which followed a variety of approaches. In addition to national SEA guidelines, various policies and regulations also have provisions of SEA as part of planning processes.

South Africa's NEMA No. 107 of 1998 provides for the development of procedures for the assessment of the impact of policies, plans and programmes. Besides, a requirement related to SEA in the context of spatial planning is referred to in the Municipal Planning and Performance Management Regulations of 2001, promulgated in terms of the Municipal Systems Act No. 32 of 2000, and in The White Paper on Spatial Planning and Land Use Management, produced by the Ministry of Agriculture and Land Affairs in 2001. Also, the South African White Paper on a National Commercial Ports Policy, states that, "SEA should be used for the proactive integration of environmental issues with social and economic issues at the policy and planning level".³⁸¹

According to the SEA guidelines by CSIR and DEAT, there are 9 principles for SEA that provides a basis for the development of local SEA processes. These are that SEA:

- is driven by the concept of sustainability;
- identifies the opportunities and constraints which the environment places on the development of plans and programmes;

³⁷⁷ Extracted from the "Strategic Environmental Assessment: A sourcebook and reference guide to international experience", Barry Dalal-Clayton and Barry Sadler, 2004, http://www.iied.org/Gov/spa/documents/SEAbook/Chapter6_Oct04.pdf, page 206

³⁷⁸ Referenced to the website of Pretoria vol. 446, Government Gazette of Republic of South Africa, <http://www.info.gov.za/gazette/whitepaper/2002/23715.pdf>

³⁷⁹ Extracted from the "Strategic Environmental Assessment: A sourcebook and reference guide to international experience", Barry Dalal-Clayton and Barry Sadler, 2004, http://www.iied.org/Gov/spa/documents/SEAbook/Chapter6_Oct04.pdf, pages 208-209

³⁸⁰ Extracted from Strategic Environmental Assessment of South Africa- Guideline Document by the Department of Environmental Affairs and Tourism, http://www.environment.gov.za/Documents/Publications/2000Feb1/SEA_final%20Guidelines.pdf

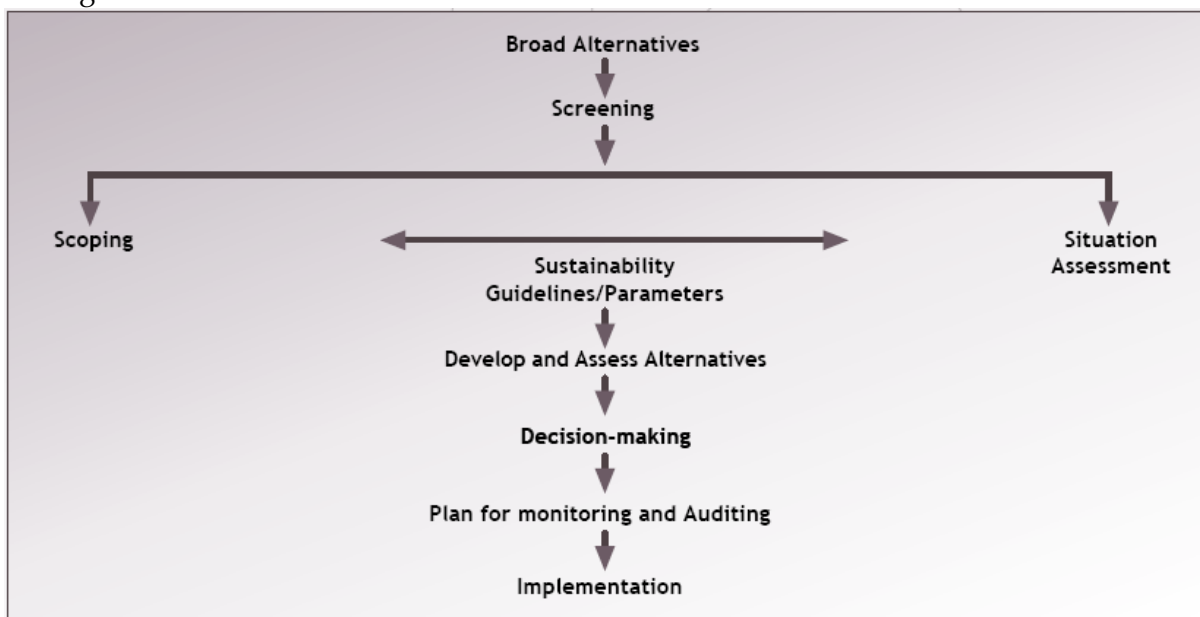
³⁸¹ Referenced to the "Integrated Environmental Management Information Series - Strategic Environmental Assessment" by the Department of Environmental Affairs and Tourism, 2005, <http://www.environment.gov.za/Documents/Publications/2005Jan7/Book5.pdf>, page 6

- sets the criteria of environmental quality or limits of acceptable change;
- is a flexible tool which is adaptable to the planning and sectoral development cycle;
- is a strategic process which begins with the conceptualisation of the plan or programme;
- is part of a tiered approach to environmental assessment and management;
- has a scope defined within the wider context of environmental processes;
- is a participative process; and
- is set within the context of alternative scenarios.³⁸²

The guidelines present SEA as including the concepts of precaution and continuous improvement and the following steps and elements:

- identify broad plan and programmes alternatives;
- screening;
- scoping;
- situation assessment;
- formulate sustainability parameters for the development of the plan or programmes;
- develop and assess alternatives plans and programmes;
- decision-making; and
- develop a plan for implementation, monitoring and auditing; and implementation.³⁸³

The figure below shows the conceptual illustration of the SEA process contained in the SEA guidelines:³⁸⁴



³⁸² Extracted from the "Strategic Environmental Assessment: A sourcebook and reference guide to international experience", Barry Dalal-Clayton and Barry Sadler, 2004, http://www.iied.org/Gov/spa/documents/SEAbok/Chapter6_Oct04.pdf, page 212

³⁸³ Extracted from the "Strategic Environmental Assessment: A sourcebook and reference guide to international experience", Barry Dalal-Clayton and Barry Sadler, 2004, http://www.iied.org/Gov/spa/documents/SEAbok/Chapter6_Oct04.pdf, page 212

³⁸⁴ Referenced to the "Integrated Environmental Management Information Series – Strategic Environmental Assessment" by the Department of Environmental Affairs and Tourism, 2005, <http://www.environment.gov.za/Documents/Publications/2005Jan7/Book5.pdf>, page 8

21.3 Environmental Evaluation/SEA on Energy Policies and Actions in South Africa

SEA in South Africa is in evolving process. There is no explicitly statutory requirement for the use of SEA in South Africa, though the NEMA makes provisions for the development of assessment procedures that aim to ensure that the environmental consequences of policies, plans and programmes including the energy sector are considered. With the provision of SEA guidelines by CSIR and DEAT, a number of SEA processes were undertaken administratively in South Africa which followed a variety of approaches. SEA is also applied as part of planning processes under various policies and regulations.

A summary table for the energy policies and actions and SEA status in South Africa is presented in **Exhibit SF-1**.

Exhibit SF-1 Summary of Energy Policies and Actions and SEA status in South Africa	
(a) Energy Policies and Actions	
Energy Policies and Actions	Policies: <ul style="list-style-type: none"> ● National Electrification Programme ● Energy White Paper of South Africa 1998 ● Energy Efficiency Strategy ● White Paper on renewable energy 2003 Actions: <ul style="list-style-type: none"> ● Integrated Energy Plan (IEP)
Guidance/Legislations in Energy	N/A
(b) Environmental Evaluations / SEA Status in Energy Policies and Actions	
Type of Assessment	SEA
Requirement Mechanisms	Administrative
Legislation for Environmental Evaluation / SEA	National Environmental Management Act (NEMA) – stipulates a range of environmental management tools, which includes SEA for the proactive integration of environmental issues at the policy and planning level
Applications	Policies, Plans and Programmes

21.4 Analysis and Conclusions

South Africa is indigenous with abundant fossil fuels and gas resources. Biomass forms the main energy source in the rural domestic sector, while other renewable energy development opportunities like solar power, wind power and hydropower are already being explored. The government has also aware of energy efficiency and conservation. In 2005, the Energy Efficiency Strategy was published. It aims to encourage sustainable energy sector development and energy use through efficient practices.

When comparing the energy situation with Hong Kong, Hong Kong has no indigenous energy resources and relies on burning fuels or imported electricity to provide energy. As a result, the city has put in considerable efforts to promote energy efficiency and renewable energy in order to restrain the rise in energy demand. Experiences on exploring technologies on renewable energy usage by South Africa, e.g. solar power, wind power, etc, would be the good references for the Hong Kong government in order to study the applicability of different types of renewable energy.

SEA in South Africa is in evolving process. There is no explicitly statutory requirement for the use of SEA in South Africa, though the NEMA makes provisions for the development of assessment procedures that aim to ensure that the environmental consequences of policies, plans and programmes are considered. With the provision of SEA guidelines by CSIR and DEAT, a number of SEA processes were undertaken administratively in South Africa which followed a variety of approaches. SEA is also applied as part of planning processes under various policies and regulations.

While South Africa has no formal provision for SEA, Hong Kong has already two systems for SEA in Hong Kong, including an administrative requirement and a statutory requirement under Schedule 3 of the EIA Ordinance. Nevertheless, it would be better for Hong Kong to continuously improve its system on SEA by making reference to other countries, as well as to extent the application of SEA by enhancing its SEA system and providing specific SEA guidelines.

21.5 Examples of Energy Policies/Actions or their Environmental Evaluation/SEA

Example SF-1 Environmental Assessment - Proposed Open Cycle Gas Turbine (OCGT) Plant and Associated Transmission Lines and Substation at Atlantis, Western Cape Province³⁸⁵	
Type of Study	Environmental Assessment
Description of Study	<p>The principle of constructing an OCGT Power Station is to meet the need for new peaking electricity generation capacity. The proposed project includes the construction of a new OCGT power station, a new substation and four 400 kV transmission lines in parallel between the new substation and the existing 400 kV transmission lines, within Atlantis Industria in the Western Cape Province.</p> <p>This study identified and evaluated potential environmental impacts associated with all aspects of the proposed project. It also included detailed studies for the two sites nominated for investigation, during the scoping phase of the project, as well as for the 400 kV transmission lines and substation to be constructed in conjunction with the OCGT facility.</p>
Summary of Alternatives	<p>The alternatives considered in the study include:</p> <ul style="list-style-type: none"> ● Not establishing an OCGT at Atlantis Industria in the Western Cape Province ● Two alternative sites for OCGT power station, 400 kV transmission lines and substation: (i) Site 1 - located in the Farm 1183 and a portion of the Farm Witzand 2 within the Atlantis Industria area and within the south-western corner of Atlantis Industria; (ii) Site 2 - located at the south-western corner of Atlantis Industria. ● Two transmission line alternatives: (i) Two double-circuit 400 kV transmission lines extend from the substation situated at the OCGT plant south east towards an existing railway track; (ii) Four single-circuit 400 kV transmission lines extend from the substation situated at the OCGT plant south across the industrial area towards the existing Koeberg-Aurora 400 kV transmission lines ● Transportation of fuels alternatives: (i) kerosene; (ii) low sulphur diesel
Scope of Assessment/ Study	<p>The scopes of the assessment include:</p> <ul style="list-style-type: none"> ● Geology, soil and agricultural potential ● Groundwater quality ● Impacts on flora ● Impacts on fauna ● Impacts on avifauna ● Air quality and emissions ● Visual/aesthetic impacts ● Impacts on tourism

³⁸⁵ Referenced to the report "Environmental Impact Assessment for the Proposed OCGT Plant and Associated Transmission Lines and Substation at Atlantis, Western Cape Province",

<http://www.eskom.co.za/content/Chapter1.pdf>

<http://www.eskom.co.za/content/Chapter2.pdf>

<http://www.eskom.co.za/content/Chapter3.pdf>

<http://www.eskom.co.za/content/Chapter4.pdf>

<http://www.eskom.co.za/content/Chapter5.pdf>

<http://www.eskom.co.za/content/Chapter6.pdf>

Example SF-1 Environmental Assessment - Proposed Open Cycle Gas Turbine (OCGT) Plant and Associated Transmission Lines and Substation at Atlantis, Western Cape Province³⁸⁵	
	<ul style="list-style-type: none"> ● Impacts on heritage sites ● Traffic impacts ● Noise impacts ● Social impacts
Environmental Measures	The mitigation measures for the adverse impacts are not available in the report.
Outcome of Study	Site 1 is nominated as the preferred feasible alternative for the establishment of the OCGT facility and associated substation and transmission lines in Atlantis Industria.

Example SF-2 Environmental Assessment - Proposed Coal Fired Power Station and Associated Infrastructure in the Witbank Geographical Area³⁸⁶	
Type of Study	Environmental Assessment
Description of Study	<p>The purpose of constructing the new coal fired power station and associated infrastructure is to meet South Africa growing electricity demand. The project comprises the design, construction, commissioning and operation of a coal-fired power station with its associated infrastructure. The power station itself would comprise six boiler/ turbine units fuelled by pulverized fuel, with a total nominal electricity generation capacity of approximately 5 400 MW.</p> <p>The proposed coal-fired power station and associated infrastructure are anticipated to impact on a range of biophysical and socio-economic aspects of the environment. One of the main purposes of the study is to understand the significance of these potential impacts and to determine if they can be minimised or mitigated. The study describes the full range of potential impacts and then proposes, based on a clear motivation, which impacts should be considered in detail in the later stage, and which should be screened out at this stage.</p>
Summary of Alternatives	<p>The alternatives considered in the study include:</p> <ul style="list-style-type: none"> ● The no-go alternative ● Two sites alternatives - The proposed sites are close together, one is near Witbank, and the other is near Johannesburg. ● Three ash handling method alternatives: (i) Aboveground ash dumping - Ash is transported to an ash dump, where it would be stacked and spread; (ii) Back ashing - Ash is dumped within the open-cast coal mine, after all the usable coal has been excavated; (iii) In-pit ashing - Ash would be placed directly into the existing excavation and the overburden and topsoil would be

³⁸⁶ Referenced to the report "Environmental Impact Assessment: Proposed Coal Fired Power Station and Associated Infrastructure in the Witbank Geographical Area", <http://www.shands.co.za/environmental/kendal/dsr.pdf>

Example SF-2 Environmental Assessment - Proposed Coal Fired Power Station and Associated Infrastructure in the Witbank Geographical Area³⁸⁶	
	placed on top of the ash. <ul style="list-style-type: none"> ● Two cooling systems alternatives: (i) Direct dry cooling/ indirect dry cooling; (ii) Indirect dry cooling system
Scope of Assessment/ Study	The scopes of assessment include: <ul style="list-style-type: none"> ● Air quality impacts ● Noise impacts ● Visual impacts ● Impacts on flora and fauna ● Impacts on aquatic ecosystems ● Groundwater impacts ● Risk assessment ● Heritage impacts ● Impacts on agricultural potential ● Socio-economic impacts ● Planning impacts ● Traffic impacts ● Geotechnical constraints
Environmental Measures	The mitigation measures for the adverse impacts are not available in the report.
Outcome of Study	No conclusion has been drawn in the study.