



For many years Eskom has practised participative management and offered all its employees equal remuneration and advancement opportunities. The organisation has always maintained sound international relations and promoted regional cooperation within southern Africa. Above all, Eskom is aware of electricity's role in promoting a growth economy which can offer everyone an improved standard of living. Eskom, therefore, naturally supports initiatives and efforts to establish a democratic, outward oriented South Africa.

1	PROFILE
2-3	HISTORICAL OVERVIEW
4-5	HIGHLIGHTS
6-7	ELECTRICITY COUNCIL AND MANAGEMENT BOARD
8-9	CHAIRMAN'S REVIEW
10-11	ORGANISATIONAL STRUCTURE
12-13	CHIEF EXECUTIVE'S REPORT
14-29	ESKOM IN ACTION IN 1990
30	THE NATIONAL GRID
31-49	FINANCIAL RESULTS 1990
50-51	HOW ESKOM PERFORMED IN 1990
52-56	TABLES

PROFILE OF ESKOM

1990

Eskom supplies more than half of the electricity used in the entire African continent. It is one of the ten largest utilities in the world.

At the end of 1990 Eskom's total assets stood at R38 801 million. Revenue for the year was R10 736 million and operating expenditure, including depreciation, was R6 366 million. Net interest and finance charges were R3 774 million before capitalisation. Net income was R845 million for the year. Capital expenditure, including interest capitalised during the year, amounted to R3 662 million. Revenue is expected to exceed R11 500 million in 1991.

Eskom operates under the Eskom Act of 1987 and the Electricity Act of 1987. It is an independent, self-financing undertaking. It has no shareholders and is funded entirely from debt and retained earnings.

Eskom's activities are planned and directed by the Electricity Council, which is appointed by the Government and consists of independent experts and representatives of consumers' interests, and by the Management Board, responsible for the day-to-day running of Eskom and appointed by the Council.

Eskom is managed on sound business principles. It is divided into eight functional groups and into business units, which ensures functional and geographic decentralisation.

Eskom's corporate headquarters are in Sandton.

HUMAN RESOURCES

Eskom employs 50 000 people. It is an equal opportunity employer and a meritocracy. Advancement and remuneration are linked to performance, without reference to race, creed or sex. All employees are encouraged to develop their potential through education, training and participative management.

TECHNICAL BACKGROUND

Eskom's 25 power stations have an installed capacity of 35 673 MW. The distribution system has more than 220 000 km of high-voltage power lines. Eskom operates some of the world's largest coal-fired power stations, has the only nuclear power station in Africa and operates the world's largest direct and indirect dry-cooled stations. It is also a recognised authority on the use of coal of an extremely low grade for power generation and leads research into the effects of lightning on power supply systems.

Eskom operates a sophisticated distribution network which includes 765 kV lines, the first to operate successfully at this voltage at high altitudes. Electricity can be distributed anywhere in South Africa and is exported to all neighbouring countries. Eskom imports power from Namibia and Mozambique's Cahora Bassa hydro-electric scheme when available.

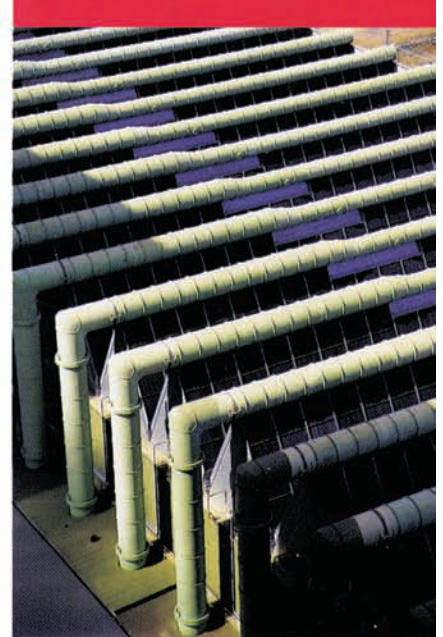
MAIN CUSTOMERS

It is estimated that industry and business use 55% of the electricity generated in South Africa, mines 26%, households 15% and the railway system 4%. Eskom supplies most mines and many industrial users direct; 43% of its electricity is sold to municipalities and neighbouring countries who resell it to end-users.

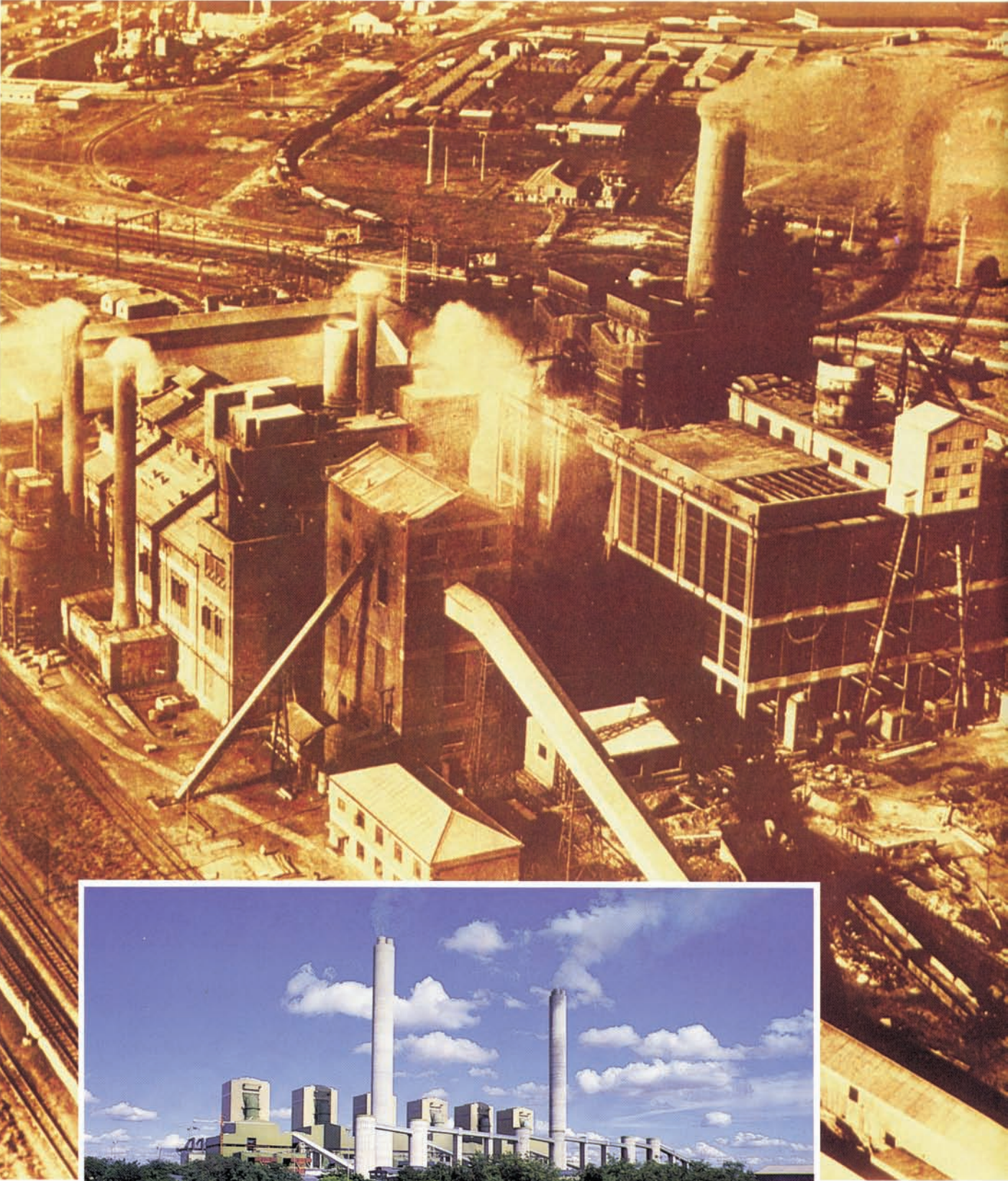
Much of the future growth in electricity demand will come from the formal sector, but with the accelerated electrification of towns and rural areas, the informal economy is expanding rapidly. Large-scale urbanisation is making the supply of electricity to many more people economically viable.

ESKOM'S VISION

Eskom is committed to being an efficient and effective organisation, so as to be able to make electricity available to its consumers at the cheapest possible price. It is also committed to making electricity available to all in South Africa who want it and can afford it, and to supporting a regional transmission grid to encourage cooperation and accelerate economic growth in the subcontinent.



Congella power station was as advanced in its technology as Matimba (inset), is today.



HISTORICAL OVERVIEW

1882

South Africa was one of the first countries in the world to use electricity on a commercial basis. As elsewhere the supply of electricity began under the auspices of various municipalities. Kimberley was the first to introduce electric street lights in 1882, before London had electric lights. Kimberley's first reticulation system was commissioned in 1890, followed by Johannesburg in 1891, Pretoria in 1892, Cape Town in 1895, Pietermaritzburg in 1896, Durban in 1897, East London in 1899, Bloemfontein in 1900 and Port Elizabeth in 1906.

1906

In the 1890s, mining groups combined to erect power stations to supply their own needs. The Victoria Falls Power Company Limited (VFP) was registered in 1906 to harness the Victoria Falls and supply electricity to industries on the Witwatersrand and in Southern Rhodesia, now Zimbabwe. For technical and financial reasons the project was abandoned and the VFP concentrated on the exploitation of Transvaal coal. By 1915 it operated four power stations under the name of The Victoria Falls and Transvaal Power Company and at one stage was the largest utility in the British Empire.

1923

The need for a national power system which could meet the demands of the entire country led to the Electricity Act of 1922 and the establishment of the Electricity Supply Commission in 1923. The Commission's first chairman was Dr H.J. van der Bijl, an internationally recognised scientist who also founded Iscor and the IDC. Eskom began generating power in 1925 and soon became South Africa's leading electricity supplier.

1948

Eskom took over the VFP in 1948, a further step towards a national supply system. By the end of 1990, Eskom was supplying more than half the electricity in Africa. It ranks among the largest electricity utilities in the world.

1962

Eskom's first power stations were far advanced for their time, but small by today's standards with sets of 33 MW and later 60 MW. In 1962, the first "big" sets, 100 MW and 125 MW, were commissioned. This led to the present 600 MW sets which are among the largest and technologically most advanced in the world.

1973

The idea of an integrated transmission system, linking all major cities in the country, was first raised in the 1920s. By 1973 this had become a reality when all Eskom undertakings had been connected. Eskom has more than 220 000 km of power lines of which 22 000 km are part of the national grid. In 1987, the first 765 kV lines were energised.

1984

With vast deposits of coal available, Eskom's base-load stations are mainly coal fired. It has also harnessed South Africa's meagre hydro potential. In addition, in 1984, South Africa's first nuclear power station became operational.

1985

Eskom was restructured in 1985 to meet the electricity demands of a changing South Africa. The Electricity Supply Commission was replaced by a body corporate known as Eskom, controlled and managed by the Electricity Council and Management Board. In 1987 the Eskom Act and the Electricity Act were promulgated and Eskom's name was changed to Eskom. Eskom commits itself to being a professionally managed, customer orientated business.

1990

Eskom supports a new democratic, outward looking South Africa. The goals of bringing affordable electricity to all and joining a sub-Saharan interconnected grid are closer to becoming reality.

HIGHLIGHTS OF THE YEAR

	1990	1989	% Change 1989/90	% Average yearly increase 1986-1990
FINANCIAL				
Revenue (R million)	10 736	9 271	15,8	18,4
Net income (R million)	845	728	16,1	3,5
Fixed assets in commission at cost (R million)	35 640	31 199	14,2	18,4
Works under construction (R million)	5 771	6 638	-13,1	-7,0
Net capital expenditure (R million)	3 662	3 993	-8,3	-4,6
Total net borrowings (R million)	25 883	24 630	5,1	8,0
Average price per kW.h sold (cents)	7,88	6,90	14,2	12,6
Average coal cost per ton (rand)	24,3	20,94	16,0	13,9

OPERATIONS

Electricity sold (GW.h)	136 168	134 347	1,4	3,9
Coal burnt in power stations (Mt)	70,9	67,5	5,0	3,6
Water consumed by power stations (Mℓ)	257 000	260 154	-1,2	-1,3
Peak demand on integrated system (MW)	21 863	21 871	-0,1	4,2
	(29.06.90)	(21.07.89)		

ASSETS IN COMMISSION

at 31 December

Installed capacity (MW)	35 673	34 141	4,5	6,8
Assigned sent-out rating (MW)	33 843	32 403	4,4	6,8
Power lines (km)	220 112	212 114	3,8	6,7

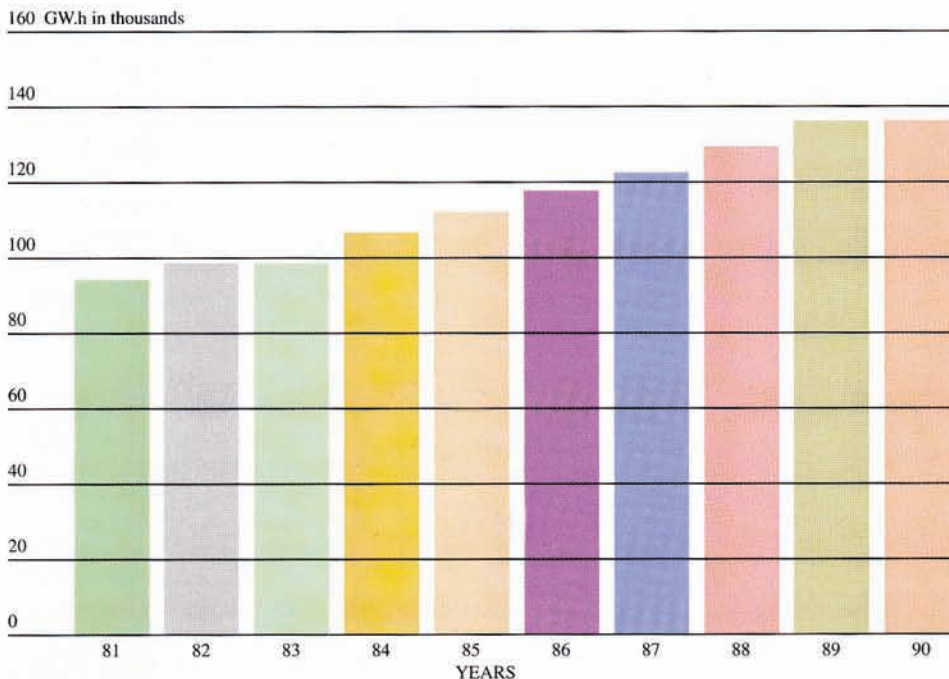
STAFF EMPLOYED

at 31 December

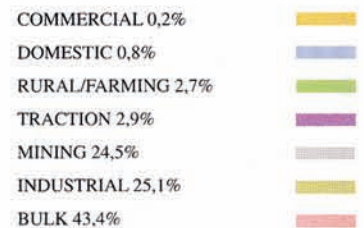
	50 000	51 554	-3,0	-5,3
--	--------	--------	------	------

More than 146 000 GW.h were sent out on the Eskom system. Plant reliability improved by 37% from 508 hours in 1989 to 694 hours at the end of December 1990. Total productivity improved by 1,3%. Overall water consumption by coal-fired stations was reduced from 2,02 ℓ/kW.h in 1989 to 1,90 ℓ/kW.h in 1990. Close to 8 000 km of power lines were added to the system. Interaction with other southern African utilities is increasing: a technical assistance contract was signed with Mozambique and another is being negotiated with Zimbabwe; a training agreement was signed with Malawi and a project management agreement was finalised with Swaziland.

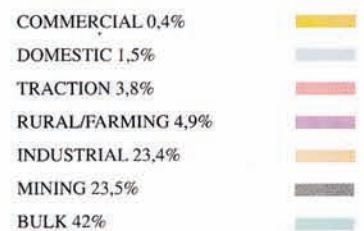
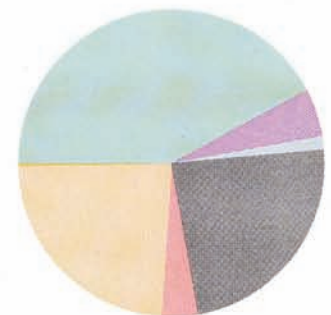
TOTAL ELECTRICITY SALES
(FROM 1981 TO 1990)



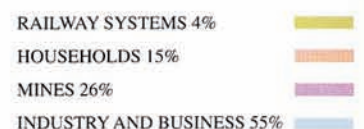
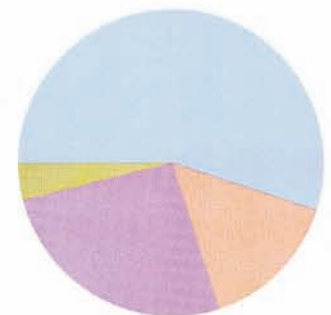
SALES PER CATEGORY
(EXCLUDING OWN USE)



REVENUE PER CATEGORY



ELECTRICITY CONSUMPTION
(IN SOUTH AFRICA)



ELECTRICITY COUNCIL

Members of the Electricity Council, left to right:
Prof. J.L. Weyers, D.B. Mostert, Prof. H.C. Viljoen, Prof. D. Konar, F.J. Malan, Prof. I.J. Lambrechts, Prof. C.R.M. Dlamini, Dr. J.W.L. de Villiers, Dr. J.B. Maree, Dr. I.C. McRae, J.F.W. Haak, A.B. Dickman, R.C. Webb, M. Lekota, B.J. Lessing, J.A. Loubser.
Absent: G.P. Croeser, Dr. D.C. Neethling, A.A. Sealey.



DR J.B. MAREE OMSG SSAS (66)
Chairman
 D.Com. (Honoris causa) (Stell.), B.Com. (Witwatersrand). Appointed to the Electricity Council in 1985.

G.P. CROESER (53)
 B.Com. (Stell.). Director general of the Department of Finance. Appointed to the Electricity Council in 1989.

DR J.W.L. DE VILLIERS OMSG (61)
 Pr. Eng., D.Sc. (Stell.). Chairman of the Atomic Energy Corporation. Appointed to the Electricity Council in 1985.

A.B. DICKMAN (60)
 B.Com. (Hons.) (Witwatersrand), FIBSA. Senior economic consultant and alternate director of Anglo American Corporation of SA Limited. Chairman of the SA Chamber of Business Standing Committee on Energy and Water Affairs. Appointed to the Electricity Council in 1985.

PROF. C.R.M. DLAMINI (39)
 LL.D. (UZ) and LL.D. (Pret.). Registrar Academic at the University of Zululand. Appointed to the Electricity Council in 1990.

J.F.W. HAAK (73)
 B.A., LL.B. (Stell.). Attorney and businessman. Appointed to the Electricity Council in 1985.

PROF. D. KONAR (37)
 D.Com. (Unisa), MAS (Illinois, USA), CA (SA). Professor and head of Accountancy at the University of Durban Westville and director of SA Reserve Bank, Board member of the SABC and trustee of The Independent Development Trust. Appointed to the Electricity Council in 1985.

PROF. I.J. LAMBRECHTS (48)
 D.Com. (Stell.), MBA (Stell.). Professor of Business Economics at the University of Stellenbosch. Chairman of the Subcommittee for Energy of the Afrikaanse Handelsinstituut. Appointed to the Electricity Council in 1985.

M. LEKOTA (33)
 B.Com. (Accounting) (UNIN), MBA (Rutgers, New Jersey, USA). Executive director of the National Federated Chamber of Commerce and Industry. Appointed to the Electricity Council in 1990.

B.J. LESSING (54)
 Pr. Eng., B.Sc., B.Eng. (Stell.). FITSA. Chief executive of Spoornet. President of the Institute of Transport in Southern Africa. Appointed to the Electricity Council in 1988.

J.A. LOUBSER (59)
 B.Sc. (Elec. Eng.) (Stell.). City Electrical Engineer of Benoni. Appointed to the Electricity Council in 1990.

F.J. MALAN (62)
 M.Sc. (Agric.) (Stell.). Wine farmer and director of the KWV, Chairman of the SA Agricultural Union's Electricity Committee. Appointed to the Electricity Council in 1985.

DR I.C. McRAE (61)
 Pr. Eng., D.Sc. (Honoris causa) (Witwatersrand), B.Sc. (Mech. Eng.) (Witwatersrand). Chief executive of Eskom and chairman of the Management Board. Appointed to the Electricity Council in 1985.

D.B. MOSTERT (53)
 B.Sc. (Mech. Eng.) (Stell.), MBA (PU vir CHO). Group chief executive of Dorbyl. Appointed to the Electricity Council in 1990.

DR D.C. NEETHLING (57)
 Sci. Nat., Ph.D. (Natal), B.Sc. (Hons.) (Pret.), B.Sc. (Stell.) Chief executive of the National Energy Council. Appointed to the Electricity Council in 1985.

A.A. SEALEY (58)
 B.Sc. (Eng.) (Witwatersrand). Deputy chairman of Rand Mines Limited and chairman of the Coal and Base Minerals Division. Executive director of Barlow Rand Limited. Appointed to the Electricity Council in 1988.

PROF. H.C. VILJOEN (53)
 Pr. Eng., Ph.D. (Eng.) (Stell.). Dean of the Faculty of Engineering at the University of Stellenbosch and chairman of the SABC Control Board. Appointed to the Electricity Council in 1986.

R.C. WEBB (60)
 Director of companies. Involved with the Small Business Development Corporation. Appointed to the Electricity Council in 1985.

PROF. J.L. WEYERS (60)
 D.Litt. et Phil. (Unisa). Vice-principal Planning of Unisa. Appointed to the Electricity Council in 1986.

MANAGEMENT BOARD

DR I.C. McRAE (61)

Chairman
 Pr. Eng., D.Sc. (Honoris causa) (Witwatersrand), B.Sc. (Mech. Eng.) (Witwatersrand). Chief executive of Eskom. Joined Eskom in 1947. Appointed to the Management Board in 1985.

B.T. CROOKES (41)

B.Com. (Hons.) (Unisa), N.Dip.T. (Mech. Eng.). General Manager (Transmission). Joined Eskom in 1969. Appointed to the Management Board in 1991.

M.L. DAVIS (33)

B.Com. (Hons.) (Rhodes), CA (SA). General Manager (Finance). Joined Eskom in 1986. Appointed to the Management Board in 1988.

R.A. FORBES (58)

Pr. Eng., MBL (Unisa), B.Sc. (Elec. Eng.) (Witwatersrand). General Manager (Distribution and Marketing). Joined Eskom in 1949. Appointed to the Management Board in 1985.

A.J. HAM (53)

Pr. Eng., B.Sc. (Mech. Eng.) (Natal). General Manager (Engineering). Joined Eskom in 1966. Appointed to the Management Board in 1987.

DR G.F. LINDEQUE (49)

D.Phil. (PU vir CHO). General Manager (Human Resources). Joined Eskom in 1975. Appointed to the Management Board in 1987.

L.J. MESSERSCHMIDT (46)

Pr. Eng., B.Sc. (Mech. Eng.) (Pret.), MBL (Unisa). General Manager (Chief Executive Office). Joined Eskom in 1967. Appointed to the Management Board in 1990.

P.M. SEMARK (46)

Pr. Eng., B.Sc. (Mech. Eng.) (Cape Town), B.A. (Unisa). General Manager (Generation). Joined Eskom in 1972. Appointed to the Management Board in 1987.

J.P. VAN DEN BERGH (44)

Pr. Eng., B.Sc. (Mech. Eng.) (Pret.), B.Com. (Unisa). General Manager (Management Services). Joined Eskom in 1970. Appointed to the Management Board in 1988.

1990

CHAIRMAN'S REVIEW

In line with the general economy, electricity consumption reflected a low growth of 1,4% in 1990. The low rand gold price impacted mining activity and the recession generally slowed down sales to commerce and industry. Eskom was able to make cost cuts and could respond to the changing circumstances as it had already embarked on a successful drive to reduce operating costs and increase productivity.

These actions ensured that our net income of R845 million approximated budget and we expect that performance over the next few years will be in line with existing financial plans.

The unrest and boycott actions in certain areas have had an effect on the payment of electricity. Managing the supply of electricity to these local authorities and negotiating the payment of accounts have absorbed a great deal of management's time. It is hoped that once the situation in these areas is normalised, regular payments will be resumed and arrear amounts liquidated.

ELECTRICITY PRICE

The price increase of 8% effective from January 1991 is well below the expected rate of inflation for the year. This will place downward pressure on net income and slow down internally generated funds and the growth in reserves. Eskom's long-term financial position remains strong and will continue to improve as we utilise current excess capacity, and reduce capital expenditure. This will ensure that we are financially well placed to fund the next capital expansion phase which will start towards the end of this decade. Although it is planned to continue keeping price increases below the rate of inflation, no undue pressure will be placed on the capital market. A relatively low electricity price will contribute to reducing the rate of inflation and will encourage export-driven economic growth.

NEW DIRECTION

Moves towards a new political dispensation and the strengthening of international relations signify that South Africa is coming to the end of a period of economic and political isolation. Eskom has been fortunate in that it has been able to maintain its international links, particularly in respect of finance and cooperation with electricity utilities worldwide. The growing awareness by utilities in southern Africa of the benefits of closer cooperation augurs well for the development of economically viable generating capacity, the establishment of a regional power grid and cross-border electricity supply.

South Africa needs a strong, fast-growing economy so as to offer all its people an improved standard of living. To achieve this we will have to increase exports and develop our mineral beneficiation and manufacturing potential. Eskom has the capacity to supply the additional electricity requirements at attractive prices. An environment which encourages entrepreneurs and business people is required. The deregulation currently taking place in South Africa is therefore viewed positively and this process should continue as speedily as possible.

A further requirement of economic growth is a commitment to a positive work ethic. If we wish to build a strong economy and if we are going to compete effectively on international markets we will have to work hard. This has been proved by those countries which have built successful economies after the

Second World War. They are now reaping the reward of their efforts in the form of higher standards of living.

OUTLOOK

Regarding the earlier investigations into the privatisation of Eskom, the Government has decided that it does not at this time regard Eskom as a suitable candidate for privatisation in the near future.

Eskom today supplies electricity at a lower price in real terms than it did five years ago. It has set for itself the objective of continuing to run its business even more effectively and by so doing contribute to the competitive position of its mining, manufacturing and agricultural customers.

I anticipate that growth in the demand for electricity will remain moderate in 1991 due to depressed economic conditions in South Africa and its main trading partners. Growth in South Africa is also affected by the availability of foreign investment funds. The new opportunities in reunified Germany and the eastern bloc countries will result in strong competition for international finance. The sooner the South African political and economic environment normalises, the better are our chances to compete successfully for such finance. In the past, Eskom has been able to raise foreign money at reasonable rates. It is anticipated that given its sound financial position and strong international standing it will be able to do so again in the future.

Future economic growth and job creation will also be dependent on the development of the informal sector of the economy which in turn will be boosted by the availability of electricity. It is my belief that an accelerated electrification programme is a key strategy for future growth.

South Africa is facing two great challenges: one political, the other economic. I am confident that the initiatives in progress will lead to political solutions being found. These will however not be lasting if all of our people do not have the prospect of an improving standard of living. For this we need an economy growing at a much faster rate. Achieving this is going to be difficult and will require great effort and close cooperation between political, business and labour leaders. I believe that South Africans have the ability and commitment to overcome the obstacles in the path to political peace and economic prosperity.

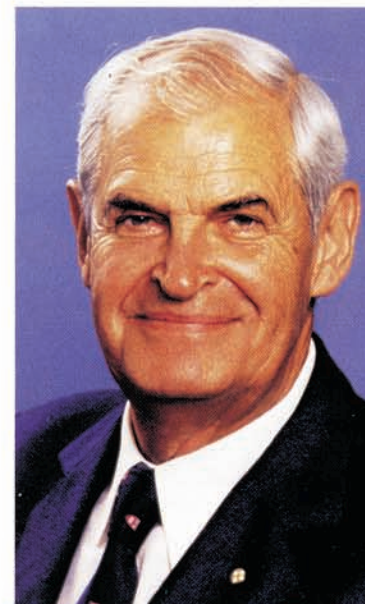
ACKNOWLEDGEMENTS

We are very grateful to Dr Dawie de Villiers, the Minister of Mineral and Energy Affairs and Public Enterprises, for his guidance and advice. He is playing a very important role in the changing South Africa and we extend our good wishes to him.

As always the involvement and support of the Electricity Council has been outstanding. During the year Mr Piet Botes, Dr Rudolph Fockema and Mr Richard Savage retired from the Council. Each one of them has made a significant contribution to the affairs of Eskom. We were pleased to welcome Prof. Charles Dlamini, Mr Movasi Lekota, Mr Jan Loubser and Mr Dawid Mostert as new members.

I would also like to thank the Management Board and all the Eskom staff for their hard work and dedication. Eskom has a very capable management team under the strong leadership of Dr Ian McRae. I am confident that the Electricity Council and the Management Board, working closely together and with the support of our staff, will successfully meet the many challenges which Eskom faces in the period ahead.

John Maree
7 March 1991



Eskom today supplies electricity at a lower price in real terms than it did five years ago. It has set for itself the objective of continuing to run its business even more effectively and by so doing contribute to the competitive position of its mining, manufacturing and agricultural customers. ”

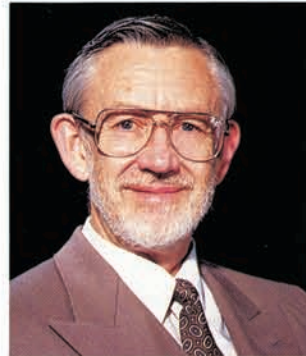
ORGANISATION STRUCTURE



Chief Executive
IAN McRAE

As at 7 March 1991

Distribution and Marketing Group



General Manager
RANDOLPH FORBES

Responsibilities
Marketing and distribution of electricity to Eskom customers

Functions

1. Marketing
2. Distribution Advice
3. Distribution Development
4. Transvaal Distribution Division
5. Cape Distribution Division
6. PWV Distribution Division
7. Natal and OFS Distribution Division
8. Distribution Engineering
9. Group Finance and Services
10. Group Human Resources

Engineering Group



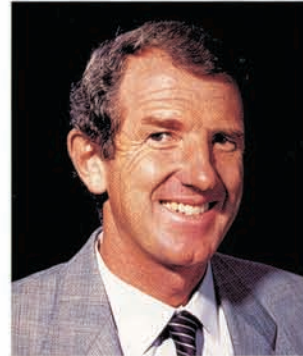
General Manager
ALEX HAM

Responsibilities
Provision of capital assets and scientific and technical support services for the generation and transmission of electricity

Functions

1. Power Station and Transmission Systems Project Management
2. Power Station Engineering
3. Eskom International (London)
4. Engineering and Scientific Investigations
5. Technical Standardisation – Eskom and national projects
6. Group Manpower Services
7. Group Financial Services
8. Project Procurement

Generation Group



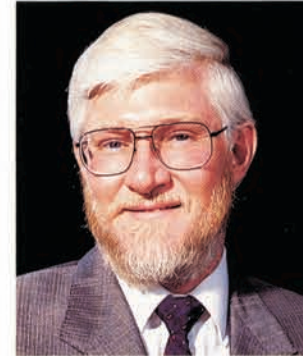
General Manager
PAUL SEMARK

Responsibilities
Generation of electricity

Functions

1. Division I
Generation of electricity at Koeberg, Kriel, Matla, Matimba, Drakensberg, Orange River Hydro, Western Cape Generation
2. Division II
Generation of electricity at Arnot, Duvha, Hendrina, Ingagane, Kendal, Lethabo, Majuba, Tutuka, Free State Generation
3. Generation Technical Services and management of stations in Asset Storage: Camden, Komati and Grootvlei
4. Fuel and Water
5. Group Finance and Services
6. Group Manpower Services
7. Wilge Training Centre
8. Generation Contracts

Transmission Group (effective from January 1991)



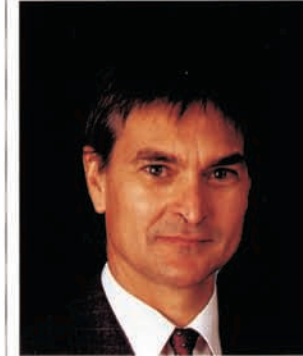
General Manager
BRUCE CROOKES

Responsibilities
Transmission of electricity

Functions

1. Transmission Operations
2. Energy Trading
3. Operating and Maintenance
4. Power System Planning
5. Transmission Technology Services
6. Group Finance and Services
7. Group Human Resources

Management Services Group



General Manager
JOHAN VAN DEN BERGH

Responsibilities
Provision of services and resources to facilitate the operation of Eskom

Functions

1. Information Technology
2. Industrial Engineering
3. Commercial Services
4. Corporate Productivity
5. Environmental Impact Management
6. Protective Services
7. Communication
8. Properties Management
9. Group Manpower and Services
10. Group Financial Services

Finance Group



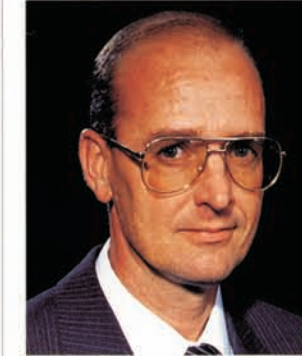
General Manager
MICK DAVIS

Responsibilities
Financial and business management of Eskom

Functions

1. Treasury
2. Financial and Management Accounting
3. Taxation Services
4. Consulting Services
5. Financial Planning
6. Insurance and Risk Management
7. Productivity Measurement
8. Group Human Resources

Chief Executive Office



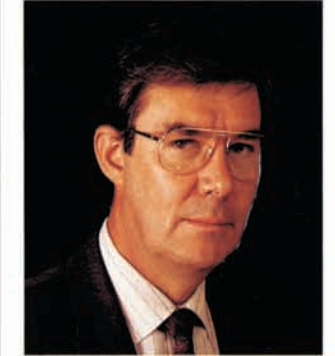
General Manager
JAC MESSERSCHMIDT

Responsibilities
Provides support to and on behalf of the chief executive in selected areas

Functions

1. Audit Services
2. Legal Services
3. Corporate Strategy
4. Strategic Information
5. Quality Management
6. Quality Assurance
7. Confidential Investigations

Human Resources Group



General Manager
GEORGE LINDEQUE

Responsibilities
Management of Eskom's human resources

Functions

1. Personnel
2. Industrial Relations
3. Human Resource Development
4. Equal Opportunities
5. Technical Training
6. Medical Services
7. Safety Risk Management
8. Learning Technology and Services
9. Group Resources Services
10. Group Financial Services

1990

CHIEF EXECUTIVE'S REPORT

PERFORMANCE

In 1990 electricity sales were 136 168 GW.h, representing a growth rate of 1,4% for the year. Although lower growth was anticipated for 1990 the actual growth rate was below expectations and budgets were adjusted accordingly during the year.

The average price per unit of electricity increased by 14% from 6,9 cents per kW.h in 1989 to 7,9 cents in 1990. The organisation is successfully keeping a tight control on costs and the philosophy that cost control, budgets and productivity are the responsibility of every employee, is entrenched in the organisation. Over the years Eskom's customers have reaped the rewards through a declining real price of electricity.

Net income was R117 million higher than in 1989 in spite of the low growth experienced during the year. This achievement was mainly due to strong financial management which resulted in lower operating costs and the excellent performance of our treasury department which resulted in lower than anticipated interest and finance charges.

Plant performance is steadily improving towards our target which is based on international standards. Less efficient generating capacity totalling 4 260 MW was taken out of service at Vierfontein, Camden, Grootvlei, Ingagane and Komati power stations. Three new coal-fired units totalling 1 892 MW were commissioned at Lethabo, Matimba and Tutuka. Special attention is being given to improving the transmission grid. Because the high performance of our interconnected system is of primary importance we have restructured the organisation by forming a new transmission group to ensure this goal is achieved and maintained.

CUSTOMER RELATIONS

Two new Time-of-Use tariffs are being planned in 1991 and constitute a significant incentive to customers to reduce their electricity costs by consuming electricity at times when it is cheapest for Eskom to supply it. In the long term this will result in a slower growth in the peak demand and thereby curtail future capital investment. It will also further reduce the average real price of electricity and thus benefit all customers. The pricing structure for supply to small users is also being reviewed.

In 1990 Eskom was faced with an additional risk as a result of a number of townships not paying for services, including electricity. When the government ceased supplying bridging finance, Eskom entered into negotiations with local authorities and other parties representing the customers to initiate payments and avoid the interruption of electricity supplies to large areas. Where negotiations have failed, legal action was instituted against local authorities. The solution lies in addressing the issues causing non-payment. This is the subject of intensive government investigation. I am confident that the situation will return to normal in due course.

HUMAN RESOURCES

To ensure that the organisation has the specialised skills needed to operate successfully, education and training of existing and potential employees is essential; so is identifying talent and giving it opportunities for development. Retention of skilled staff is also a high priority. Eskom has many programmes in place to achieve these objectives.

While Eskom tries to provide a secure employment environment, low growth forced us to take out of service some of the less efficient excess capacity.

Employees who have become redundant will be retrained and redeployed where possible, or receive fair separation packages.

Good labour relations were maintained during the year and a very low incidence of industrial action was experienced.

ENVIRONMENT

Eskom acknowledges its role as a major corporate citizen with diverse activities, some of which have the potential to affect the natural environment adversely. We accept our responsibility to integrate consideration for the environment into our business practices. To this end we have set ourselves the goal of achieving a net positive impact on the natural environment and our programmes have led to an increased environmental awareness throughout the organisation. To measure the extent of our success, we have agreed that an independent environmental audit be conducted and published.

OUTLOOK

Roughly two thirds of South Africa's population still have no electricity at home. Until recently those without electricity were either rural dwellers or were considered "transient" urban dwellers. The abolition of influx control and large-scale urbanisation have made it necessary to find means to supply affordable electricity to 2.5 million urban households.

Funding, legal constraints and political issues remain the most significant problems with electrification. These are best addressed by rationalising the electricity supply industry and directly involving the customer. We believe Eskom can play an important role in this process.

As political constraints begin to ease, other utilities in the southern African region are eager to exchange know-how and link up resources for the benefit of all. Many barriers have fallen and I expect to see more progress in the near future if institutional constraints are set aside.

ACKNOWLEDGEMENTS

Ters Oosthuizen and Bussie Els retired from the Management Board in 1990. Jac Messerschmidt was appointed as General Manager (Chief Executive Office) in 1990 and Bruce Crookes as General Manager (Transmission) early in 1991. I also wish to express my gratitude to the Electricity Council and in particular the chairman, Dr John Maree, for their guidance and to the management and staff of Eskom for their effort and support.

Ian McRae
7 March 1991



The abolition of influx control and large-scale urbanisation have made it necessary to find means to supply affordable electricity to 2.5 million urban households.”

E S K O M ■ I N ■ A C T I O N

1990

The Eskom dealing room, where all treasury transactions are struck.

(Inset) LUKAS KRÜGER and GERARD RAMAGE are amongst the 115 people employed in the treasury department.



PERFORMANCE

Technology

It is essential that, as the main provider of electricity, Eskom maintains a high-level technology base. Planning for the electricity needs of a growing nation is a long-term undertaking. To fulfil these needs Eskom is monitoring, developing and adapting all appropriate technology so that it is always well placed to apply the most cost-effective solutions to supplying adequate electricity at an affordable price.

In keeping with this policy, Eskom has proved to be a world leader in optimising the design of power stations, transmission systems and the development of energy management control systems. The organisation is also progressing with the rationalisation of national technical standards, which should foster the export potential of products while simultaneously reducing the cost of manufacture.

Capital project management

Power station construction projects continue to be managed within 5% of the overall project budgets. Successful in-house design and planning as well as effective project management and procurement strategies make Eskom's cost of constructing new generating plant compare very favourably with other utilities worldwide.

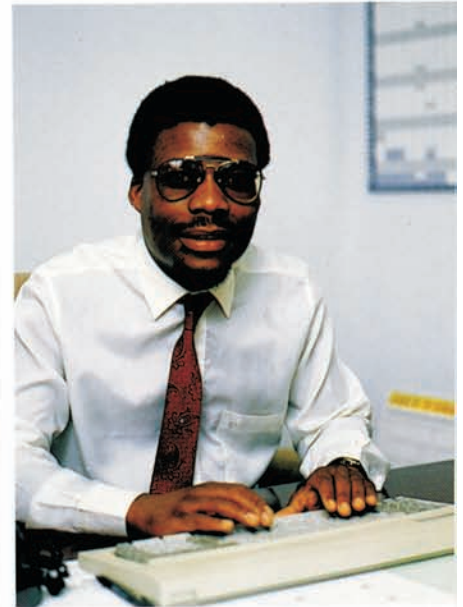
Productivity

Working in close cooperation with the NPI (National Productivity Institute), Eskom has consistently improved its productivity performance over the past few years. During 1990, total productivity again improved by 1,3%, generating additional value of R131 million.

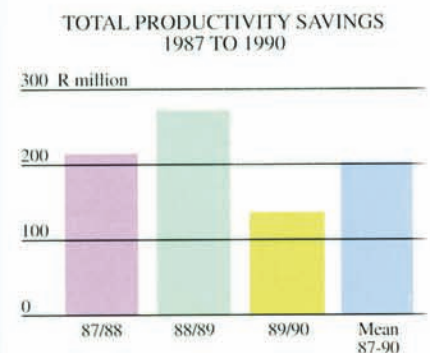
Over the past three years Eskom has absorbed an annual average of R167 million of its costs which it did not pass on to its customers. This contribution to the reduction of inflation was made possible by consistent improvements in total productivity.

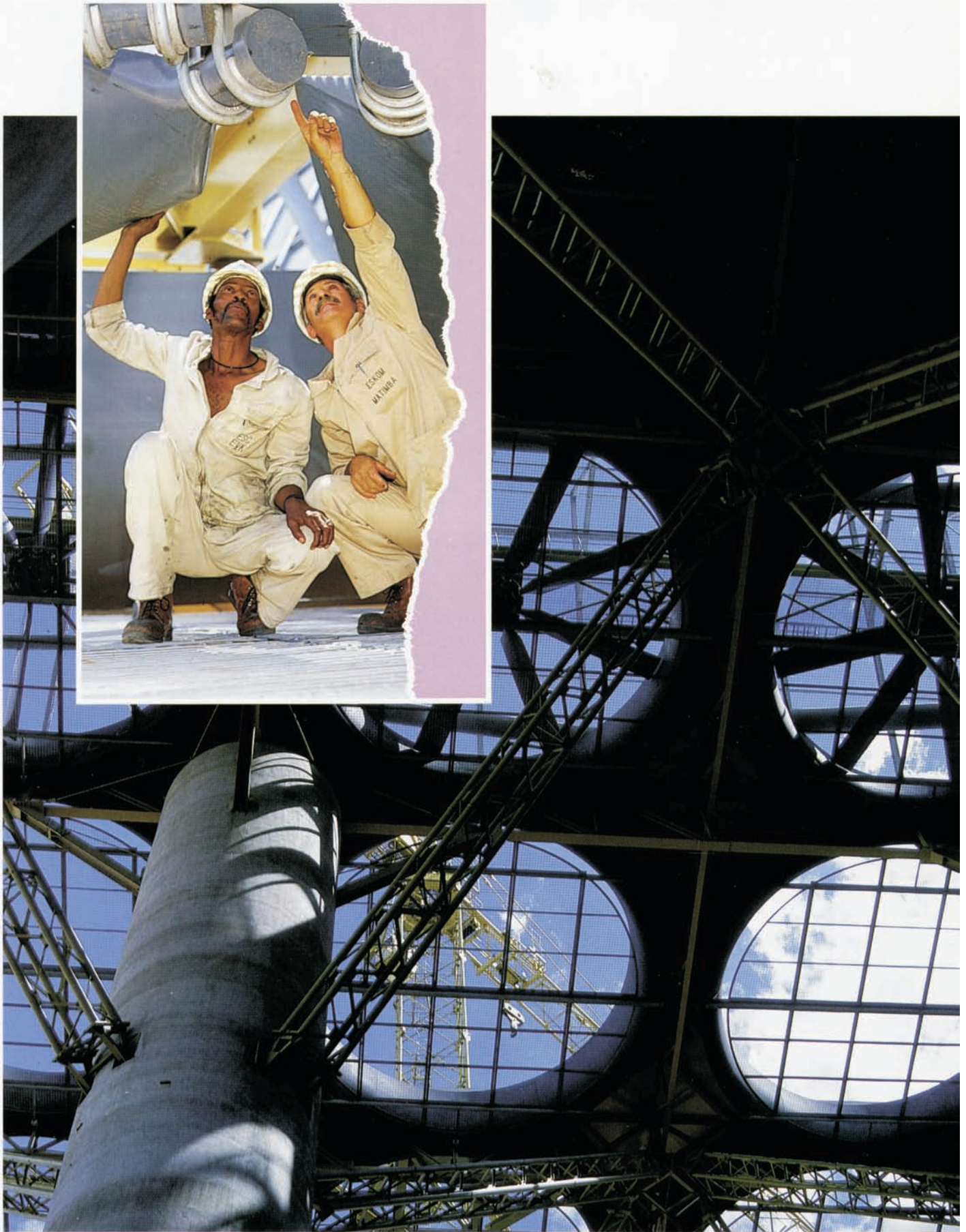
The organisation's efforts to optimise the use of all its resources have been officially rewarded by the NPI. In 1990 Koeberg power station won the NPI Gold Award while the Distribution and Marketing Group received two silver and one bronze award.

Eskom encourages all employees to identify more closely with the organisation and its goals. Recognition is given to those who apply their talents and develop their skills so as to contribute to improved operation.



On his own initiative, Solomon Marutho enrolled on a course to improve himself and his working performance. He is now on a bridging programme to prepare for a B.Com. degree.





At Matimba, the world's largest direct dry-cooled power station, 288 fans cool the condensers. The fans are 9,1 m across and 45 m above ground. (Inset) FLIP DREYER and NOAH SETSHEDI are shown inspecting one of them.

A productivity advisory service created within Eskom has initiated a wide range of productivity improvements which are reflected in enhanced performance and a reduction in management layers. This productivity drive is an ongoing process closely related to the establishment of a quality culture within Eskom.

Inventory control

Eskom has substantially reduced its inventory levels, saving R300 million over the last five years. Inventory investment as a percentage of fixed assets over the past five years compares favourably with other international utilities.

Information technology

Considerable work was carried out during the year to ensure the security of Eskom's information asset. A comprehensive disaster recovery plan was developed. Data is also better protected from unauthorised access. A levelling out in the use of processing power despite a 30% increase in workload resulted in no additional mainframe capacity being planned for 1991.

PRODUCT

The availability of affordable electricity is seen as one of the key factors to economic growth in South and southern Africa.

Generating capacity

When Eskom's latest power stations were planned and orders placed, electricity demand was growing at 7%-8% per year. This growth has since slowed down to a yearly average of 3,9% over five years due to local and international conditions. As a result, Eskom has 4 686 MW surplus generating capacity. The drop in growth of electricity demand made it uneconomic to keep older, inefficient plant operating. A total of 5 260 MW of plant has been mothballed or reserve stored at Taaibos, Highveld, Ingagane, Komati, Grootvlei and Camden power stations since 1989. This is saving R118 million cash flow a year on operating maintenance and primary energy costs alone and enables the more efficient newer plant to be fully utilised with additional savings on primary energy. Vierfontein power station was retired. New, more efficient capacity of 1 892 MW was commissioned at Lethabo, Matimba and Tutuka. Tutuka was officially opened in October 1990.

Specific programmes aimed at large customers have also been introduced to manage the remaining excess capacity. So far this has resulted in using an additional 1 250 MW.

Advantage has been taken of the excess capacity period by investigating generating sets not in service with regard to extending their economic life. Stations under investigation are Komati, Camden, Grootvlei, Hendrina and Arnot, with a total sent-out capacity of 7 400 MW. Reports will be available in 1991.

Plant performance

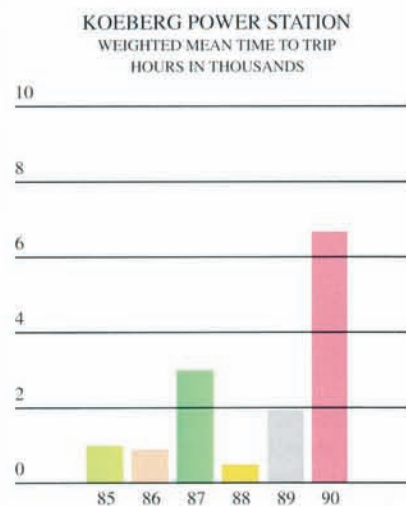
Eskom's plant performance indicators are similar to international measures but not identical, due to unique operating conditions, particularly in respect of extremely low-grade coal used by some power stations.

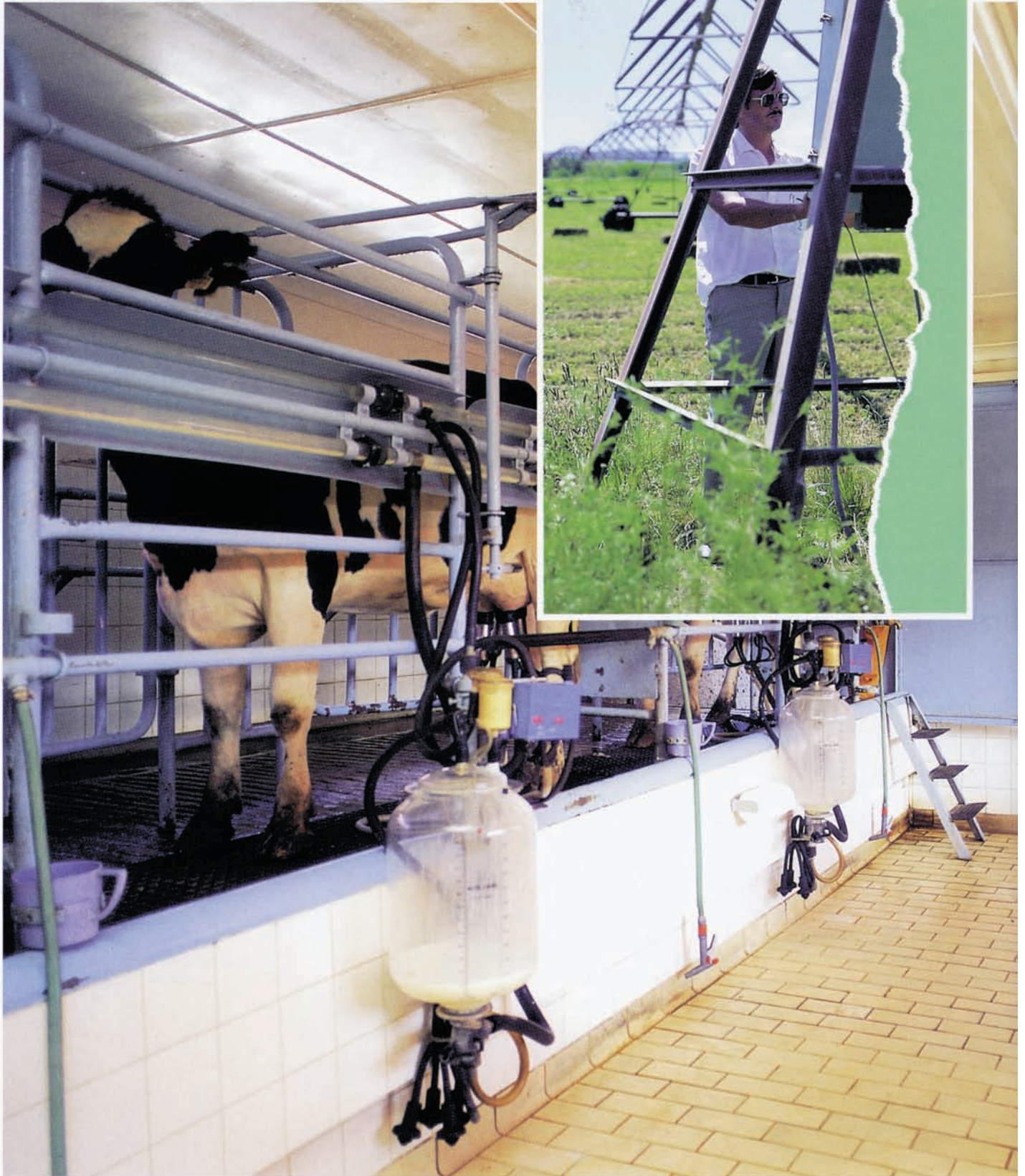
Eskom's approach to improved plant performance includes both technical issues and people-related matters. Resources are channelled into areas where specific problems exist and experience gained is communicated to other power stations. Eskom's indicators for reliability are weighted mean time to trip/failure (WMTTT/WMTTF) which measure the average number of hours a generating unit operates without unforeseen trips/failures. Reliability has improved 37% from 508 hours in 1989 to 694 hours at the end of December 1990. This factor still needs to be improved. Top performer for coal-fired power stations was Hendrina, with a WMTTT of 1 134 hours. Top performer overall was Koeberg with a WMTTT of 6 600 hours.

Plant availability is the proportion of time a generating unit is capable of giving service. Availability of 75% in 1990 was lower than 1989's 78% because of a



Frances Pretorius tested and implemented complex programmes well beyond her training enabling Koeberg power station to extend the duration of nuclear fuel cycles.





***Infrared heating keeps dairy areas at a constant temperature.
(Inset) DOUW STEYL of Agrelek advises farmers on electricity applications.***

high planned outage rate but is still ranked high by world standards. Forced outage rate was 13.9% as against 11.4% in 1989, based on the net available sent-out capacities of power stations. This was due to prolonged unplanned shutdowns of units for repairs. Overall thermal efficiency, measuring the success with which the heat energy in the fuel is converted to electrical energy in the generator, was 33.7% (33.6% in 1989). The computer-based systems for capture, storage and retrieval of operating data are being modernised. Systems studies and audits will improve and facilitate assessment of plant performance.

Fuel and water

Pressures on coal costs were offset by effective management. As a result, the cost increase of 12.2% was slightly below the ruling rate of inflation (12.3%). During the latter part of 1990 negotiations began for the termination of coal supplies from three older collieries and the reduction of supply from another two on account of the reduced demand. Development of new major coal supplies progressed well while costs were kept under control. Contact was made with Botswana's Geological Survey Department with the object of investigating the suitability of certain Botswana coal reserves for large power stations. Eskom was also involved in assessing the potential of coal reserves in Zimbabwe for power generation. The reduction of water consumption by Eskom stations has continued. The overall consumption by coal-fired stations is now 1,90 ℓ /kW.h compared to 2,02 ℓ /kW.h in 1989. Dry-cooled stations Matimba and Kendal as well as the continued optimisation of water usage at all stations contributed to the reduction. Matimba in particular reduced its specific water consumption by 44% in 1990. Total expenditure on primary energy resources (coal, water, nuclear fuel, fuel-oil) showed a saving of 2.2% against budget in 1990.

Transmission system

The system of substations and transmission lines conveying electricity from the power stations to the 12 distribution regions continues to expand. In 1990 it supplied 143 367 GW.h, an increase of 1,5% on 1989. The peak demand of 21 863 MW did not exceed the 1989 peak of 21 871 MW. The Proteus substation which supplies power to the Mossgas oil-from-gas refinery was commissioned. Altogether 605 km of lines were added to the system.

CUSTOMERS

Electricity sales in 1990 grew by 1,4% (1989: 3,7%) to 136 168 GW.h. The highest growth rate was recorded in the bulk category which increased by 8,5%, due to natural growth and certain municipalities taking over some customers. This accounts for the decline of -11,4% in the domestic sector. Negative growth also took place in all other categories except for rural supplies which increased by 5,9%. This was largely due to the activities of Agrelek, Eskom's agricultural marketing service, which was launched late in 1989. The industrial and mining sectors, representing 25,1% and 24,5% of Eskom's market respectively, both showed a negative growth of -3,7%, due to reduced economic activity. Marketing of electricity has become more focused. In the 12 distribution regions the marketing departments have been strengthened by the creation of sales teams. These include agricultural and industrial sales advisers in 50 districts throughout South Africa. Supporting these sales teams are two specialist marketing arms, Agrelek for the agricultural market and Industrelek for the commercial, mining and industrial markets. Industrelek opened in 1990 and is Eskom's seventh information centre addressing the replacement of other energy forms with electricity.



Gary Aldwin invented a novel and inexpensive method of smokestack inspection using a balloon-mounted camera.

Informal dwellings at Orange Farm south of Johannesburg have been fitted with token-operated meters and with ready-boards which replace expensive distribution boards and house wiring. (Inset) MR FRANS PHITHI MAJOLA, first Orange Farm customer to be connected.



A product promotion programme was launched during the year to highlight the benefits of electricity and promote its safe and efficient use. This supports Eskom's drive to increase its share of the energy market.

Market research

Market research is supplying insights which will guide Eskom to serve its markets better and to identify areas for growth in energy market share and the effective and efficient use of electricity.

One study revealed that some 25% of electricity consumed in South Africa is exported as a component of products across the spectrum of agricultural produce, manufactured goods and minerals.

Assessment of electricity intensiveness of mining and metal industry processes showed that electricity required per unit of production has declined in all categories except gold mining, where an increase was caused by greater depth of mining and declining average grades per ton.

Studies about the effect of electrification of households in urbanising communities revealed that over a period of several decades electrification could stimulate the economy and help create employment in the formal and informal sectors.

Quality of supply

The index measuring continuity of supply showed a slightly unfavourable trend in 1990. The main reasons for this were veld fires, earth tremors, disruptive storms and a tornado which caused extensive damage to electrical installations. Other categories showing negative trends are customer faults, human errors and copper thefts. Eskom is providing advice and guidance to its customers to reduce "self-inflicted" outages. The public is being educated in electric safety during farming and building activities as well as in the home by means of a wide range of publications. Enquiries are held into specific human error cases and preventive action taken.

There were three large-transformer failures of which only one was very serious (there were 13 in 1988 and three in 1989). Low-frequency incidents show an 11% improvement, from 55 in 1989 to 49 in 1990. The minimum frequency recorded was 49,02 Hz, and the highest 50,54 Hz.

PEOPLE

In the context of the new South Africa with its changing demands, structures and expectations, people must be reassured that they are Eskom's greatest asset. Their needs, fears and aspirations must be addressed.

THE HUMAN ENVIRONMENT

Eskom's initiatives to enhance the human environment are aimed primarily at employees but also benefit the population at large.

In 1990 these initiatives included, amongst other things, basic literacy training for 2 100 employees. Eskom's target over the next 10 years is 95 percent functional literacy, defined as the equivalent of a standard five education. A numeracy programme was developed for Eskom by Stellenbosch University.

Confidential counselling, health and Aids awareness, family planning, sports and recreation look after the physical and psychological well-being of employees on an ongoing basis.

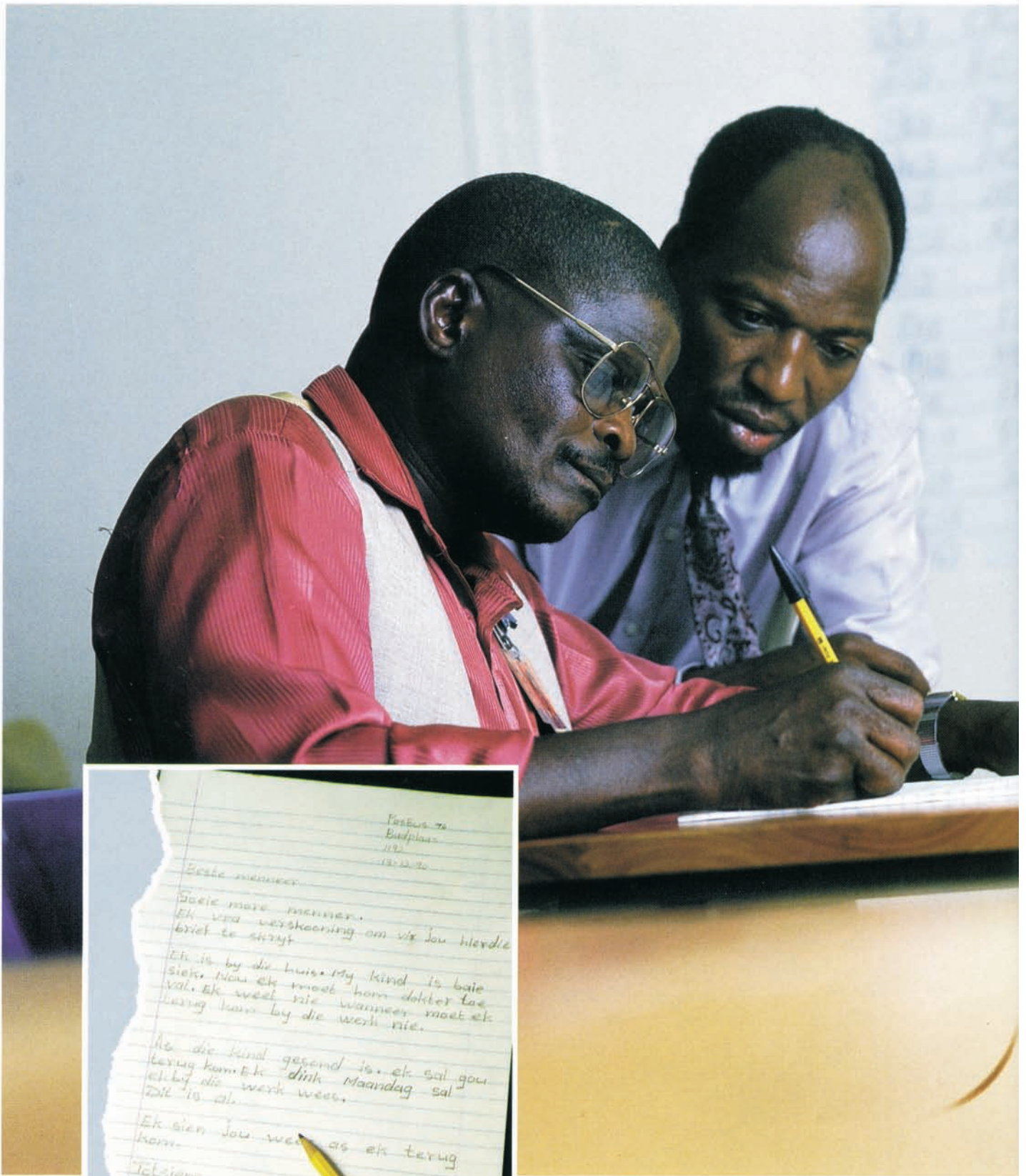
Township development

Eskom facilitates home ownership for employees by making housing subsidies available to all. Eskom is involved in township development to address the acute housing shortage in South Africa. These developments are in areas where Eskom has a high concentration of workers. A total of 3 800 stands will be available over the next couple of years. To make them viable, some schemes are open to employees of other companies and will be run by local authorities.



Kenneth Mohlala, a former security guard, is completing a university degree.

AMOS MALINDISA, of the Tutuka Horticultural Department, learned to read and write in 1990, under the tuition of PHILLIP MASHEGO. (Inset) A letter written by Mr Malindisa.



Postbus 70
Budplan
111
12-12-90

Eerste manneer

Goede more manneer.
Ek vra verskoning om vir jou hierdie
brief te skryf

Ek is by die huis. my kind is baie
siek. nou ek moet hom dokter toe
val. Ek weet nie wanneer moet ek
terug kom by die werk nie.

As die kind gesond is. ek sal gou
terug kom. Ek dink Maandag sal
ek by die werk wees.
Dit is al.

Ek sien jou weer as ek terug
kom.

Telkens.

Goede wense
Amos Malindisa

Building of schools

Due to the great shortage of schools countrywide Eskom has converted existing prefabricated buildings into schools in areas where there is a concentration of Eskom workers. Eight schools were completed in this manner, with costs and construction times far below the average.

Equal opportunities

Eskom is fostering a climate in which all potential is realised. It has achieved parity in all its job gradings. Employees in general are responding better than expected to equal opportunity programmes.

Safety risk management

Eskom's low disabling injury incidence rate of 0,49 in 1990 compares favourably with other utilities internationally. Two fatal accidents arising from contact with live electrical equipment were recorded internally as opposed to nine in 1989. Contact accidents involving members of the public decreased slightly. A special project was created to reduce these incidents and suitable safety publicity material has been produced.

Safety gradings by the National Occupational Safety Association (NOSA) continue to be high: 93% of Eskom business units boast four stars or the maximum of five stars. All five power station construction sites, which are hazardous by nature, have a five-star grading. Eskom was also awarded 46 out of 366 national safety awards presented by NOSA for 1990.

Industrial relations

A relatively healthy industrial relations climate was maintained and no serious disputes arose. To a large extent this can be attributed to regular contact and meetings with the 12 recognised trade unions which represent 72% of Eskom's employees. Salary and wage negotiations were successfully concluded in a relatively short period.

Some industrial action occurred involving incidents of short duration.

The emphasis placed by the Industrial Relations Department on sensitising managers on their role in maintaining sound industrial relations will be a significant factor in Eskom's ability to manage change in a changing South Africa.

Education and training

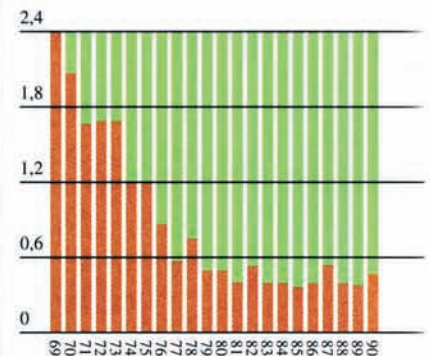
Eskom has various programmes in place to meet its demand for skilled employees and plans to become largely self-sufficient by 2000 in critical skills.

These include engineers, technicians, artisans and information technologists. Strategies include optimal utilisation of employees and the retraining and redeployment of redundant staff. They also include actions to change Eskom's racial mix, as well as the composition of the workforce with fewer unskilled workers at all levels of the organisation. Eskom is heavily involved in the accelerated training and development of black people.

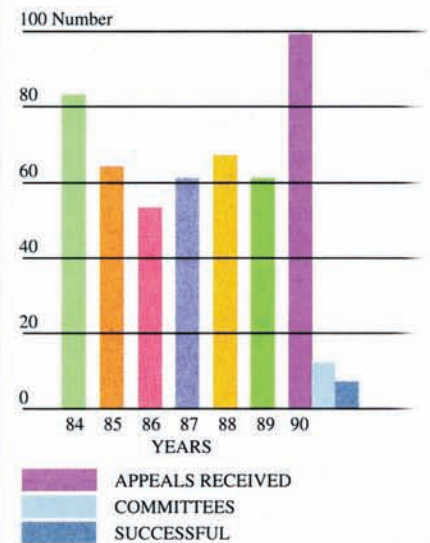
In 1990 Eskom supplied formal and non-formal educational support at secondary school level to 37 775 pupils and 766 teachers. Children are given career guidance with emphasis on technology and science. One such programme called "Moonwalking to Mars" was screened on national television. Bridging courses were offered to 30 students, enabling them to register at universities. At tertiary level, 843 apprentices, 546 pupil technicians, 690 bursars, both internal and external, were trained. In 1990 Eskom sponsored 176 graduates-in-training and 246 engineers-in-training.

Curricula for the mechanical, electrical and control and instrumentation disciplines were developed by Eskom. The approach is competency-based and modular and lends itself to the retraining of existing technical staff and to satisfying individual development needs. The number of technical staff trained at Eskom College near Johannesburg was 7 718, of which 72 were from other organisations and 53 from neighbouring countries.

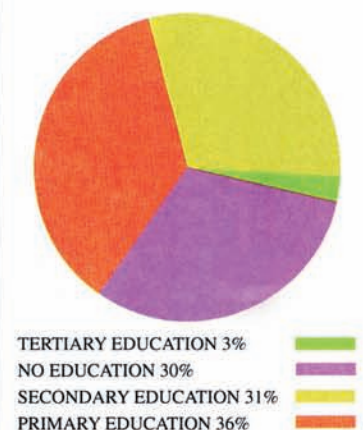
DISABLING INJURIES PER 200 000 MANHOURS WORKED



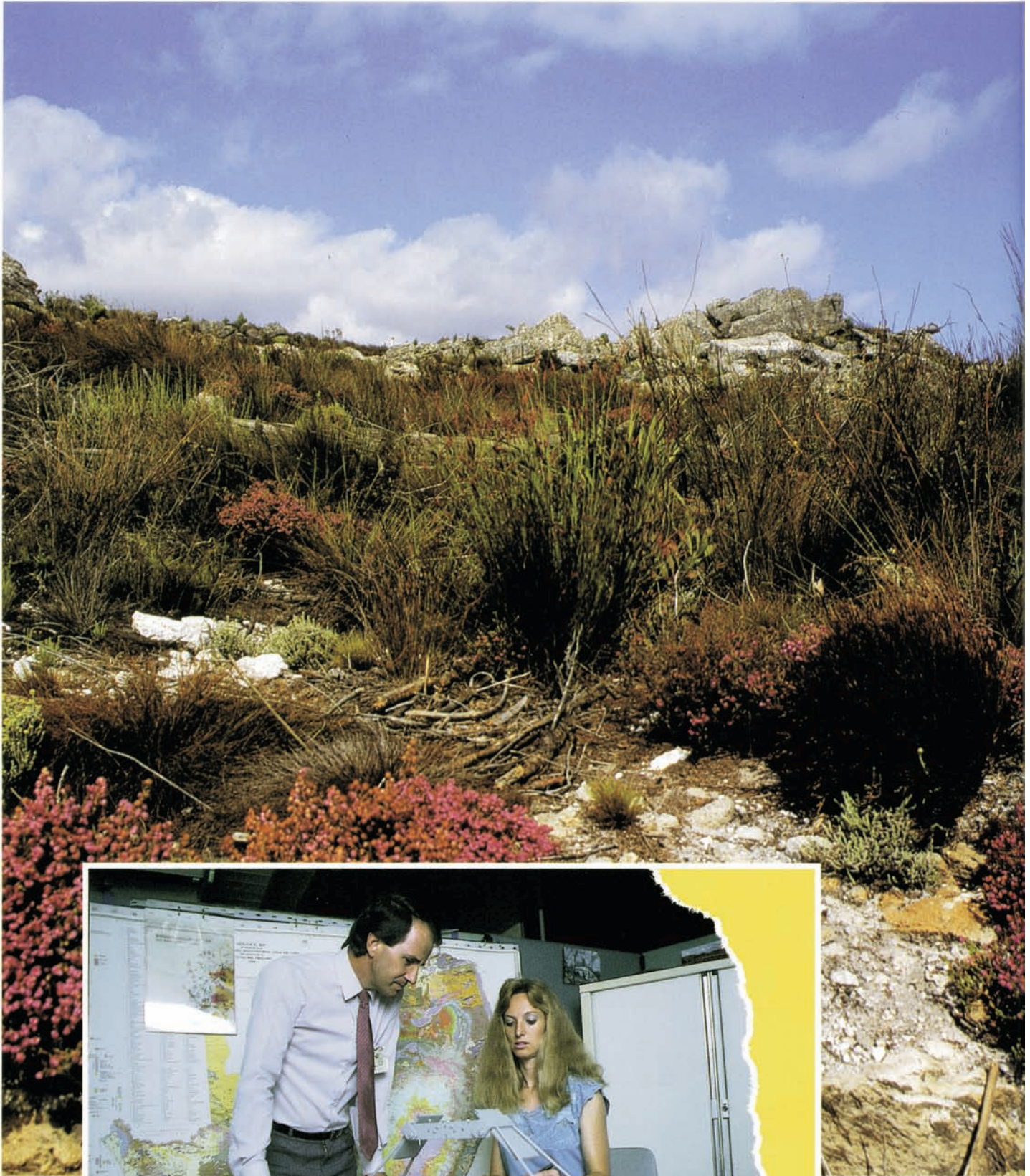
DISCIPLINARY CODE AND PROCEDURE APPEALS RECEIVED AT CORPORATE LEVEL



EDUCATION PROFILE OF SOUTH AFRICA



**At Palmiet pumped-storage scheme the area's fynbos and aesthetics have been protected and erosion prevented.
(Inset) BEVERLEY VAN WYK and JOSE CLARA carry out environmental impact assessments on power line routing.**



Management training

The severe shortage of managers has prompted Eskom to give much attention to management training. To date, 711 certificates in the University of South Africa's management development programme have been received by employees. A leadership development initiative for Eskom's best managers was launched in 1990. This programme was designed by a team of top managers and includes delegates from electricity supply utilities in the neighbouring states. A technology leadership programme was also introduced to supply engineers and technicians with management skills in order to enrich their specialised careers.

THE NATURAL ENVIRONMENT

Eskom has set itself the ultimate goal of having a net positive impact on the environment. To assess the degree of success in achieving this goal, the organisation has become one of the few utilities in the world to subject itself to an external and independent environmental audit over three years and to publish the results.

Environmental highlights

The 1990 M-Net/South African Nature Foundation (SANF) national trophy for corporate performance on environmental management was awarded to Eskom. In March 1990 Eskom held a workshop entitled "The business of environmental management – strategies for the 1990s" and a seminar entitled "Environmental responsibility – the business dimension", hosting international speakers. On Arbor Day Eskom donated and planted a total of 12 000 trees countrywide. A scientific forum was held for the first time to submit findings on air quality to other scientific organisations and experts. Cooperation with bodies such as the CSIR, the Department of Health and Population Development and academic institutions is envisaged on a number of major projects.

STATEMENT BY THE ENVIRONMENTAL AUDITING TEAM

We have conducted an investigation with two primary objectives:

- to evaluate the existence and appropriateness of Eskom's environmental goals, policies and standards
- to give an opinion on the quality of environmental management systems in place in Eskom's distribution and transmission business units, and in its operational coal-fired power stations

For the purpose of this statement, "environment" refers to the natural environment.

Our findings and conclusions are as follows:

Environmental vision

By world standards, Eskom is up to date with – and in some cases at the cutting edge of – environmental policy, and within South Africa the organisation is taking a leading role in corporate environmental management. At top management level, there is clear vision and leadership regarding the environmental goal which needs to be achieved, namely to have a net positive impact on the biophysical environment. This is an extremely challenging goal, especially in the light of the very nature of Eskom's business, its existing technology and economic constraints.

Top level commitment

Top management commitment to the above goal is evidenced by the organisation accepting responsibility for an installation's entire life cycle; acknowledgement of line responsibility for environmental impacts; the inclusion of environmental auditing as an integral element of environmental management; the establishment of a separate Environmental Impact Management department and the acceptance by senior executives of accountability for environmental performance.

Progress to date

Overall, Eskom has achieved a great deal in a short space of time in terms of establishing the infrastructure for an environmental management system throughout the organisation. The comprehensive internal audit of environmental management systems during 1990 played a major role in raising general environmental awareness and upgrading management systems at the operational level. Several specific conservation projects have been initiated and supported by Eskom, especially through Eskom's Wildlife Impact Advisory Committee.

Stage of development

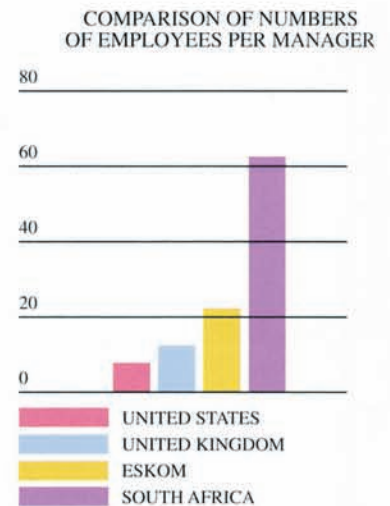
Given that integrated environmental management is a relatively recent management practice worldwide, the primary focus within Eskom at an operational level is still on addressing issues of high public awareness and the minimisation of obvious impacts. This differs significantly from the corporate goal of having a net positive impact on the environment.

Formalisation of systems

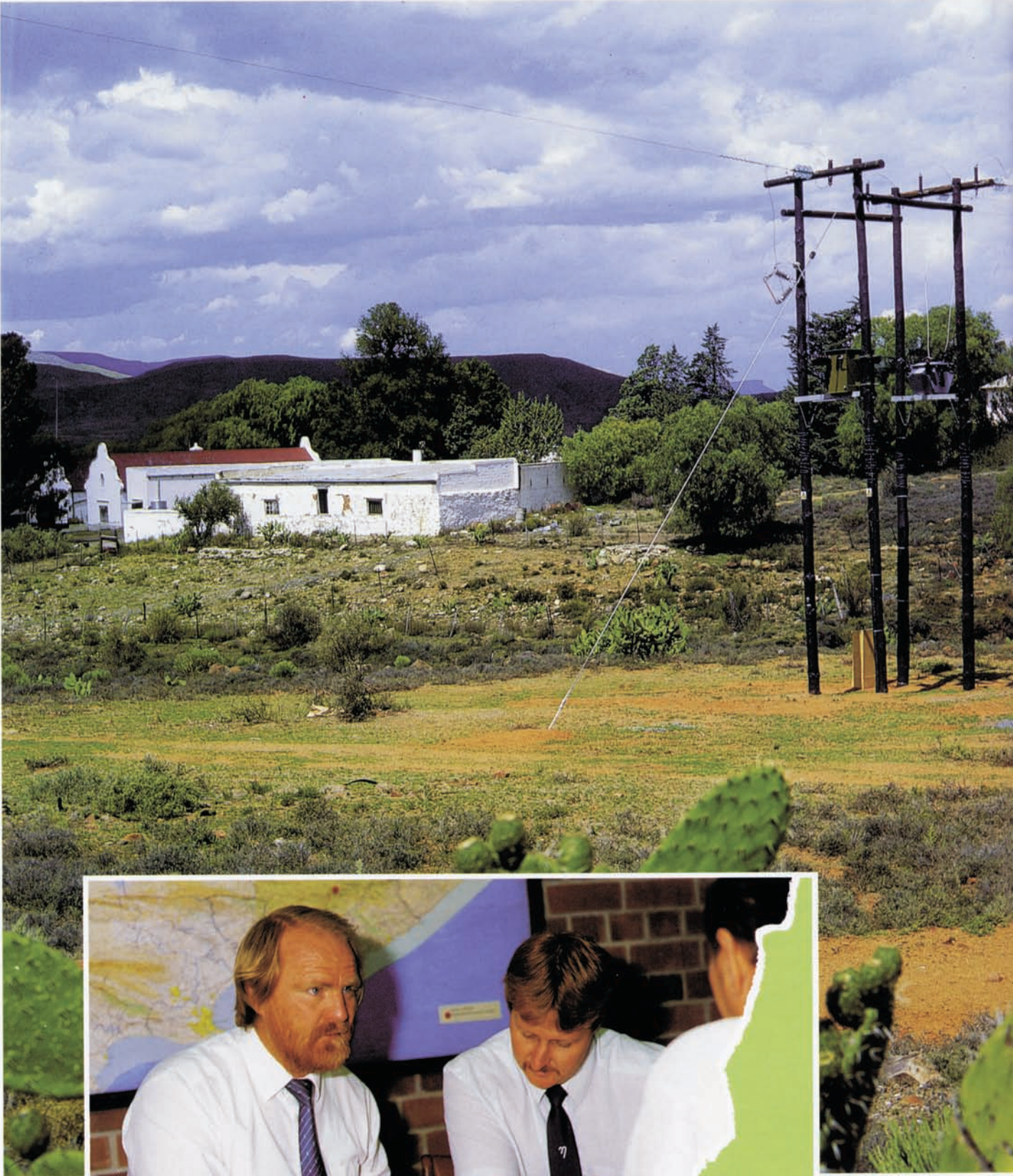
Many environmental management systems have not yet been formalised at the operational



Ingra du Buisson took the initiative to design a refresher course in mathematics for her colleagues which is now being used Eskomwide.



**Cost-effective technology to supply electricity to the end-user has cut supply costs by half.
(Inset) IAN MUIRHEAD and SELWYN MEISE, members of one of the teams introducing the new rural reticulation systems.**



level (e.g.: in terms of policies, procedures, structures and plans). This lack of formalisation leads to an ad hoc approach which is very often reactive and dependent on the level of awareness and commitment of the individual. There is also considerable scope for the integration of environmental management within Eskom, within business units, between business units and between the business units and corporate level.

Air quality issues

By virtue of the variation in the quality of coal, specifically ash and sulphur content, and the resultant influence on the operating efficiency of the dust-removing equipment, many of Eskom's power stations are unable to consistently comply with legal requirements regarding emissions. Although in most cases measuring equipment exists, older power stations are unable to measure the emissions accurately. While studies are regularly conducted to apportion impact on air quality and crops, Eskom is unable to quantify conclusively the impact it is having on the environment through air pollution.

Skills, knowledge and training

At this stage, although good environmental intentions exist, generally there is insufficient understanding in Eskom of the extent of the organisation's actual and potential impacts on the environment and of ways of managing these issues. Training has been identified as a top priority requirement, both at a broad sensitisation level and at a specific, technical level.

The need for an environmental management process

As many environmental decisions are being made on a subjective basis within Eskom at present, there is a need for a comprehensive environmental management process. Such a process would incorporate a sound decision support system to help managers make responsible trade-off decisions which take environmental considerations into account.

Conclusions

Relative to its position a few years ago in terms of environmental management systems, Eskom has made enormous progress. Relative to what should be in place to ensure good environmental management systems throughout the organisation, much has still to be achieved. In terms of international trends, the organisation is headed in the right direction, with support and commitment from senior management. Through achieving all of the objectives to which management has already committed itself, the required environmental management systems will be in place.

Deloitte Pim Goldby.

Deloitte Pim Goldby
Management consultants

December 1990

PROSPECTS

Electricity for all

To meet customers' needs for minimal capital contributions, Eskom uses cost-effective technology to distribute electricity to households.

Savings are being achieved in certain areas by using aerial bundle conductors instead of underground cables, readyboards instead of full house wiring systems and pole-mounted transformers and switchgear instead of pavement-mounted units and/or brick substations.

The introduction of a 1 000 volt single-phase system and a 22 000 volt single-wire earth return (SWER) reticulation system for low-density and low-load areas is leading to some 40% savings in costs compared to the conventional rural electrification systems.

Inside the home, the pre-payment meters called budget electricity controllers (BECs) are proving popular with both high and low income customers.

At the moment the electricity market is growing at approximately 100 000 new connections a year. This figure would need to be trebled if everybody in South Africa were to have domestic electricity by the end of the century. The process is being hampered by problems concerning the availability and cost of capital, legal constraints and, in many cases, the politicisation of electricity supply. Eskom believes that it is possible to achieve a further reduction in infrastructure costs without sacrificing quality of supply or safety, and ways and means of doing this are being explored.

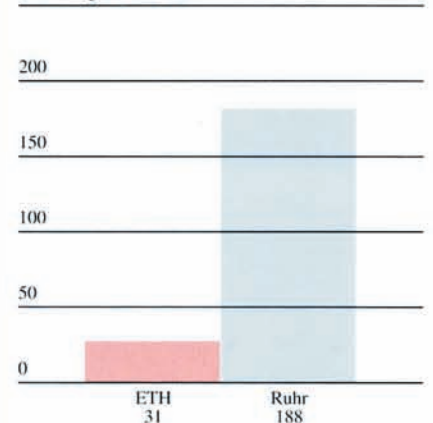
Sub-Saharan grid

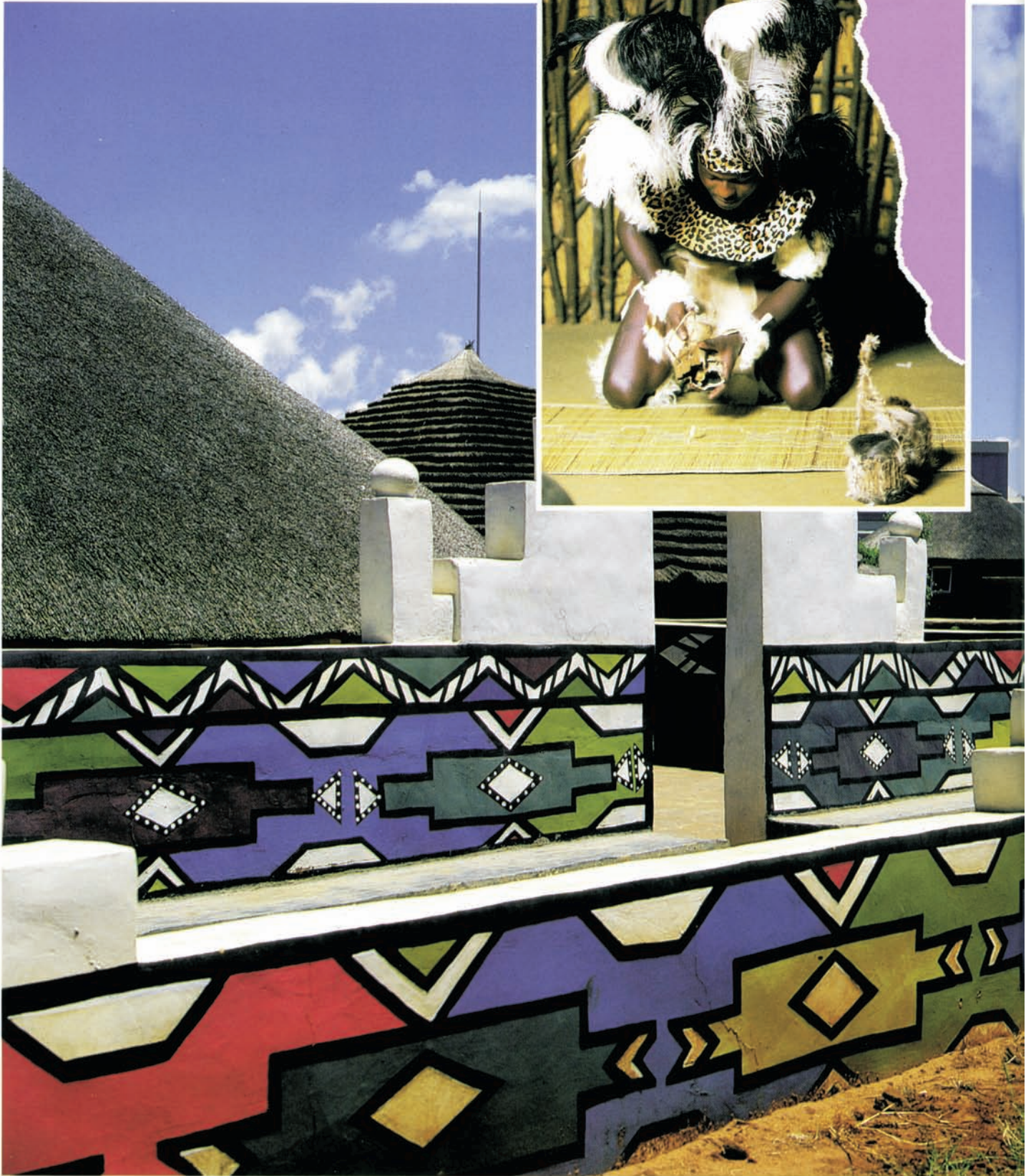
In the next century, the huge unexploited resources in countries to the north of South Africa could be harnessed to benefit the whole subcontinent. The availability of electricity would stimulate economic growth in the region.



Abe Coetzee of Bloemfontein invented a debugging system for Eskom's computers.

SULPHUR DIOXIDE EMISSION DENSITIES
TONS/SQ KM/YEAR





Eskom's cultural centre exposes visitors to different cultural experiences.

(Inset) JOSEPH DUBE shares his extensive knowledge of South African customs with visitors.

The vision of an electricity grid encompassing the whole of the subcontinent is closer to becoming a reality. Interaction between utilities in the region is increasing.

A technical assistance contract was signed with Mozambique and another is being negotiated with Zimbabwe. Various potential hydro-electric sites are being investigated by some southern African utilities, drawing on Eskom expertise.

The grid now extends from the south to Zaire via Botswana, Zimbabwe and Zambia. Representatives from the Zaire utility have visited Eskom to explore closer cooperation links.

Discussions on the rehabilitation of the Cahora Bassa line have entered a new phase with the recognition that business principles should drive the system and that international financial support should be based on this. The reconnection is still dependent on international funds being made available for the repair of the line. Talks with EdM of Mozambique, HCB of Portugal and Zesa of Zimbabwe concerning Eskom's assistance on the Songo-Bindura inter-connector line, have reached an advanced stage. Eskom is acting as mediator in this project.

An agreement was finalised with the Swaziland Electricity Board for the project management and engineering work for the Nhlanguano-Kalanga 132 kV line. Work on site has commenced. Eskom also assisted with a management audit for the SEB.

A training agreement with Escom Malawi was signed. An Eskom project manager has been deployed in Blantyre to assist in management and technical matters.

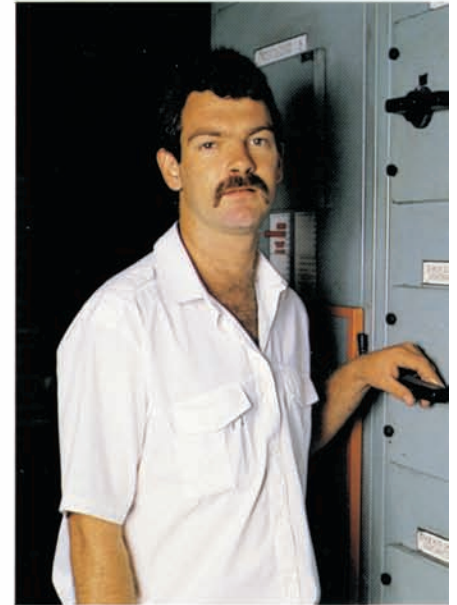
Eskom participated in the third African International Hydro Symposium held at Ruacana power station in Namibia and in the World Energy Council Forum in Zimbabwe.

INTERNATIONAL COOPERATION

Eskom is a member of various international organisations such as VGB (Technical Association of Large Power Plant Operators), UNIPEDE (International Union of Producers and Distributors of Electrical Energy), CIGRE (International Conference of Large High Voltage Electric Systems), WANO (World Association of Nuclear Operators), IAEA (International Atomic Energy Agency), ANS (American Nuclear Society), USCEA (United States Council for Energy Awareness) and Permac User Association, and has exchange agreements with Electricité de France and Taipower.

Eskom has exchanged information with a number of African, Eastern European and Asian countries on technical issues, particularly those in which it has taken a lead, such as dry cooling and use of low-grade coal.

Various papers were delivered by Eskom experts at international gatherings.



Arnot electrician Dave van Rensburg was nominated South Africa's top apprentice of the year.

THE NATIONAL GRID



LEGEND

POWER STATION

- ▲ Coal-fired
- ▲ Pumped storage
- △ Power stations under construction
- ▲ Nuclear
- ▲ Gas turbine
- ▲ Hydro
- Mothballed power stations

INDEPENDENT COUNTRIES

- 1. Bophuthatswana
- 2. Ciskei
- 3. Transkei
- 4. Venda

- Power lines
- - - Current projects



FINANCIAL RESULTS



Financial report	32 – 35
Annual financial statements	36 – 48
Report of the independent auditors	36
Accounting policies	37
Balance sheet	38
Income statement	39
Cash flow statement	40
Notes to the financial statements	41 – 47
Local registered stock	48
Unlisted investments	49

FINANCIAL REPORT

INCOME STATEMENT AND BALANCE SHEET

Electricity revenue amounted to R10 736 million for the year (1989: R9 271 million). Operating expenditure was R6 366 million (1989: R5 644 million) and net interest and finance charges were R3 302 million (1989: R2 899 million), leaving a net income, after abnormal items of R223 million (1989: nil), of R845 million (1989: R728 million). Accumulated reserves stood at R9 600 million at the end of 1990 (1989: R8 755 million). Year-on-year revenue increased by 15,8% of which the price increase accounts for approximately 14%. The lower growth in sales in 1990 reflects the depressed state of the South African economy. This low growth is expected to continue into 1991 and Eskom will make every effort to increase its sales through proactive marketing activities and price incentive schemes.

Total operating expenditure per kW.h rose by 11,4% in 1990, from 4,20 cents per kW.h to 4,68 cents per kW.h. This is a satisfactory performance against an inflation rate (PPI) of 12,3% for the year, and reflects Eskom's ongoing productivity improvement programme. Improved financial control and better asset management has enabled Eskom to offset some of the inflationary pressures on operating costs.

Net interest and finance charges were R403 million higher than in 1989 and were held to an increase of 13,9% for the year despite sustained high local interest rates. Eskom is reducing its funding requirements but remains vulnerable to increases in interest rates. Abnormal items amounted to R223 million for the year (1989: nil). Of this, R128 million arose as a result of a decision in 1990 to mothball certain power stations and represents a provision for relevant costs of mothballing these power stations and suspension of operations at associated collieries. An amount of R95 million has also been raised as a provision for arrear debts.

Net income after abnormal items increased by R117 million to R845 million in 1990. This performance was satisfactory given the low growth in sales and the extent of abnormal items. However, to make up for declining sales growth, Eskom undertook specific initiatives to reduce operating expenditure. This exercise saved R120 million in 1990 and went a long way in offsetting the negative impact of lower sales. A further major factor contributing to the increase in net income for the year was the curtailment of interest and finance charges despite the increase in the volume of debt.

Net operating income covered net interest and finance charges 1,32 times (1989: 1,25) with a net interest-bearing debt equity ratio of 2,7 (1989: 2,81). The long-term financial plan is aimed at improving these ratios. The interest rate exposure needs to be reduced by improving the levels of internally generated funds through increased sales volumes, strict cost control and productivity improvement.

Eskom established the Eskom Finance Company in 1990 in joint venture with certain financial institutions to fund housing loans for employees and at 31 December 1990 Eskom's loan to the associated company for its portion of the financing was R521 million.

1991 PRICE INCREASE

Eskom's pricing strategy has been to maintain price increases below the ruling rate of inflation in terms of the PPI to ensure stable and predictable price increases. In an effort to break the inflationary spiral and to stimulate the economy, Eskom will continue to keep price increases to a minimum. During the past three years the average price of electricity has declined by 3,3% in real terms. The increase of 8%, effective from January 1991, compares favourably to increases of 14% in 1990 and 10% per year in 1989 and 1988 respectively.



1990

INSURANCE RISK MANAGEMENT

Eskom continues to pursue a policy of managed risk and self-insurance of selected risks. Cost, benefit and risk information relating to self-insurance is continually updated and reviewed in accordance with the latest assessment of asset values and risk exposures. Certain risks, such as political riot and nuclear, are insured to the extent that cover is available in the commercial insurance market. For construction projects insurance is arranged which covers Eskom and all its contractors, subcontractors and suppliers on site. Considerable effort is employed to ensure that the risk of loss or damage is minimised. There is a safety and risk management programme directed at staff and contractors in order to avoid industrial accidents and occupational diseases. This risk management awareness extends beyond the pure brick and mortar approach to assets and includes greater emphasis on environmental awareness. The risk management programme forms an integral part of an ongoing process of identification, appraisal, evaluation and measurement of exposures at risk.

In all instances, assets are valued on a replacement basis for insurance and risk management purposes and management is satisfied that there is no significant unprotected risk exposure. The 1989/90 renewal period was adjusted so as to fall in line with the financial year.

FINANCIAL RISK MANAGEMENT

The financial risks created by an organisation of Eskom's size and their impact on the South African economy have necessitated the development of a sound philosophy of financial risk management. The extent of the financial risks is considerable in that net interest-bearing debt of R26 billion has a very significant impact on Eskom's results and therefore on the price of electricity to the consumers.

The developed financial risk management philosophy has taken into account the enormity of the liabilities, their nature and timing and the impact that Eskom can have on the financial markets through the daily activities of its treasury.

Eskom treasury manages its funds as a single pool consisting of debt and investments. To show the economic reality of this operation more clearly, investments of R4 066 million (1989: R3 241 million) have been offset against borrowings which are disclosed on the balance sheet as net interest bearing debt. Investments represent funds received from swap cash flows and prefunding activities which have been invested pending their use for repayment of loans and for funding operating and capital expenditure. It is the policy of Eskom to actively manage all its foreign exchange and interest rate exposure within appropriate risk parameters and the current risk management strategies include the use of a variety of instruments such as forward exchange contracts, options, interest rate swaps, interest rate caps and forward rate agreements in both the local and foreign financial markets within strictly controlled parameters. This philosophy has resulted in significant savings.

The gross borrowings at the end of 1990 amounted to R29 949 million (1989: R27 871 million), of which 73% (1989: 71%) are in fixed rate instruments. In addition there are hedging strategies in place which provide protection against adverse interest rate movements. Of the borrowings some 61% (1989: 61%) are from domestic sources, whilst the maturity structure for all borrowings indicates that 28% (1989: 29%) matures within the next three years.

An asset/liability committee was established in 1990 and the broad parameters within which financial risks should be managed have been set. Considerable work has been done in formulating a comprehensive system to achieve these objectives. Eskom believes that this project is of a pioneering nature for a corporation with so diverse a range of financial risks and much is expected from this integrated approach.



1990

FINANCIAL REPORT CONT.

The relative importance of the interest and finance charges to Eskom's net income should be seen in the light of the fact that they represent some 34% of annual costs. The nature and timing of the liabilities and commitments, and their sensitivity to interest rate fluctuations, are such that an increase of 1% in interest rates for a full calendar year will affect the net income by approximately R70 million at current borrowing levels. The positioning of Eskom's loan 168 at a yield below that of the Government long term stock – the theoretical risk free gilt instrument – has been achieved over a number of years through a deliberate strategy of providing liquidity in the stock by making a market in both the spot and options market. However, we expect this gap to close in the medium term as a result of the SA Reserve Bank now also making a market in government stock.

1990 FUNDING PLAN

Changed economic conditions and lower swap cash flows than anticipated necessitated the raising of some R1 208 million more than the R3 139 million planned. This resulted in an amended funding programme which is reflected in the table below. A further factor in the amended funding programme for 1990 was that the refinancing of maturing foreign loans yielded fewer funds than originally budgeted for. The additional funding was sourced from the money market and the realisation of investments so as not to increase the pressure on the capital market in 1990.

FUNDING PLAN

	Planned	R million Actual	Variance
	1990	1990	
Local capital market	2 300	2 483	183
Money market	(132)	612	744
Investments realised	444	797	353
Foreign loans	244	160	(84)
Project finance	283	295	12
	<u>3 139</u>	<u>4 347</u>	<u>1 208</u>

FUNDING PLAN 1991

The funding requirement for 1991 is lower than that of 1990 as a result of lower capital expenditure requirements and reduced repayments of foreign debt.

The 1991 funding plan is reflected below with details of the expected funding sources:

	R million
Capital market	1 600
Money market	309
Foreign loans	250
Project finance	300
Maturing investments	385
	<u>2 844</u>

Eskom is in a position of surplus generating capacity and as such will not incur capital expenditure of the magnitude experienced in the past few years. The projected funding requirements during the 1990s indicate that Eskom will move to a relatively low requirement by the middle of this period. It is expected that the capital market offtake in these years will be substantially below those of the past few years and that foreign loans will begin to play a greater role as a source of funds than in recent times. Eskom will however continue to support liquidity in the financial markets even in periods when its funding requirement is low.

VALUE CREATED

Value added is the result of acquiring and applying raw materials, products and services in the generation and distribution of electricity.

Value created from the sale of electricity is the excess of the revenue from these sales over the costs of generation and distribution, comprising primary energy, materials and services.

The Value Added Statement shows the sources of value created and how it is distributed, both to meet obligations and to reward those responsible for Eskom's achievement.

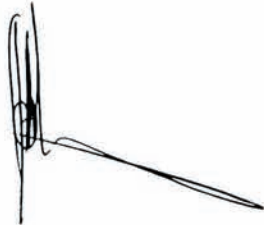
Value Added Statement

	R million	
	1990	1989
Value created		
Electricity revenue	10 736	9 271
Revenue from other activities	146	128
	<u>10 882</u>	<u>9 399</u>
Less: Cost of primary energy, materials, services and abnormal items	3 374	2 735
	<u>7 508</u>	<u>6 664</u>
Value distributed		
Employment costs: Salaries, wages, benefits and other employment costs	2 244	1 979
Less: Portion attributable to capital expansion	324	306
	<u>1 920</u>	<u>1 673</u>
Providers of capital: interest and finance charges	3 302	2 899
Maintenance and expansion of assets:		
Depreciation	1 441	1 364
Retained income	845	728
	<u>7 508</u>	<u>6 664</u>

1990

ANNUAL FINANCIAL STATEMENTS

The annual financial statements for the year ended 31 December 1990, set out on pages 37 to 48, which are the responsibility of the Electricity Council, and which have been recommended by the Management Board were approved by the Electricity Council and signed on its behalf on 7 March 1991 by



Dr J.B. Maree
Chairman of the Electricity Council



Dr I.C. McRae
Chief Executive of Eskom

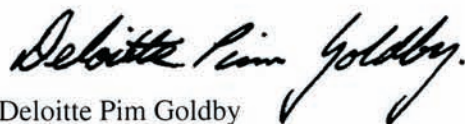
REPORT OF THE INDEPENDENT AUDITORS

To the members of the Electricity Council

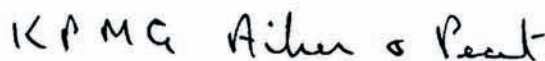
We have audited the annual financial statements set out on pages 37 to 48.

We conducted our audit in accordance with generally accepted auditing standards. These standards require that we plan and perform the audit to obtain reasonable assurance that, in all material respects, fair presentation is achieved in the financial statements. Our audit included an evaluation of the appropriateness of the accounting policies, an examination on a test basis of evidence that supports the amounts included in the financial statements, an assessment of the reasonableness of significant estimates and a consideration of the appropriateness of the overall financial statement presentation and disclosure. We consider that our audit procedures were appropriate in the circumstances to express our opinion presented below.

In our opinion these financial statements fairly present the financial position of Eskom at 31 December 1990, and the results of its operations and cash flow information for the year then ended in conformity with generally accepted accounting practice as required by the Eskom Act of 1987.



Deloitte Pim Goldby



KPMG Aiken & Peat

Chartered Accountants (SA)
Auditors

Johannesburg
7 March 1991

ACCOUNTING POLICIES

Basis of preparation

In terms of the Eskom Act and as determined by the Electricity Council, the financial statements are prepared in accordance with the applicable requirements of the Companies Act in conformity with generally accepted accounting practice. The financial statements are prepared on the historical cost basis, except for short-term investments held for trading purposes. The following principal accounting policies are consistent in all material respects with those applied during the previous year.

Insurance reserve

The insurance reserve is held to cover abnormal losses. The reserve is increased annually by any excess of internal premiums, at market-related rates, over claims not covered by external insurance.

Decommissioning of generating plant

Provision is made for the estimated costs of decommissioning nuclear plant over its estimated useful life.

Provision is not made for the costs of decommissioning other plant unless it is expected that decommissioning costs will exceed the net proceeds from the sale of associated land and the salvage value of the plant.

Loan discount

Discounts and premiums on local registered stock in issue are amortised over the period of each loan using the yield to redemption method.

Investments

Long-term investments are stated at cost which is adjusted for amortised discount where applicable. Profits or losses are recognised on realisation.

Short-term investments held for trading purposes are stated at market value and profits or losses are accounted for on revaluation.

Off balance sheet financial instruments

The premiums received and paid on financial instruments, designated as hedges for future funding requirements, are amortised over the lives of the instruments. Where they are not designated as hedges they are stated at their market value and the resultant profits or losses are included in interest and finance charges on foreign and other debt.

Foreign currencies

Transactions in foreign currencies are recorded at the spot rates ruling when the initial forward cover contracts are established or at the spot rates ruling at transaction date.

Assets, liabilities and commitments in foreign currencies are translated to South African Rand at the spot rates of the underlying forward cover contracts or at the rates of exchange ruling at year-end.

Forward cover costs are recognised over the periods of the related forward cover contracts and are included in interest and finance charges.

Gains and losses on foreign exchange are included in interest and finance charges.

Fixed assets and depreciation

Fixed assets in commission are stated at cost of acquisition or construction, less depreciation thereon. Works under construction are stated at cost, which includes all costs necessarily incurred to bring plant to the condition and location essential for its intended use. Costs include overheads and research and development costs, and interest which is capitalised at the average cost of capital employed.

Construction materials are stated at weighted average cost.

The cost of renewal and maintenance of assets is expensed as incurred. Where the life of an asset is extended, such costs are capitalised and depreciated over the adjusted useful life of the asset.

Land is not depreciated. Rights are fully depreciated on acquisition.

Plant at mothballed power stations is not depreciated.

Depreciation is charged on the full cost of power stations placed partially in reserve storage.

Other fixed assets in commission, equipment and vehicles are depreciated on the straight line basis over their estimated useful lives.

Leased assets

Assets subject to finance lease agreements are capitalised at their cash cost equivalents and the corresponding liabilities are raised. The assets are depreciated on the straight line basis over their estimated useful lives. Lease finance charges are included in interest and finance charges on foreign and other debt.

Future fuel supplies

Certain long-term supply contracts require advance payments to suppliers of fuel for pre-production costs. These payments, together with interest capitalised thereon, are deferred and amortised on the basis of quantities of fuel purchased.

Fuel and stores

Nuclear fuel is valued at cost on the first-in-first-out basis. The charge to operating expenditure is based on estimated fuel consumption.

Other fuel and stores are valued at weighted average cost. Provision for obsolescence is made where appropriate.

Electricity revenue

Revenue is recognised at the time customers are billed.

Retirement benefits

Contributions to the Eskom Pension and Provident Fund are based on a percentage of salaries and are expensed in the period in which they are incurred. Gratuities paid to retiring employees are expensed in the period in which they are paid.



1990

BALANCE SHEET

At 31 December 1990	Notes	1990	1989
(in R million)			
Capital employed			
Accumulated reserves		9 600	8 755
Other reserves and provisions	1	331	302
		<u>9 931</u>	<u>9 057</u>
Net interest-bearing debt	2		
Long-term		22 911	21 876
Short-term		2 972	2 754
		<u>25 883</u>	<u>24 630</u>
		<u>35 814</u>	<u>33 687</u>
Employment of capital			
Fixed assets	3	34 030	31 728
Non-current assets	4	2 501	2 185
		<u>36 531</u>	<u>33 913</u>
Current assets			
Fuel and stores	5	1 312	1 259
Debtors		958	920
		<u>2 270</u>	<u>2 179</u>
Interest-free liabilities			
Creditors		2 512	1 952
Interest payable		475	453
		<u>2 987</u>	<u>2 405</u>
		<u>35 814</u>	<u>33 687</u>

INCOME STATEMENT

For the year ended 31 December 1990 (in R million)	Notes	1990	1989
Electricity revenue		10 736	9 271
Bulk		4 511	3 633
Industrial		3 128	2 794
Mining		2 527	2 309
Traction		412	384
Domestic and lighting		158	151
Operating expenditure	6	6 366	5 644
Net operating income		4 370	3 627
Net interest and finance charges	7	3 302	2 899
Net income before abnormal items		1 068	728
Abnormal items	8	223	—
Net income		845	728
Accumulated reserves at beginning of year		8 755	8 127
		9 600	8 855
Transfer to insurance reserve	1	—	100
Accumulated reserves at end of year		9 600	8 755



1990



CASH FLOW STATEMENT

For the year ended 31 December 1990 (in R million)	Notes	1990	1989
Cash generated from operations			
Net operating income (after abnormal items)		4 147	3 627
Non-cash items	12.1	1 473	1 419
		<u>5 620</u>	<u>5 046</u>
Cash released from/(applied to) working capital	12.2	272	(35)
		<u>5 892</u>	<u>5 011</u>
Net financing charges	12.3	(2 835)	(2 789)
Net cash flow from operations		<u>3 057</u>	<u>2 222</u>
Loans and facilities raised			
Local registered stock		3 407	1 825
Foreign and other		2 050	2 023
Net proceeds on maturity of forward cover contracts		—	1 289
Total raised		<u>5 457</u>	<u>5 137</u>
Total cash generated		<u>8 514</u>	<u>7 359</u>
Cash applied			
Loans and facilities repaid			
Local registered stock		(71)	(181)
Foreign and other		(2 972)	(1 454)
Net cash applied to maturity of forward cover contracts		(459)	—
Total repaid		<u>(3 502)</u>	<u>(1 635)</u>
Investments and deposits		(1 350)	(1 731)
Capital expenditure	12.4	(3 662)	(3 993)
Total cash applied		<u>(8 514)</u>	<u>(7 359)</u>

NOTES TO THE FINANCIAL STATEMENTS



1990

For the year ended 31 December 1990 1990 1989
 (in R million)

1. Other reserves and provisions

Insurance reserve	100	100
Provision for decommissioning costs	231	202
	<u>331</u>	<u>302</u>

The insurance reserve has been set aside to absorb abnormal losses not covered by external insurance policies.

2. Net interest-bearing debt

Eskom's funding is managed in a single pool consisting of interest-bearing debt and investments. Investments represent funds received from swap cash flows and prefunding activities which are utilised for the repayment of loans and the funding of operating and capital expenditure.

The manner in which Eskom's funding is managed is most appropriately disclosed by netting off interest-bearing debt and investments as follows:

Interest-bearing debt	33 812	30 989
Loan discount	(3 863)	(3 118)
Gross borrowings	29 949	27 871
Investments	(4 066)	(3 241)
Net interest-bearing debt	<u>25 883</u>	<u>24 630</u>

Long-term and short-term interest-bearing debt consists of the following:

2.1 Long-term

Eskom local registered stock	20 881	17 097
Loan discount	(3 852)	(3 116)
	<u>17 029</u>	<u>13 981</u>
Foreign and other	7 755	8 703
	<u>24 784</u>	<u>22 684</u>

Less: Investments

Republic of South Africa, municipal and other stock – at cost	1 873	808
Market value R1 916 million (1989: R801 million)		
	<u>22 911</u>	<u>21 876</u>

NOTES TO THE FINANCIAL STATEMENTS CONT.

1990

For the year ended 31 December 1990	1990	1989
(in R million)		
2.2 Short-term		
Eskom local registered stock	488	68
Loan discount	(11)	(2)
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	477	66
Foreign and other	4 688	5 121
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	5 165	5 187
Less: Investments		
Eskom local registered stock – at market value	—	54
Deposits	2 193	2 379
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	2 193	2 433
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	2 972	2 754
2.3 The authorised nominal value of local registered stock is R31 998 million (1989: R26 893 million). (Refer schedule 1).		
2.4 All significant foreign currency exposures were hedged by forward cover contracts at 31 December 1990.		
2.5 The average rate of net interest and finance charges incurred during the year on net interest-bearing debt amounted to 15,1 percent per annum (1989: 14,6 percent per annum).		
2.6 Short-term debt includes credits and short-term advances totalling R3 534 million (1989: R3 117 million) which are of a revolving nature.		

NOTES TO THE FINANCIAL STATEMENTS CONT.

For the year ended 31 December 1990

(in R million)



1990

3. Fixed assets

	Cost	Accumulated depreciation	Book value
1990			
Land and rights	317	63	254
Buildings and facilities	2 125	603	1 522
Plant – Generation	24 052	4 408	19 644
– Transmission	3 652	862	2 790
– Distribution	4 464	1 059	3 405
– At mothballed power stations	780	568	212
Test and telecommunication equipment	250	151	99
Total in commission	<u>35 640</u>	<u>7 714</u>	<u>27 926</u>
Works under construction	5 615	—	5 615
Construction materials	156	—	156
Equipment and vehicles	781	482	299
Leased equipment	112	78	34
	<u>42 304</u>	<u>8 274</u>	<u>34 030</u>
1989			
Land and rights	309	62	247
Buildings and facilities	2 134	545	1 589
Plant – Generation	21 598	4 081	17 517
– Transmission	3 090	725	2 365
– Distribution	3 878	903	2 975
Test and telecommunication equipment	190	132	58
Total in commission	<u>31 199</u>	<u>6 448</u>	<u>24 751</u>
Works under construction	6 480	—	6 480
Construction materials	158	—	158
Equipment and vehicles	686	400	286
Leased equipment	112	59	53
	<u>38 635</u>	<u>6 907</u>	<u>31 728</u>

NOTES TO THE FINANCIAL STATEMENTS CONT.

1990

For the year ended 31 December 1990	1990	1989
(in R million)		
4. Non-current assets		
Future fuel supplies	1 754	1 757
Housing loans to employees	155	368
Loan to associated finance company	521	—
Debtors for reticulation systems	62	55
Unlisted investments – at cost	9	5
	2 501	2 185
Housing loans to employees are secured by first mortgages		
5. Fuel and stores		
Fuel	823	818
Maintenance and consumable stores	489	441
	1 312	1 259
6. Operating expenditure		
Operating expenditure includes:		
Depreciation		
Assets in commission	1 325	1 225
Equipment and vehicles	97	112
Leased equipment	19	27
Lease charges on equipment		
Operating leases	5	4
Surplus on disposal of fixed assets	(30)	(7)

NOTES TO THE FINANCIAL STATEMENTS CONT.



1990

For the year ended 31 December 1990 (in R million)	1990	1989
7. Net interest and finance charges		
Interest paid and discount amortised		
Local registered stock	2 357	1 792
Foreign and other debt	1 432	1 286
Forward cover costs	820	836
	4 609	3 914
Interest received	(835)	(528)
	3 774	3 386
Amounts capitalised	(472)	(487)
	3 302	2 899
8. Abnormal items		
8.1 Provision for costs relating to the mothballing of power stations and suspension of operations at associated collieries	128	—
8.2 Provision for arrear debts	95	—
	223	—
9. Commitments		
9.1 Estimated capital expenditure contracted for, excluding future contract price adjustments and general sales tax	5 366	5 600
This expenditure will be financed from borrowings and internally generated funds and is expected to be incurred as follows:		
within one year	1 822	
thereafter	3 544	
9.2 Undrawn amounts in respect of housing loans granted to employees	4	20

NOTES TO THE FINANCIAL STATEMENTS CONT.

For the year ended 31 December 1990

10. Contingent liabilities

- 10.1 Guarantees issued to financial institutions as security for housing loans granted to employees amount to R60 million (1989: R115 million).
- 10.2 In terms of the shareholders' agreement signed between the members of an associated company, Eskom has guaranteed the amounts due by the associate to other members of the company. The amount outstanding at year-end amounted to R300 million.
- 10.3 Eskom has indemnified the Eskom Pension and Provident Fund against any loss resulting from the negligence, dishonesty or fraud of the Fund's officers or trustees.
- 10.4 Call options expiring during 1991 were written at an average rate of 15,288%, on Local Registered Stock with a nominal value of R450 million.

11. Retirement benefits

Eskom employees are members of the Eskom Pension and Provident Fund which is a defined benefit plan governed by the Pension Funds Act.

The Fund is valued at intervals of not more than three years. Any deficit will be funded by the payment of actuarially determined lump sums or by future contributions.

The last actuarial valuation was performed at 31 December 1989 when the actuaries reported that the Fund was in a sound financial position. No events have taken place since this valuation which have had a significant effect on the Fund.

NOTES TO THE FINANCIAL STATEMENTS CONT.



1990

For the year ended 31 December 1990	1990	1989
(in R million)		
12. Cash flow information		
12.1 Non-cash items		
Depreciation	1 441	1 364
Other	32	55
	1 473	1 419
12.2 Cash released from/(applied to) working capital		
Fuel and stores	87	16
Debtors	(59)	(21)
Creditors	244	(30)
	272	(35)
12.3 Net financing charges		
Interest and finance charges (net of capitalisation)	(4 137)	(3 427)
Interest received	835	528
Net interest	(3 302)	(2 899)
Non-cash portion of hedging cost	300	97
Local registered stock discount amortised	123	79
Net interest receivable	44	(66)
	(2 835)	(2 789)
12.4 Capital expenditure		
Expenditure on land, buildings and plant	(3 685)	(3 813)
Expenditure on equipment and vehicles	(119)	(212)
	(3 804)	(4 025)
Proceeds from disposals	104	95
	(3 700)	(3 930)
Expenditure on future fuel supplies	(175)	(106)
Housing loans to employees	213	43
	(3 662)	(3 993)

LOCAL REGISTERED STOCK

As at 31 December 1990

Schedule 1

(in R million)

Loan	Authorised Nominal Value		Repayment Date/s	Issued Nominal Value	
	31/12/90	%		31/12/90	31/12/89
58	30	6.5	1989/91	10	11
60	35	6.75	1991	11	13
61	35	6.875	1992	26	14
64	12	6.5	1992	7	8
65	37	6.875	1992	29	19
70	10	6.5	1993	8	8
71	70	6.875	1993	30	28
75	22	6.5	1993	16	18
76	48	6.875	1993	44	39
78	20	6.5	1994	17	16
79	30	6.875	1994	22	24
81	10	6.5	1994	9	9
82	25	6.875	1994	23	23
83	18	7.5	1995	15	16
84	3	7	1995	3	2
85	35	8.75	1995	32	20
86	10	8.5	1995	8	5
87	45	9.25	1996	12	21
88	10	8.75	1996	5	5
89	20	9.25	1996	7	8
90	30	9.25	1996	9	9
91	10	8.75	1996	3	3
92	20	9.25	1997	12	14
93	22	9.125	1997	5	6
94	5	8.75	1997	2	2
95	25	8.5	1997	3	6
96	28	8.25	1997	14	15
97	7	8	1997	3	4
98	45	8.25	1997	35	36
99	30	8.25	1998	10	10
100	20	8.375	1998	6	7
101	5	8	1998	3	2
103	24	8	1998	19	19
104	6	7.625	1998	3	3
106	45	8	1998	7	6
107	27	9	1999	24	16
108	3	8.5	1999	0	0
110	30	9.5	1999	24	13
111	9	10.75	2000	4	3
112	29	10.75	2000	20	19
113	40	10.75	2000	35	35
114	25	10.75	2000	19	18
C/fwd	1 010			594	553

(in R million)

Loan	Authorised Nominal Value		Repayment Date/s	Issued Nominal Value	
	31/12/90	%		31/12/90	31/12/89
B/fwd	1 010			594	553
115	5	10.25	2000	4	3
116	30	10.75	2000	24	25
118	55	11	2000	53	49
119	6	10.75	1995	0	1
121	40	11.4	2001	34	28
122	2	11.1	1986/96	1	1
123	40	12.75	1996	38	40
126	40	12.5	2001	38	36
127	150	12.6	1999	135	146
131	250	11.15	2002	12	12
132	250	11.75	2002	70	71
134	170	10.75	2003	11	12
135	270	11.3	2003	46	58
138	150	9.7	2003	10	13
139	340	10.25	2003	39	38
141	130	8.65	2004	17	18
142	350	9.15	2004	61	66
144	130	9.05	2005	9	10
145	270	9.55	2005	16	72
147	100	9.05	1992	44	45
148	100	9.05	2005	47	48
149	230	9.55	2005	43	46
150	0	10.25	1990	0	68
151	275	10.95	2004	9	9
152	100	12.8	1993	92	94
153	400	12.95	2006	206	243
154	220	10	2007	155	209
155	170	13.2	2007	144	160
157	415	14.25	2008	397	410
158	1 250	9.25	1994	754	658
159	325	12	2008	194	264
160	350	11	2009	264	281
162	600	14.25	1991	468	328
163	125	10.5	2004	105	112
164	1 000	14	1992	858	567
165	1 000	11	1995	564	450
166	1 250	11	1993	729	599
167	1 400	12	1996	1 035	821
168	16 000	11	2008	13 123	10 262
169	3 000	15	1998	926	239
	31 998			21 369	17 165

UNLISTED INVESTMENTS

The following unlisted investments are recorded at cost in the financial statements under non-current assets (see note 4). These investments have not been consolidated since their operations are not similar to those of Eskom and the amounts involved are not material to Eskom's assets, nor does the combined income significantly affect Eskom's income.

Name	Issued/ stated capital R	Effective holding		Business activity
		1990	% 1989	
PRINCIPAL SUBSIDIARY COMPANIES				
Rotek Industries (Pty) Ltd	4 000	100	100	Group maintenance and service company
Rosherville Engineering (Pty) Ltd	1	100	100	Management company
Natal Navigational Collieries and Estate Company Ltd	1 542 850	100	100	Holding company for surface and mining rights and claims
PRINCIPAL ASSOCIATE COMPANIES				
Ash Resources (Pty) Ltd	200	25	25	Ash processing company
Eskom Finance Company (Pty) Ltd	4 000	25	—	Finance company (Note 1)
KwaNobuhle Electricity Supply Company (Pty) Ltd	40 000	50	50	Electricity reticulation company
Kescor (Pty) Ltd	5 000	50	—	Electricity reticulation company

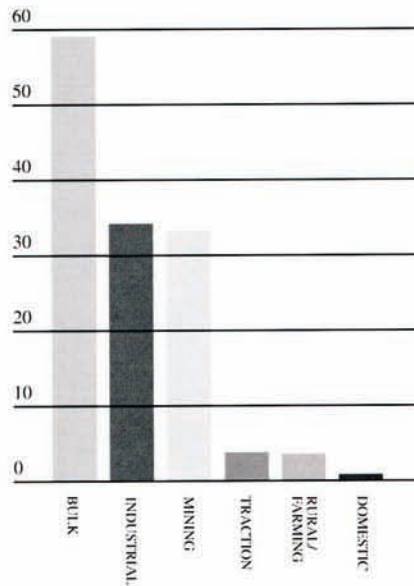
Note 1: During the year a company was incorporated to accommodate employee housing loans. Eskom has taken up a minority interest in the company and has made loans available to the company.

1990

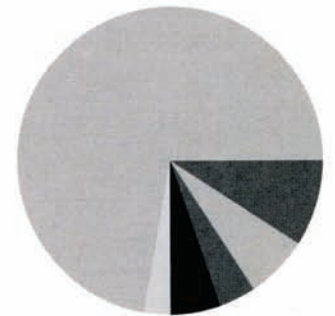
HOW ESKOM PERFORMED IN 1990

ESKOM SALES BY CATEGORY

70 GW.h in thousands

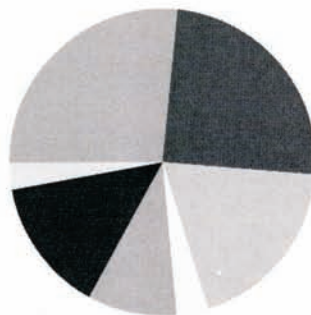


MAJOR MINING SALES



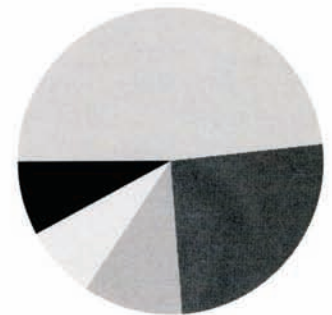
DIAMONDS 2.7%
COPPER 3.9%
MINOR MINING 5.4%
COAL 6.7%
PLATINUM 9.2%
GOLD & URANIUM 72.1%

SALES TO INDUSTRY



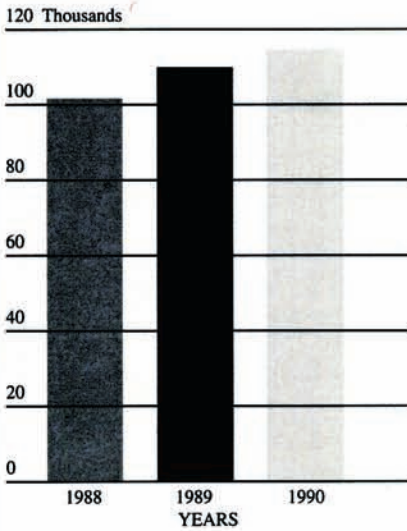
PAPER ETC. 2.9%
NON-METALLIC 3.1%
AGRICULTURE 9.5%
OTHER 14.1%
CHEMICALS 19%
NON-FERROUS 24.8%
IRON & STEEL 26.6%

MINOR MINING SALES

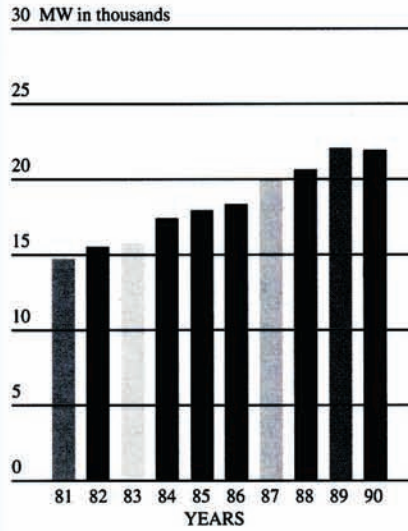


MANGANESE 7.7%
ASBESTOS 7.8%
CHROME 10.6%
IRON 25.6%
OTHER 48.3%

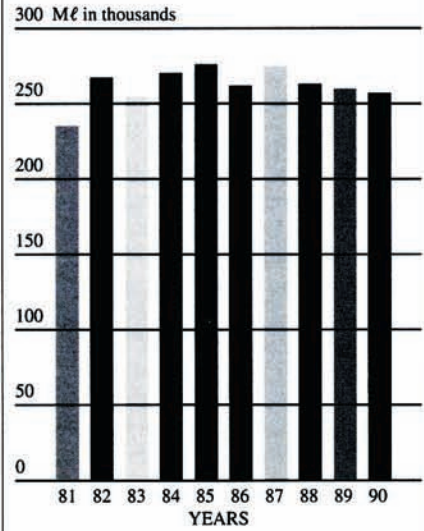
RURAL SUPPLIES
(NUMBER OF SUPPLY POINTS AT 31 DECEMBER)



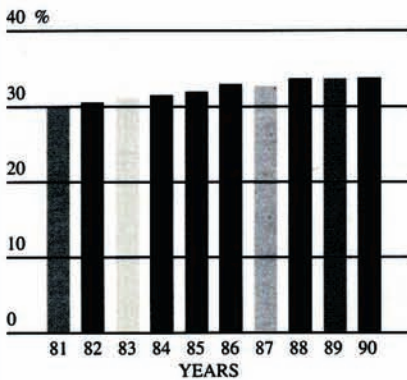
MAXIMUM DEMAND



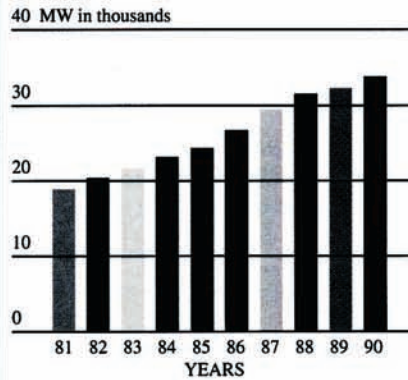
WATER CONSUMPTION



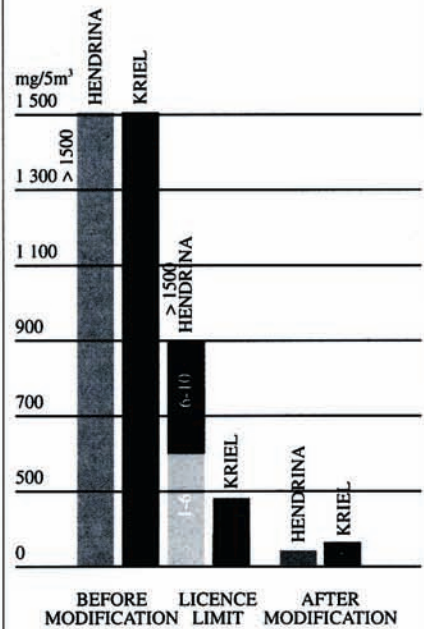
THERMAL EFFICIENCY



SENT-OUT CAPACITY

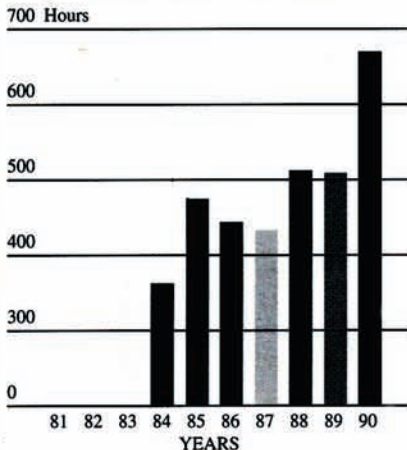


SMOKE EMISSIONS AT KRIEL AND HENDRINA POWER STATIONS



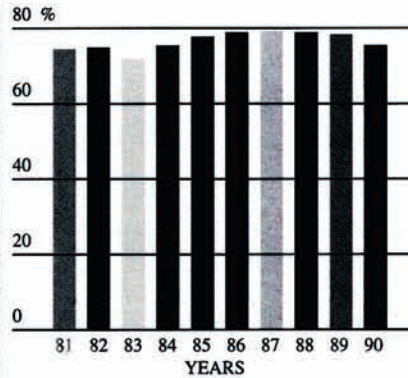
SMOKE EMISSIONS FROM KRIEL AND HENDRINA POWER STATIONS BEFORE AND AFTER INSTALLATION OF SO₂ GAS CONDITIONING EQUIPMENT. EMISSIONS AS LOW AS 32 mg/5m³ CAN BE ACHIEVED.

RELIABILITY
WEIGHTED MEAN TIME TO TRIP



BASIS OF RELIABILITY DETERMINATION WAS CHANGED DURING 1989 FROM PERCENTAGE TO WEIGHTED MEAN TIME TO TRIP/FAILURE.

PLANT AVAILABILITY



TABLES

1. Statistical overview

	1990	1989
Financial, R million		
Revenue	10 736	9 271
Net income ¹	845	728
Fixed assets in commission, at cost	35 640	31 199
Works under construction	5 771	6 638
Capital expenditure	3 662	3 993
Total net borrowings	25 883	24 630
Plant performance		
Total power station capacity, installed rating, MW	35 673	34 141
Total power station capacity, assigned sent-out rating, MW	33 843	32 403
Peak demand on integrated Eskom system, MW	21 863	21 871
Average station availability ²	75,0	78,1
Station load factor, percent ³ (after excess capacity management)	50,5 (57,3)	51,1
Integrated Eskom system load factor, percent	74,9	73,7
Coal burnt, thousands of tons	70 861,2	67 529,3
Coal burnt, kg/kW.h sent out	0,526	0,523
Average heat rate of coal-fired stations, MJ/kW.h sent out	10,66	10,72
Average heat content of coal (as received), MJ/kg	20,26	20,20
Overall thermal efficiency, sent-out basis	33,7	33,6
Average coal cost, R/ton	24,3	20,9
Average coal cost, c/kW.h sent out	1,2780	1,1023
Electricity output		
Total electricity sent out in South Africa, GW.h ⁴	147 244	146 162
Eskom electricity sent out as percentage of South African total	97,4	96,7
Total electricity sent out on Eskom system (Eskom stations and purchased), GW.h ⁵	146 320	143 548
Total sent out from Eskom stations, GW.h	146 047	143 204
Subtotal from coal-fired stations, GW.h	134 744	128 304
Subtotal from hydro-electric stations, GW.h	1 010	2 759
Subtotal from pumped-storage stations, GW.h	1 841	1 039
Subtotal from diesel and gas-turbine stations, GW.h	3	3
Subtotal nuclear power station, GW.h	8 449	11 099
Total purchased by Eskom and sent out on Eskom system, GW.h	273	344
Total consumed by Eskom, GW.h ⁶	2 953	2 265
Total available for distribution, GW.h	143 367	141 283
Total sold, GW.h ⁷	136 168	134 347
Growth in GW.h sales, percent	1,4	3,7
Employees		
Total number at 31 December	50 000	51 554
Ratio number/GW.h sold	0,367	0,384
Sales to countries in southern Africa, GW.h		
Bophuthatswana	2 972,0	2 453,1
Botswana	84,2	57,8
Ciskei	369,0	353,8
Mozambique	321,6	307,1
Lesotho	192,3	181,9
Swaziland	409,5	274,0
Namibia	586,3	556,6
Transkei	191,0	109,7
Venda	107,6	92,7
Zimbabwe	13,2	14,6
	5 246,7	4 401,1

1. Certain adjustments had to be made to make figures comparable with current figures, which are presented in terms of the Eskom Act of 1987. 2. Capacity hours available x 100/total capacity hours in year. 3. kW.h sent out x 100/(average assigned sent-out rating x hours in year). 4. Electricity sent out by Eskom, some industries and municipalities which generate all or part of their electricity requirements. 5. Includes Eskom electricity sent out to neighbouring countries.

	1988	1987	1986	1985	1984	1983	1982	1981
Revenue	8 159	7 046	5 845	4 625	3 832	3 302	2 695	2 141
Net income ¹	816	702	781	738	732	744	671	507
Fixed assets in commission, at cost	28 680	24 986	19 907	15 496	12 058	9 218	7 689	6 323
Works under construction	5 512	6 075	7 753	8 552	7 271	6 434	5 198	3 854
Capital expenditure	3 969	3 895	3 755	4 757	3 719	2 757	2 741	1 951
Total net borrowings	22 779	21 475	19 462	17 621	13 861	10 686	8 534	6 334
Total power station capacity, installed rating, MW	33 176	31 261	28 086	25 716	24 514	22 949	21 749	20 049
Total power station capacity, assigned sent-out rating, MW	31 465	29 618	26 682	24 359	23 168	21 673	20 523	18 989
Peak demand on integrated Eskom system, MW	20 589	20 001	18 278	17 852	17 296	15 639	15 532	14 674
Average station availability ²	79,1	79,2	78,5	77,5	74,9	71,9	74,3	74,2
Station load factor, percent ³ (after excess capacity management)	52,3	54,3	55,5	58,0	58,1	55,6	59,3	62,2
Integrated Eskom system load factor, percent	75,5	73,9	77,3	76,2	75,0	76,9	75,3	77,6
Coal burnt, thousands of tons	64 489,6	65 787,0	58 915,9	59 488,6	58 703,6	55 010,2	55 198,4	53 903,7
Coal burnt, kg/kW.h sent out	0,521	0,535	0,515	0,522	0,533	0,546	0,551	0,563
Average heat rate of coal-fired stations, MJ/kW.h sent out	10,71	11,00	10,95	11,26	11,45	11,57	11,82	12,01
Average heat content of coal (as received), MJ/kg	20,44	20,48	21,19	21,52	21,38	21,11	21,39	21,25
Overall thermal efficiency, sent-out basis	33,6	32,7	32,9	32,0	31,4	31,1	30,5	30,0
Average coal cost, R/ton	18,67	17,11	14,87	13,25	12,55	12,44	11,75	9,71
Average coal cost, c/kW.h sent out	0,9727	0,9155	0,7665	0,6916	0,6692	0,6793	0,6471	0,5473
Total electricity sent out in South Africa, GW.h ⁴	140 802	134 751	130 056	126 206	120 835	112 366	109 536	106 135
Eskom electricity sent out as percentage of South African total	97,0	96,1	95,1	94,5	94,3	93,8	93,6	93,9
Total electricity sent out on Eskom system (Eskom stations and purchased), GW.h ⁵	139 197	132 774	126 766	122 494	117 086	108 321	104 920	100 425
Total sent out from Eskom stations, GW.h	138 837	132 507	126 511	121 987	116 581	103 295	102 769	97 824
Subtotal from coal-fired stations, GW.h	123 777	122 947	114 298	113 941	110 094	100 738	100 217	95 675
Subtotal from hydro-electric stations, GW.h	3 162	1 617	1 623	624	560	595	1 016	1 653
Subtotal from pumped-storage stations, GW.h	1 403	1 774	1 785	2 107	1 994	1 957	1 519	415
Subtotal from diesel and gas-turbine stations, GW.h	2	2	2	0	8	5	17	81
Subtotal nuclear power station, GW.h	10 493	6 167	8 803	5 315	3 925	—	—	—
Total purchased by Eskom and sent out on Eskom system, GW.h	360	267	255	507	505	5 026	2 151	2 601
Total consumed by Eskom, GW.h ⁶	2 567	3 229	3 018	3 265	3 188	2 917	2 404	712
Total available for distribution, GW.h	136 630	129 545	123 748	119 229	113 898	105 404	102 516	99 713
Total sold, GW.h ⁷	129 493	122 524	117 353,0	112 305,9	106 904,1	98 251,1	96 135,9	93 844,0
Growth in GW.h sales, percent	5,7	4,4	4,5	5,1	8,8	2,2	2,4	7,2
Total number at 31 December	56 726	56 830	60 800	66 000	64 560	62 420	58 850	52 080
Ratio number/GW.h sold	0,438	0,464	0,518	0,588	0,604	0,635	0,612	0,555
Sales to countries in southern Africa, GW.h	2 295,7	2 124,5	1 805,9	1 750,4	1 490,1	1 242,9	1 181,5	1 324,8
Bophuthatswana	53,4	77,5	232,3	222,4	185,7	159,7	87,4	11,2
Botswana	299,8	250,7	191,4	164,5	133,7	104,4	84,1	4,8
Ciskei	340,4	329,2	303,8	227,8	283,5	293,2	293,2	235,1
Mozambique	170,9	156,2	134,6	123,7	116,8	110,9	123,6	117,4
Lesotho	290,3	253,5	277,1	227,2	250,2	333,4	308,9	211,0
Swaziland	452,9	613,6	411,1	223,8	186,9	422,2	160,1	173,9
Namibia	126,9	110,6	84,9	99,8	138,7	160,2	120,8	106,9
Transkei	73,8	59,8	54,0	45,0	35,0	27,1	24,1	20,1
Venda	16,5	16,5	15,6	11,5	12,5	13,1	13,2	11,2
Zimbabwe								
	4 120,6	3 992,0	3 510,7	3 096,1	2 833,0	2 867,1	2 396,9	2 216,4

6. In respect of pumped storage facilities and synchronous condenser mode of operation. See Table 2, Note 7. 7. Difference between electricity available for distribution and electricity sold is due to transmission losses.

TABLES

2. Power stations in commission at 31 December 1990

Name of station	Type	Location	No. and rating of generator sets MW	Total installed rating MW	Total sent-out rating MW ¹
Acacia	Gas turbine	Cape Town	3 x 57	171	171
Arnot	Coal fired	Middelburg, Tvl	6 x 350	2 100	1 955
Camden	Coal fired	Ermelo	8 x 200	1 600	1 520
Drakensberg	Pumped storage	Bergville	4 x 250	1 000	1 000
Duvha	Coal fired	Witbank	6 x 600	3 600	3 450
Grootvlei	Coal fired	Balfour	6 x 200	1 200	1 130
Hendrik Verwoerd	Hydro-electric	Norvalspont	4 x 80	320	320
Hendrina	Coal fired	Hendrina	10 x 200	2 000	1 900
Highveld	Coal fired	Sasolburg	8 x 60	480	412
Ingagane	Coal fired	Newcastle	5 x 100	500	465
Kendal	Coal fired	Witbank	1 x 686	686 ²	640 ²
Koeberg	Nuclear	Cape Town	2 x 965	1 930	1 840
Komati	Coal fired	Middelburg, Tvl	5 x 100; 4 x 125	1 000	891
Kriel	Coal fired	Bethal	6 x 500	3 000	2 850
Lethabo	Coal fired	Sasolburg	6 x 618	3 708	3 558
Matimba	Coal fired	Ellisras	5 x 665	3 325 ²	3 075 ²
Matla	Coal fired	Bethal	6 x 600	3 600	3 450
Palmiet	Pumped storage	Grabouw	2 x 200	400	400
Paratus	Gas turbine/diesel	Walvis Bay	1 x 22,4; 4 x 6,4	48	48
Port Rex	Gas turbine	East London	3 x 57	171	171
Salt River	Coal fired	Cape Town	4 x 30; 2 x 60	240	228
Taaibos	Coal fired	Sasolburg	8 x 60	480	440
Tutuka	Coal fired	Standerton	6 x 609	3 654	3 510
Vanderkloof	Hydro-electric	Petrusville	2 x 110	220	220
Wilge	Coal fired	Witbank	2 x 30; 3 x 60	240	199
Total in service, 25 Eskom stations²				35 673	33 843⁸
Subtotal coal fired (17 stations) ⁴				31 413	29 673
Subtotal gas turbine (3 stations) ⁵				390	390
Subtotal hydro-electric (2 stations) ⁶				540	540
Subtotal pumped storage (2 stations) ⁷				1 400	1 400
Subtotal nuclear (1 station)				1 930	1 840
Total in service, 25 Eskom stations				35 673	33 843

1. Differences between generator rating and total station rating, and installed and sent-out rating reflect auxiliary power consumption and reduced capacity caused by age of the plant and/or low coal quality. 2. Dry-cooled unit specifications are based on design back-pressure and ambient air temperature. 3. Eskom has agreements to purchase electricity from SWAWEK, Tescor and some municipalities. 4. Base-load stations, except in the case of older, uneconomical plant, which are used only for peak demands or in emergencies. 5. Used only for peaking or in emergencies. 6. Use restricted to peaking and emergencies and availability of water in Hendrik Verwoerd and P.K. le Roux dams. 7. Pumped storage facilities are net users of electricity and are used for peaking. Water is pumped during off-peak periods to generate electricity during peak periods. 8. Of these 5 027 MW capacity was in reserve storage or mothballed.

3. Generating sets taken into service during 1990

	Total installed rating MW	Total sent-out rating MW
Lethabo, set 6	618	593
Matimba, set 5	665	615
Tutuka, set 6	609	585
Total	1 892	1 793

4. Generating sets on order at 31 December 1990

Name, type and location of power station	No. and installed rating of set MW	Sent-out rating of set MW	Total installed rating of station MW	Total sent-out rating of station MW	No. of sets in service (on order)	Total installed rating of sets on order	Total sent-out rating of sets on order	Year of completion first (last) set
Kendal, coal fired, Kendal	6x686	640	4 116	3 840	1 (5)	3 430	3 200	1988 (1993)
Majuba, coal fired, Volksrust	3x657 3x711	3x612 3x667	4 104	3 837	0 (6)	4 104	3 837	1996 (2001)
Matimba, coal fired, Ellisras	6x665	615	3 990	3 690	5 (1)	665	615	1987 (1991)
Total generating sets on order						8 199	7 652	

Dates on which sets on order will be taken into commercial service may change, depending on growth in electricity demand.

TABLES

5. Transmission and distribution equipment in service at 31 December 1990

		1990	1989	Change
Main transmission system, km	765 kV ¹	871	871	0
	533 kV DC	1 030	1 030	0
	400 kV	12 344	11 789	555
	275 kV	6 994	6 945	50
	220 kV	1 239	1 239	0
Distribution lines, km	165 – 132 kV	16 358	16 107	251
	88 – 33 kV	20 996	20 824	172
Reticulation lines, km	22 kV – lower	160 280	153 309	6 970
Total all lines, km		220 112	212 114	7 998
Cables, km	165 – 132 kV	67	67	0
	88 – 33 kV	341	345	-4
	22 kV – lower	4 371	4 257 ²	114
Total all cables, km		4 779	4 669	110
Transformers	Capacity MVA	146 697	142 352	4 345
	Number	129 394	122 680	6 714

1. Although two lines are constructed at 765 kV, only one runs at this voltage, and the other at 400 kV.

2. Adjusted figure.

6. Sales of electricity to categories of customers

Category	Number of customers	GW.h sold		Increase % 89 – 90	Average yearly % increase 86 – 90	Average price c/kW.h sold	
		1990	1989			1990	1989
Bulk	673	59 076	54 422	8,5	9,5	7,636	6,675
Domestic and street lighting	111 696	1 081	1 221	-11,4	-2,1	14,600	12,376
Commercial	11 948	340	368	-7,5	—*	12,797	11,222
Industrial	2 599	34 152	35 452	-3,7	—*	7,364	6,502
Mining	592	33 363	34 661	-3,7	1,6	7,575	6,663
Rural/farming	114 746	3 641	3 438	5,9	—*	14,465	12,562
Traction	32	3 958	4 229	-6,4	-2,9	10,414	9,076
Own usage	306	557	556	0,3	—*	7,594	2,872
	242 592	136 168	134 347	1,4	3,9	7,884	6,901

* Basis of sales to the industrial category has changed, which distorts comparisons. Usage on Eskom distribution premises, internal sales to other BUs and also sales to rural and commercial customers previously included under industrial sales, are now also listed separately.