

Responding to climate change and limiting the impact on the environment

Climate change

Looking forward

Eskom's climate change strategy contains our commitment to reduce our greenhouse gas emissions. It also spells out how we understand the impacts of climate change on our business and people and how we pro-actively manage these impacts. The strategy has been summarised into Eskom's six-point plan on climate change. The elements of this plan are:

1. **Diversification** of the generation mix to lower carbon-emitting technologies
2. **Energy efficiency** measures to reduce demand and greenhouse gas and other emissions
3. **Adaptation** to the negative impacts of climate change
4. **Innovation** through research, demonstration and development
5. **Investment** through carbon market mechanisms
6. **Progress** through advocacy, partnerships and collaboration

Diversification of the energy mix

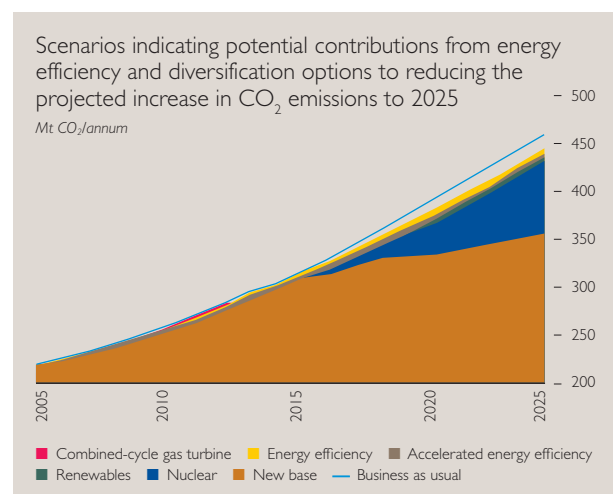
Every electricity generation technology has both positive and negative aspects. We acknowledge that there is no "silver bullet" and that we need access to all available options to make significant cuts in greenhouse gas emissions in the longer term.

Although the amount of CO₂ that we emit will increase in the short to medium term, we are committed to assessing options to retard that rate of increase and, ultimately, begin to decrease it. Our intent, therefore, is to reduce our relative CO₂ (Mt CO₂/MWh), footprint until 2025 and, thereafter, to continually reduce absolute emissions in support of national and global targets. This will be done by investing in lower carbon-emitting technologies as these technologies become available and meet the feasibility requirements.

Our capital expansion plan provides a significant opportunity to change our energy mix and this can be achieved by increasing the nuclear, gas, renewables and clean coal components. Plans include increasing the renewables component to at least 1 600MW by 2025. Clean coal technologies are already being applied to the coal-fired power stations under construction.

In the longer term, our existing power stations will reach the end of their lives and be replaced with more advanced and less carbon-emitting technologies, further changing our energy mix and carbon intensity.

We have modelled the potential contribution of demand- and supply-side initiatives to the future reduction of CO₂ emissions. A possible future scenario up to 2025 is illustrated in the figure below. With electricity supply growing at a potential 4,4% per annum and traditional coal-fired technologies remaining at a high percentage of the electricity generation mix (approximately 90%), CO₂ emissions from electricity generation would more than double over the next 20 years. Through the implementation of several energy efficiency and diversification options, this increase can be limited. The potential contribution of the energy efficiency and diversification options, considered in this scenario, is indicated by the different coloured "wedges" in the graph below. These options show how we would retard the rate of emissions growth from the "business as usual" line to the new emissions base line should we realise all the wedges.



Note that the technical and financial viability of these options is continually being re-assessed.

Eskom plans to increase the renewables component to at least 1 600MW by 2025.

We continue to model scenarios based on technology choices to determine the most optimal way of reducing emissions. This work will continue in the next year and will continue to inform our diversification strategy.

Refer to www.eskom.co.za/annreport08/029 where we detail CO₂ emissions scenarios from 2025 to 2050.

Energy-efficiency measures

The primary short-term focus is on energy-efficiency measures, since they can be implemented quickly and produce measurable reductions. We have continued with the internal energy-efficiency programme to save a billion kilowatt-hours. We also work with our consumers to reduce their demand through our demand-side management programme. The short-term target for this nationwide programme is to save 3 000MW by 2012 and 8 000MW by 2025. In reality this equates to about two of our large coal-fired power stations.

Adaptation to the negative impacts of climate change

We accept that global initiatives to reduce CO₂ emissions will take many decades. As such the negative impacts of climate change will become a reality to which we must adapt in order to sustain our business. Adaptation risks in South Africa include an increased number and severity of droughts and floods, human settlement and thus infrastructure movements. Short-term adaptation measures include dry-cooling in our new power stations, which can reduce water consumption by approximately 90%. The trade-off is an efficiency loss and, as a result, an increase in CO₂ emissions. Medium- to long-term considerations include improving the resilience of our infrastructure and staff, by incorporating adaptation issues into long-term planning and risk mitigation strategies. Over the next year we will develop our adaptation strategy. This will be done with input from local and international experts.



The proposed concentrating solar thermal technology to be used for the Upington area.

Innovation through research, demonstration and development

Research is the key platform for the development and deployment of new carbon-reducing technologies that will result in reductions in greenhouse gas emissions in the long term. Eskom has a proud record of cutting-edge research and development. A number of years ago, we anticipated the need for lower carbon technologies suited to South African conditions. We then initiated projects capitalising on our inherent strengths, building local capacity and associated industries optimised for local conditions. Eskom has and is participating in a number of exciting pilot projects that will achieve this aim:

- an underground coal gasification pilot study that can improve efficiency, reduce environmental impacts and possibly provide a mechanism for the sequestration of CO₂
- a "System Johansson" gasifier biomass pilot for small-scale applications
- a 100MW concentrating solar thermal plant which may overcome the barrier of intermittency and generate a local industry
- hosting the development plant for the pebble-bed modular reactor project, which incorporates modular nuclear technology

Performance review continued

Concentrating solar power research

If feasibility studies provide satisfactory results in assessing the new technology, we will establish a 100MW pilot concentrating solar power (CSP) plant in the Northern Cape Province. An environmental impact assessment was completed and a positive environmental authorisation obtained from the Department of Environmental Affairs and Tourism in September 2007, while the project feasibility assessment was finalised in November last year:



The technology has the potential to be used as a peaking, mid-merit or baseload plant and therefore has significant potential to be expanded as a renewable energy source in our generation mix.

We are developing technology road maps to underpin these technology choices – the coal roadmap has been completed. Roadmaps on other clean technologies are also being developed to guide our research and optimise our resources.

Investment through carbon market mechanisms

We support the carbon market and we are keen to see policy certainty after 2012 for a long-term global carbon market. The carbon market is an essential mechanism to level the playing field by making technologies more accessible and, in turn, inviting sustainable investment into developing countries. We are participating in the clean development mechanism (CDM) (refer page 74) and view it as a good vehicle to bridge some of the cost gaps, as well as for the wide-scale deployment of low carbon-emitting technologies. We are also investigating the application of programmatic CDM in our demand-side management portfolio. This allows for a programme of activities to be registered, in this way reducing costs and time taken for approval. The credits

obtained from these DSM activities will be earmarked for further DSM activities, continuing to promote energy efficiency.

Eskom uses a shadow price for carbon to evaluate all investment decisions. Over the next year we will be peer-reviewing our post-2012 strategy. This details different scenarios of the future climate change regime and provides valuable insight into how our climate change strategy should evolve.



At no other time in recent memory has the electricity utilities industry faced such tremendous challenges. Balancing a social mandate to extend and enhance access of power to marginal and rural communities while at the same time wage a business savvy fight against climate change is no easy feat. Furthermore, nobody would argue against the fact that electricity is the lifeblood of economic growth and yet almost all of us would also agree that this essential service can no longer be produced and consumed in the same way as it has been for the last century.

So, what's the good news? Eskom has been a driver of cutting-edge thinking on these challenges while moving the debates into the business opportunity space. As a member of the World Business Council for Sustainable Development, a business coalition of some 200 leading companies that share a commitment to the principles of sustainable development via economic growth, ecological balance and social progress, they have joined forces with 10 other electricity utility companies and developed a concrete understanding of the sustainability challenge facing the sector while identifying urgent needs required to power the 21st century.

Bjorn Stigson is the president of the World Business Council for Sustainable Development.

Eskom uses a shadow price for carbon to evaluate all investment decisions.

Progress through advocacy, partnerships and collaboration

Our response to climate change supports government's activities. We are active members of the National Committee on Climate Change (NCCC) and participate in the long-term mitigation scenario process. Internationally, Eskom interfaces with leading global organisations that address aspects such as emissions trading, policy directions, post-2012 scenarios, ground-breaking research and business collaboration.

Organisations include the World Business Council for Sustainable Development (WBCSD), the International Emissions Trading Association (IETA), Combating Climate Change (3C), the Global Roundtable on Climate Change (GROCC), Carbon Sequestration Leadership Forum (CSLF), Coal Industry Advisory Board (CIAB), Electric Power Research Institute (EPRI), International Energy Agency (IEA), the International Chamber of Commerce (ICC) and the World Economic Forum (WEF).

We are confident that we have made and will continue to make significant progress in meeting the challenge of climate change. Opportunities and risks have been identified and are being managed pro-actively.

We are also currently developing a "climate change intent", which will set some key parameters for our aspiration to reduce our relative CO₂ emissions until 2025, and thereafter continually reduce emissions in absolute terms. These parameters will be in support of national and global efforts in this area.

Stakeholder comment

How does a coal-based electricity utility plan for a carbon-constrained future? Clearly, with electricity supply accounting for about 40% of South Africa's emissions, the challenge of mitigation cannot be met without Eskom – but addressing electricity alone will not be enough.

Planning should take seriously the information from the long-term mitigation scenarios (LTMS). How should Eskom set clear targets to reduce GHG emissions, monitor progress and report publicly? What will change when there is a price on carbon?

LTMS identified wedges in three broad categories for the electricity sector – renewables, nuclear and cleaner coal. With significant public investment in R&D and demonstration going into the latter two, significantly greater effort will be needed on renewables.



The pressurised water reactors at Koeberg nuclear station will also be used at the possible new nuclear stations.

Stakeholder comment (continued)

That needs to start right now, with significant investment in options like solar, wind and other technologies. Five years from now, we should have the choice whether the next power plant should be a coal-fired "six-pack" or from renewables. Research should investigate the institutional arrangements, human capacity development, risk sharing, distributed generation systems and storage options. Solar thermal electricity deserves particular attention, notably concentrating solar plant (CSP) with 60% plus availability – investigating the feasibility and bankability of CSP projects.

In its research process, Eskom needs to shift from its culture of insisting that research results are confidential, to greater transparency, publishing results and opening them to independent peer review.

Climate change is a long-term challenge that needs urgent action, now. Research and development must help Eskom face the challenge of charting a path to a low- or zero-carbon electricity sector.



Harald Winkler is Associate Professor at the Energy Research Centre, UCT. He comments in his individual capacity.

Performance review continued

Performance

Highlights

Our investment decision-making process integrates sustainability issues from the “idea” identification stage right through to build, and thereafter operation and maintenance. In the last year, we developed a shadow price for carbon to enable equitable evaluation of different technologies based on our carbon emissions. This was a positive step in support of our aspiration to diversify towards lower carbon-emitting technologies and ensures that longer-term issues are taken into consideration in decision-making. We have also completed a carbon trading strategy that looks at the management of carbon credits.

Renewable energy plays an important role in meeting our diversification aspirations. In the last year we decided to invest in a 100MW wind facility in the Western Cape which will consist of 50 turbines, each rated at 2MW. Subject to the necessary approvals being obtained, the plant could be in operation by 2010. Further decisions to increase the renewables component to at least 1 600MW by 2025 are under consideration.

With regard to “off-grid” applications, we started the national rollout of solar water heating and compact fluorescent lamp (CFL) programmes. The uptake of these can contribute greatly to the reduction in the country’s carbon footprint by reducing the amount of electricity needed for water heating and lighting.

The two new coal-fired stations being built will be classified as supercritical plant, which will employ clean coal technologies. This means that the boilers operate at much higher temperatures than did the previous fleet of subcritical coal plant, resulting in higher efficiencies and therefore less coal burnt per unit of electricity generated. In addition, the pilot underground coal gasification plant allows for higher efficiencies and therefore lower carbon emissions.

Lowlights

There was an increase in the level of CO₂ emission from 208,9Mt (2007) to 223,6Mt¹ (2008) mainly due to the increased quantities of coal burnt and electricity produced, reduction in our average coal calorific value and an overall drop in thermal efficiency of our power stations.

Benchmarking

Eskom has been part of the WBCSD for a number of years. We co-chair the electric utilities sectoral project. This grouping includes 10 utilities from around the world. In the last year they compiled the “Powering a Sustainable Future” report on the policies and measures required to progress the climate change regime from a utilities’ perspective. This was well received and has often been quoted by the executive secretary of the United Nations Framework Convention on Climate Change as the type of information they want to see from business. Eskom played a pivotal role in the development of this report.

Refer to www.eskom.co.za/annreport08/030 for a case study on the WBCSD.

The clean development mechanism

The clean development mechanism (CDM) is one of three market mechanisms that have been introduced by the Kyoto Protocol to assist countries in reducing their emission reduction targets more cost effectively.

Refer to www.eskom.co.za/annreport08/031 for more details on the clean development mechanism.

Limiting the impact on the environment

Environmental performance is managed as an integral part of our governance structure, from the board sustainability committee, to the executive management committee (Exco) sustainability and safety subcommittee. Accountable environmental managers and environmental practitioners ensure the effective implementation of environmental management systems throughout our business.

The current focus on securing continuity of supply, executing the build programme and responding to climate change provides us with environmental opportunities. These include introduction of renewable technologies, expansion of our nuclear programme, identification and implementation of internal energy-efficiency projects, further expansion of water conservation programmes, and conservation of land as a biodiversity offset.

Through this commitment, our objective is to ensure continual improvement in our environmental performance by setting

¹ Calculated annual figure is based on coal characteristics and coal-fired power station design parameters (excluding liquid fuels).

The two new coal-fired power stations will employ clean coal technologies.

environmental performance indicators and management systems and ensuring the use of balanced criteria in our decision-making processes. These commitments are set out in our safety, health and environment policy.

Our environmental commitment continues to be based on the efficient use of natural resources while controlling our activities that impact on the environment.

Performance

Environmental performance is co-ordinated at an organisational

level and an overall picture of environmental performance is maintained.

Refer to www.eskom.co.za/annreport08/032 for more details on the Eskom environmental liaison committee.

We continue to measure our performance against a number of environmental parameters. Four of the most significant of these are linked to targets set annually in the Eskom business plan. Alarms and standards are set and measured against these four measures as part of the operational health dashboard.

| Key environmental performance indicators | Unit of measure | Target 2008 | Actual 2008 | Actual 2007 | Result |
|---|-----------------|-------------|-------------|-------------|--------------|
| Relative particulate emissions ^{1,2} | kg/MWh sent out | ≤0,21 | 0,21 | 0,20 | Achieved |
| Specific water consumption ³ | L/kWh sent out | ≤1,29 | 1,32 | 1,35 | Not achieved |
| Enhanced PreCare/MaxiCare environmental component | score | ≥80,00 | 97,21 | 100,80 | Exceeded |
| Reported legal contraventions per the operational health dashboard ⁴ | number | 0 | 6 | 0 | Not achieved |

Over and above these indicators, performance against other significant environmental aspects of our operations is set out in the table below. The process of identifying our significant environmental aspects involves:

- identifying the environmental aspects and impacts associated with our activities
- determining the significance of the environmental impacts
- determining the significance of the impacts on business
- ranking these aspects

| Other significant environmental indicators | Unit of measure | Target 2008 | Actual 2008 | Actual 2007 | Result |
|---|-----------------|--------------------|-------------|-------------|---------------------|
| CO ₂ | Mt ⁵ | N/A | 223,57 | 208,90 | Increase |
| Radiation exposure, per annum | milliSieverts | ≤0,25 ⁶ | 0,0041 | 0,0034 | Exceeded |
| SO ₂ | kt ⁵ | N/A | 1 950 | 1 876 | Increase |
| NO _x | kt ⁵ | N/A | 983,9 | 929,9 | Increase |
| Total number of environmental legal contraventions ⁷ | number | N/A | 46 | 50 | Decrease |
| Ash recycled | % | N/A | 7,0 | 6,3 | Increase (positive) |

¹ Figures are calculated as a 12-month moving index.

² Amount of ash emitted per unit of generated power sent out (excluding Camden and Grootvlei power stations – correlation tests on environmental indicators not yet completed).

³ Volume of water consumed per unit of power sent out by all generating stations (excluding Camden and Grootvlei power stations).

⁴ Under certain conditions, contraventions of environmental legislation are classified in terms of the Eskom operational health dashboard index. These include instances where censure was received from authorities, legal contraventions were not reported to government and internally, if it is a repeat legal contravention or where the contravention was not addressed adequately. Managing directors can escalate any significant contravention to Exco if deemed appropriate.

⁵ Calculated annual figures based on coal characteristics and power station design, but excludes gas-turbine power stations.

⁶ National Nuclear Regulator limit.

⁷ The reporting date of legal contraventions is based on its classification at the ELC. This may result in legal contraventions from one year being reported in the following year.

Performance review continued

Air quality

The generation of electricity at Eskom's coal- and gas- (liquid fuel) fired power stations results, *inter alia*, in the release of combustion gases and particulate matter, which can affect local and regional air quality. The legislation governing air quality and atmospheric emissions is the National Environmental Management: Air Quality Act (39 of 2004) and the implementation plans detailed in the 2007 National Framework for Air Quality Management (11 September 2007).

Our approach to air quality considers the emission of particulates, sulphur dioxide (SO₂), oxides of nitrogen (NO_x), heavy metals, fugitive emissions, volatile organic compounds (VOCs) and greenhouse gases.

In the past, our focus was on reducing our particulate emissions significantly, with continual improvement over two decades. The current focus is on gaseous emissions. The bigger issues relate to climate change and ambient air quality and we recognise the need to control the emissions to the atmosphere emanating from our power stations. To this end, we take a pro-active stance in discussions of possible environmental impacts with DEAT, and comply with requirements as included in environmental authorisations issued by DEAT as an outcome of the EIAs for our future power stations.

Air quality research

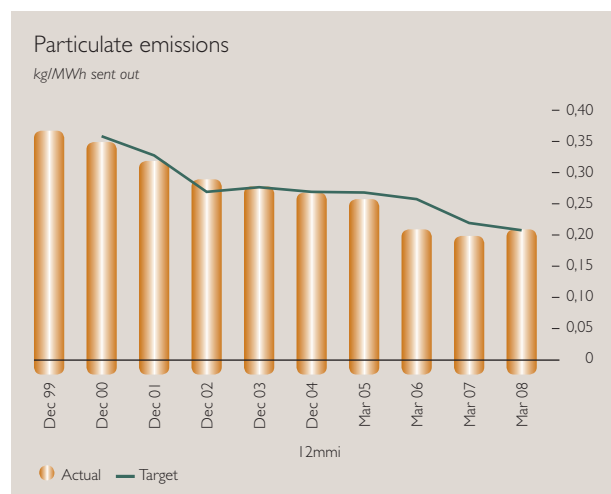
We have been undertaking investigative ambient air quality monitoring and research on a regional scale since the late 1970s, using state-of-the-art equipment. The data is analysed and interpreted to assess air quality in terms of guidelines and standards, evaluate significant trends and determine the relative contributions of the various source groups to air quality degradation. Other applications include determining background concentrations for EIA purposes, performance testing of predictive air quality models, predicting long-term air quality trends for strategic planning purposes and defining research direction.

Refer to www.eskom.co.za/annreport08/033 for more details on air quality research.

Particulate emissions

The emission of particulates from power station stacks has been a focal point since the early 1980s. Significant reductions in the quantity of particulates emitted have been achieved through the use of technologies that enhance the efficiency of electrostatic precipitators, such as sulphur trioxide flue gas conditioning, skew flow technology and modern control systems, and through the retrofitting of pulse jet fabric filters.

The actual particulate emissions based on a 12-month moving index (12mmi) were 0,21 kg/MWh sent out (2007: 0,20 kg/MWh) against a target of ≤0,21 kg/MWh sent out. Although the target set was achieved, there was no improvement when compared to the previous year as a result of an overall deterioration in power station plant performance, poorer coal quality and the running of the power stations to their limits in attempts to avoid load shedding. Poor coal quality has led to electrostatic precipitator problems at Duvha; ash plant technical problems at Kendal and failure of the SO₃ plant at Matla.



Refer to www.eskom.co.za/annreport08/33a for more details on particulate emissions.

7% (2007: 6,3%) of coal ash produced was recycled.

Gaseous emissions

South African standards for emissions of SO₂ and NO_x are being formulated and will be incorporated into DEAT's 2008 national framework for air quality management. Numerous removal technologies are available to reduce the quantities of these gases prior to their release, ranging from low NO_x boilers and clean coal technologies to flue gas desulphurisation (FGD) and flue gas denitrification. FGD and denitrification systems have not been installed at any of the current power stations. However, FGD will be installed for the proposed Project Bravo coal-fired power station in Mpumalanga.

| Gaseous emissions ¹ | Unit of measure | 2008 | 2007 |
|--|-----------------|---------|---------|
| Nitrous oxide (N ₂ O) | kt | 2,9 | 2,7 |
| Carbon dioxide (CO ₂) | Mt | 223,6 | 208,9 |
| Sulphur dioxide (SO ₂) | kt | 1 949,7 | 1 875,7 |
| Nitrogen oxide (NO _x) as NO ₂ | kt | 983,9 | 929,9 |

We calculate and record on a monthly basis the annual amounts of oxides of nitrogen (NO_x), sulphur dioxide (SO₂) and carbon dioxide (CO₂) emitted from power stations, based on the coal characteristics and power station design parameters. All coal-fired power stations are installing a continuous emissions monitoring system on one unit per power station.

Research into SO₂ reduction

A study is underway to identify alternative ways to reduce SO₂ emissions at coal-fired power stations. These include:

- identification of coal beneficiation/processing options to reduce sulphur in the product for use in an Eskom plant on a site-specific basis
- improved calorific value impacts on emissions
- quantification of the reduction of contaminants associated with identified technology options
- peripheral or lifecycle impact on the environment due to the beneficiation options, for example, increased discard production
- amounts of water that may be required for these processes

¹ Calculated annual figures based on coal characteristics and power station design parameters, excluding Camden and Grootvlei and gas-turbine power stations.



Eskom has partnered with Wessa on a very successful environmental education programme.

Ambient air quality monitoring and modelling

Eskom runs an ambient air quality monitoring and modelling programme at sites around the country to define general air quality and emissions associated with our operations.

Ambient air quality data gathered over 20 years has enabled extensive modelling of the dispersion of air emissions. Impact studies have been undertaken, including a wet and dry deposition monitoring programme, both within South Africa and in neighbouring countries.

The intention of our ambient air quality monitoring and modelling programme is to monitor ambient particulate, SO₂ and NO_x concentrations on population agglomerations potentially affected by power station emissions, and at other sites deemed necessary in order to understand the current and future impact of Eskom's activities on ambient air quality.

Modelling of ambient particulate, SO₂ and NO_x concentrations from Eskom power stations is carried out and compared with ambient measurements at appropriate sites.

Performance review continued

Ambient air quality

In October 2007, DEAT released a discussion document on the establishment of national standards for ambient air quality. Research has been initiated to compare both measured ambient air quality data and modelled data against the proposed standards. Monitored results from 2003 to 2006 will be analysed and assessed against DEAT's proposed standards. Impacts from all pollution sources on population densities are to be assessed and modelled.

Refer www.eskom.co.za/annreport08/034 for more detail on ambient air quality monitoring.

Looking forward

Air quality

Our approach to ensure continual improvement in atmospheric air quality management is guided by the following:

- commitment to diversification of our dominant coal energy mix, including the use of cleaner coal technologies, nuclear and renewables
- minimising adverse health impacts of atmospheric emissions
- the identification and use of the best practicable environmental option to control emissions
- the use of detailed cost-benefit analyses to balance the option to control emissions against environmental risks and other factors
- source significance of emissions ranked on health impacts of the emissions, not just on the quantities
- accommodation of the interests of Eskom's stakeholders by considering economic, social and environmental factors, as far as is reasonably practicable
- taking into account national and international requirements, comparisons and trends
- consideration of potential future legislative requirements
- developing sustainable human resource skills and advanced technology
- compliance with national legislation
- the decision to adopt mitigation technologies based on scientific studies and on a case-by-case basis

Eskom participates in government's "Basa Njenjo Magoga" programme (the "Clean Fires Campaign") – a programme aimed at introducing an efficient way of lighting fires in urban areas and where low-level air emissions are high as a result of household fires.

Clean coal technology research

Eskom will continue its reliance on coal as its primary energy source for the foreseeable future, although it plans to reduce the coal component of its generating capacity to 70% within 20 years. Clean coal technologies that use coal for power generation in more environmentally acceptable and economically viable ways will form part of this mix.

A number of clean coal technologies exist now and are expected to be available over the next 20 years. Examples of these are supercritical pulverised fuel, coal beneficiation, subcritical and supercritical circulating fluidised-bed combustion (FBC), fluidised-bed gasification (FBG), integrated gasification combined cycle (IGCC), and underground coal gasification (UCG). All of these technologies have advantages and disadvantages that need to be understood. Clean coal technologies are thus part of the Eskom research programme that focuses on assessing the different technologies under local conditions.



1 MW (thermal) pilot scale pulverised fuel combustion test facility and fluidised-bed combustion and gasification pilot test facility located at the Eskom Research and Innovation Centre in Johannesburg.

Refer to www.eskom.co.za/annreport08/035 for more detail on clean coal research.

Refer to www.eskom.co.za/annreport08/036 for more detail on heavy metals and fugitive emissions.

A study is underway to reduce SO₂ emissions at coal-fired power stations.

Water usage

While water is a critical resource for Eskom, it is also a scarce resource in South Africa. Eskom consumes about 2% of the country's freshwater resources and this calls for continual improvement in performance. Refer to page 60 for more information about our use of water.

Compliance with environmental legislation

We have for many years had processes in place to ensure that non-compliance with legal requirements is identified, reported and investigated and that corrective and preventative measures are implemented.

During the year our internal audit exercise, at a selection of sites visited in the year, uncovered weaknesses in reporting processes and controls designed to ensure that all environmental legal contraventions were identified and reported to the environmental liaison committee. Issues identified relate to understanding and application of the corporate reporting procedures and identification of legal contraventions.

As a result of these findings, we have engaged an external service provider to assess the adequacy of reporting procedures and design and operation of controls and reporting processes at all significant sites. Any environmental legal contravention identified through this process will be recorded in the 2009 annual report.

For this reporting period, 46 (2007: 50) environmental legal contraventions were recorded.

Most of the environmental legal contraventions related to water events. For the financial year, 6 (2007: 0) legal contraventions were recorded in terms of the Eskom operational health dashboard. The significant increase in the number compared to the previous year is due to the inclusion of additional criteria related to repeated legal contraventions.

One was due to a letter of censure following the cutting of vegetation without the necessary permit. A further incident was related to a repeat of an event related to the non-compliance with conditions of authorisation for the construction of a 132kV power line. The significant increase in water-related contraventions was



The 8 000 hectare Ingula site is managed according to strict conservation principles.

as a result of higher-than-average rainfall, compounded by human error and equipment failure, resulting in unauthorised releases of water from our power stations. This resulted in four such repeat events.

Refer to www.eskom.co.za/annreport08/037 for more detail on the definition of a legal contravention.

Biodiversity

We have over 366 000km of power lines, operate 27 existing power stations and have four new power stations under construction, which means that our business footprint on biodiversity needs to be monitored and managed closely.

The significant threats in terms of biodiversity are managed and controlled through our partnerships with civil society to ensure best practice and specialist input. This includes the Endangered Wildlife Trust (EWT) for avian impacts; BirdLife South Africa and the Middelpunt Wetland Trust for the conservation of a sensitive wetland and associated biodiversity next to the new Ingula pumped-storage scheme; and the Wildlife and Environment Society of SA (WESSA) for broader environmental education programmes in the area of energy and sustainability.

Refer to www.eskom.co.za/annreport08/038 for more detail on Eskom's biodiversity partnerships.

Vulture enclosure research

The vulture enclosure research project, a partnership between Eskom and the Rhino and Lion Wildlife Conservation NPC, is an alternative method to study mitigation methodologies to prevent vultures and other birds from being electrocuted on power lines. The project is aimed at reducing bird electrocutions in the identified danger zones on pylons through the application of cost-effective equipment such as insulation covers and bird diverter methods.

The vulture enclosure will serve a dual purpose. Firstly, it will allow the rehabilitated vultures to recuperate before they are released back into the wild. Secondly, it will support research studies in vulture behaviour on the identified problem towers in order to prevent and limit the continual vulture electrocutions on power lines.



Refer to www.eskom.co.za/annreport08/039 for further information on vulture research.

Waste

As a generator, transmitter and distributor of electricity, our significant waste streams are ash (a by-product of the coal burned), oils and asbestos-containing materials. Management practices are in place to report on various waste streams, ranging from domestic waste, garden refuse, building rubble, metals and fluorescent tubes to health care waste. Metals, paper and printer cartridges are recycled where feasible.

Quantities of waste disposed of at registered waste sites

| | Unit of measure | 2008 | 2007 |
|--|-----------------|-------|---------|
| Materials containing asbestos | tons | 321,0 | 6 060,0 |
| Polychlorinated biphenyls | tons | 17,0 | 10,0 |
| Volume of low-level radioactive waste (Koeberg), (stored in steel drums) | m ³ | 181,8 | 86,2 |
| Volume of intermediate-level radioactive waste (Koeberg), (stored in concrete drums) | m ³ | 26,8 | 36,0 |
| Ash (approximate) | Mt | 36,0 | 34,2 |

Polychlorinated biphenyls (PCBs)

In line with the Stockholm Convention, Eskom is committed to the phasing out of PCBs by 2025. We have implemented stringent management practices relating to PCBs. These cover the handling, disposal, storage, testing and labelling of PCB-contaminated equipment, the compiling of inventories and the development of phase-out plans that meet the requirements of the Stockholm Convention.

Ash

Of the approximately 36 million tons (2007: 34 million tons) of coal ash produced at the coal-fired power stations over the 12-month period, 7,0% (2007: 6,3%) was recycled. This recycled ash from Lethabo, Matla, Kendal and Majuba power stations is used in the production of cement.

The remaining ash is disposed of in ash dams and dumps next to our power stations. These are then rehabilitated to control fugitive dust.

Ash from several power stations is used in the production of cement.



All ash dams at power stations are rehabilitated.

Nuclear

The low- and intermediate-level radioactive waste from Koeberg power station is sealed in steel drums and concrete containers respectively. This waste is disposed of at the Vaalputs national radioactive waste repository. This is a near-surface disposal site for radioactive waste, licensed by the National Nuclear Regulator and operated by Necsa. All the spent fuel (high-level waste) from the power station is stored in the power station in fuel pools.

The increase in the disposal of intermediate-level radioactive waste was due to two shutdowns at the Koeberg nuclear power station for maintenance and refuelling of the reactor; whereas there is normally only one shutdown at Koeberg during the reporting year.

Looking forward

Eskom volunteered to participate in the Mpumalanga provincial waste reporting initiative. The outcome of this was the development of a hazardous waste management plan for Mpumalanga. Following this initiative, Eskom has committed itself to participating in DEAT's national rollout of the South African waste information system (SAWIS). Eskom has set a target of phasing out all asbestos-containing material by 2033.

Refer to www.eskom.co.za/annreport08/040 for further information about international agreements regarding PCBs and asbestos.

Environmental expenditure

Funds were allocated for environmental capital and operational expenditures. These amounted to R1,3 billion on capital projects and R460 million on operational environmental activities (2007: R616 million capital and R362 million operational). The increase in capital expenditure is due to the capital expansion programme.

The largest component was on air quality management at coal-fired power stations, water management, rehabilitation at coal mines and expenditure on environmental impact assessments for power stations, power line and substation construction projects, waste and sewage management, rehabilitation of land and control of vegetation.

Environmental management systems

Environmental management tools such as management systems, audits, monitoring and measurement, and EIAs are used to control our activities and work towards continual improvement.

Many parts of Eskom have received ISO 14001 standard certification, while the rest of the group undertakes audits and management reviews to ensure that the requirements of the standards are achieved.

Refer to www.eskom.co.za/annreport08/041 for details of divisions and subsidiaries who have achieved ISO 14001 certification.

Refer to www.eskom.co.za/annreport08/042 for details of Eskom's occupational health, safety and environment policy.