Escom provides more than 93 per cent of the electricity consumed in South Africa, which is just under 60 per cent of the electricity used on the entire African continent. The growth in the demand for electricity indicates that Escom will have to double its present installed capacity of 16 000 MW by the end of the 1980s.

Electricity Supply Commission

Megawatt Park, Maxwell Drive, Sandton

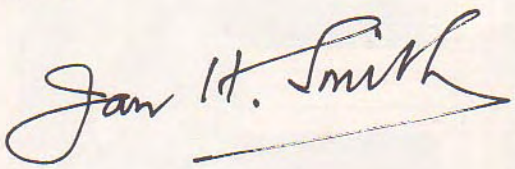
The Minister of Industries and of
Commerce and Consumer Affairs
Parliament
Cape Town

3 April 1980

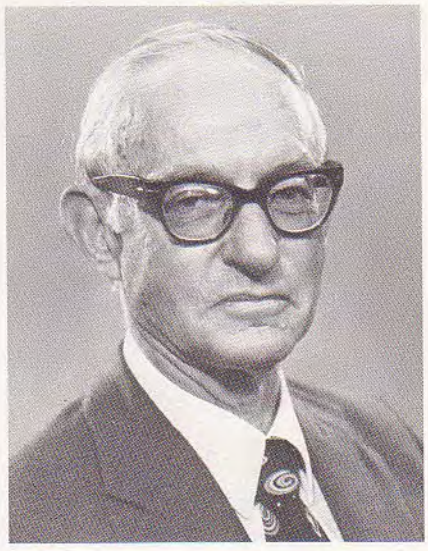
Sir

As required by Section 19 of the Electricity Act, 1958, the Commission has the honour of presenting its fifty-seventh Annual Report and Financial Statements covering its work for the financial year ended 31 December 1979.

During the year under review, my predecessor, Dr. R. L. Straszacker, was in office.

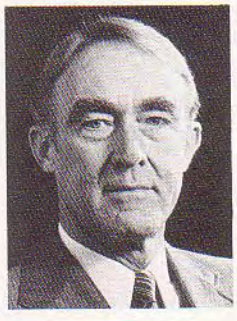


Members of the Commission



Chairman
Dr. R. L. Straszacker

Dr. A. J. du Toit



D. J. Malan

E. Pavitt

Jan H. Smith

Dr. H. J. J. Reynders
(until 3 October 1979)

Prof. G. Marais

In view of the retirement of Dr. R. L. Straszacker on 18 February 1980, the State President appointed the General Manager, Mr. Jan H. Smith, as Chairman of the Commission.

Retirement of Dr. R. L. Straszacker

Dr. R. L. Straszacker retired as Chairman of the Electricity Supply Commission on 18 February 1980. His association with Escom began in 1952 when he was appointed a member of the Commission; ten years later, in 1962, he became its fourth Chairman.

Escom is indeed privileged to have had, for so many years, a leader of the stature of Dr. Straszacker. A distinguished engineer and academic when he joined the Commission, he had a thorough knowledge of the technical challenges confronting Escom; he combined this with an equally intimate knowledge of the economic environment in which Escom operates. But above all, as a man of vision, he understood the importance of electricity to the development of South Africa, and unfalteringly took up the challenges related to this development. Under his leadership Escom became one of the world's largest electric utilities, operating a technologically advanced supply and distribution system.

Dr. Straszacker is one of the outstanding men of our time. His contribution to South Africa extends far beyond the confines of electricity supply. Through the years he has served on numerous councils, commissions and committees in the business, scientific and educational spheres.

In recognition of his exceptional contribution to South Africa, Dr. Straszacker received the Decoration for Meritorious Service from the State President.

It is with regret that we take leave of him. Of his 70 years, 28 were devoted to Escom, and for this we are most thankful. I should like to record here the sincere appreciation of the Commission, the Management and Staff of Escom as well as my own, for the outstanding service he has rendered Escom.

Jan H. Smith
Chairman

Members of the Management Committee

General Manager
Jan H. Smith
Pr. Eng.,
M.A. (Oxon),
B.Sc. (Oxon),
B.Sc. (Eng.)
(Cape Town)

Assistant General Manager
I. D. van der Walt
Pr. Eng.,
B.Sc. (Elec. Eng.),
B.Sc. (Mech. Eng.)
(Witwatersrand)

Senior Manager (Operations)
I. C. McRae
Pr. Eng.,
B.Sc. (Eng.)
(Witwatersrand)

Senior Manager (New Works)
J. L. Rothman
Pr. Eng., B.Sc.,
B.Sc. (Eng.)
(Stellenbosch)

Commercial Manager
A. J. Levy
Pr. Eng.,
B.Sc. (Eng.)
(Witwatersrand)

Administrative Manager and Chief Legal Adviser
P. J. T. Oosthuizen
B.A., LL.B.
(U.O.F.S.)

Production Assets Manager
G. A. Park
Pr. Eng.,
B.Sc. (Eng.)
(Witwatersrand)

Financial Manager
L. te Groen
B.Com.
(Witwatersrand),
C.A. (S.A.)

Personnel Manager
F. J. W. Barnard
(from 1 August 1979)
Pr. Eng.,
B.Sc. (Eng.) (Stel.),
M.B.L. (UNISA)

Until 31 July 1979
J. L. van der Walt
Pr. Eng.,
B.Sc. (Eng.)
(Witwatersrand),
B. Admin.
(UNISA)

With the appointment of Mr. Jan H. Smith as Chairman, the Assistant General Manager, Mr. I. D. van der Walt, has been appointed Senior General Manager with effect from 19 February 1980.

Regional Managers

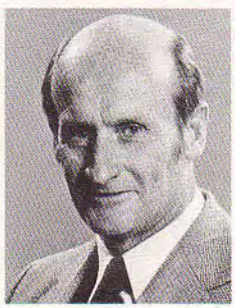
Rand and Orange Free State Region
M. W. Walter
(from 1 April 1979)
Pr. Eng.,
B.Sc. (Eng.) (Natal)

Until 31 March 1979
F. J. W. Barnard
Pr. Eng.,
B.Sc. (Eng.) (Stel.),
M.B.L. (UNISA)

Western Cape Region
R. P. A. Myburgh
Pr. Eng.,
B.Sc. (Eng.)
(Cape Town)

Eastern Transvaal Region
T. P. O'Connor
Pr. Eng.,
B.Sc. (Eng.) (Natal)

Eastern Cape Region (including Border, Cape Eastern and Orange River Undertakings)
E. F. Otten
Pr. Eng.,
B.Sc. (Eng.)
(Witwatersrand)

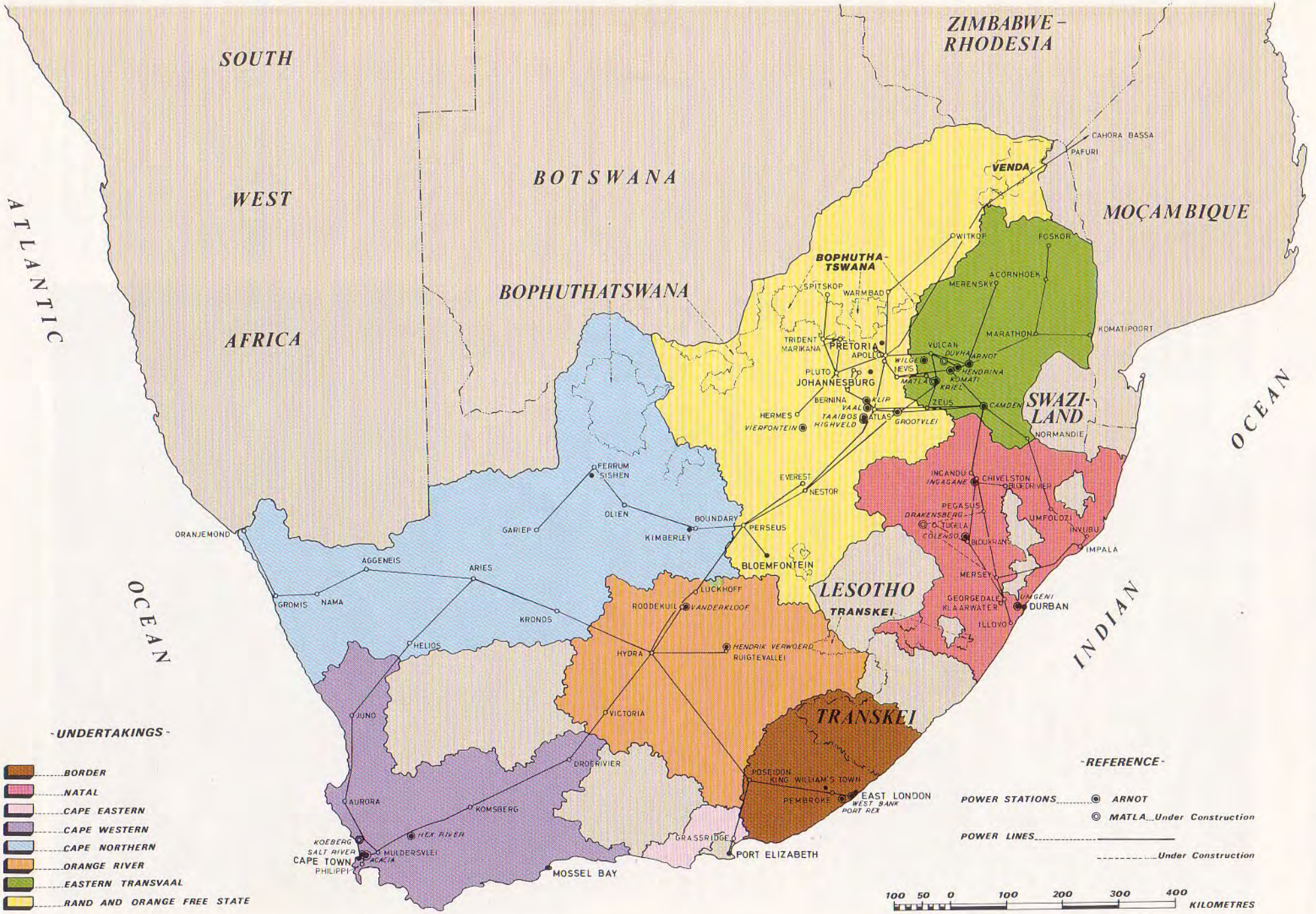


Northern Cape Region
J. P. Rodger
Pr. Eng.,
B.Sc. (Eng.)
(Cape Town)

Natal Region
H. E. Wohlberg
Pr. Eng.,
B.Sc. (Eng.)
(Stellenbosch)

Contents

Escom map showing undertakings and national grid

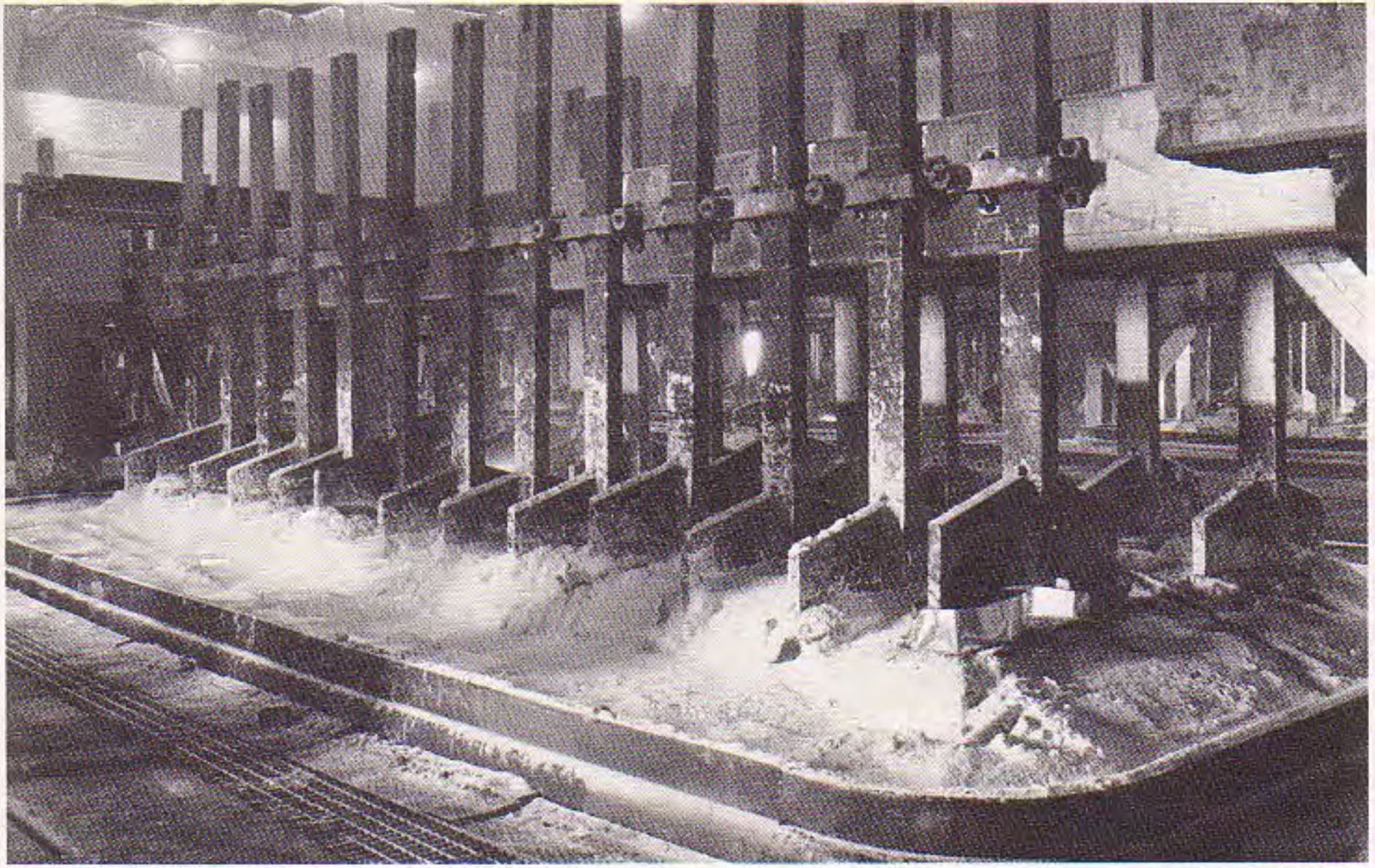


The role of Escom in South Africa

Escom was established as an electric utility by the passing of the Electricity Act No. 42 of 1922. The intervening 57 years have witnessed a proud record of service to South Africa during a period in the country's history when there have been substantial social, economic and political changes.

Escom's primary objective is to provide an abundant supply of electricity at cost wherever it can be used for the economic advancement of the Republic of South Africa. The organisational structure of Escom has been designed to permit the optimal attainment of this objective by ensuring that all sectors of the economy and all geographical areas of the country can contribute to its management. Care has also been taken to represent the major disciplines, both technical and business orientated, in the internal management hierarchy.

The management of Escom vests in a board of seven commissioners appointed by the State President for their knowledge of, and experience in, the various sectors of the economy and in electricity supply. Until 18 February 1980, the Chairman and General Manager were assisted in the daily running of the organisation by a management committee of eight full-time Escom employees. Organisational changes have since been introduced and the Chairman is now assisted by a Senior General Manager and he in turn by a management committee consisting of three general managers and other corporate managers. The



Aluminium factory, served by Escom. Electricity constitutes nearly 20 per cent of the total net energy usage in South Africa. With the increasing cost of other energy sources, this figure is expected to double by the end of the century.

corporate head office is at Megawatt Park, Sandton.

Escom is further divided into six regions for administrative purposes, each headed by a regional manager, who is responsible for the operation of power stations and the distribution systems in his region. There are regional head offices in Cape Town, East London, Durban, Witbank, Johannesburg and Kimberley. For accounting purposes the territory served by Escom is divided into eight distribution undertakings, each of which is a licensed area of supply.

Because of its importance to the Republic, Escom is required in terms of the Electricity Act to submit a report to the Minister of Industries and of Commerce and Consumer Affairs before the end of April each year. The report is tabled in Parliament.

Interaction with the economy

Escom's major direct contribution to the economy is the provision of over 93 per cent of all electricity consumed in the Republic (or just under 60 per cent of all electricity used in Africa). The 7 per cent not supplied by Escom is generated by some mines, industries and by a number of municipalities (which operate their own power stations but often also buy electricity in bulk from Escom to supplement their requirements).

It is estimated that electrical energy constitutes nearly 20 per cent of the total net energy usage in South Africa. With the increasing cost of other energy sources, notably oil, it is expected that Escom will have to supply about 40 per cent of the country's total net energy requirement by the turn of the century. This is a considerable increase over the figure of 7,5 per cent in 1950.

In addition to its direct contribution to the economy, Escom indirectly promotes the economic well-being of the country by purchasing goods and services from local suppliers. In so doing it acts as a stimulus to the economy during the cyclical troughs in the business cycle. This is particularly true of the civil and heavy engineering sectors; these can be fed a reasonably constant amount of work because the long lead times associated with Escom's capital projects imply that short-lived fluctuations should not affect its capital expansion programme.

Besides the obvious financial benefits of Escom's capital expenditure programme, employment is provided to thousands of people. The balance of payments is also favourably affected by the inflow of foreign capital which is used extensively to finance new projects.

In all, an adequate and firm supply of electricity is a factor on which this country's business planners can rely.

Financing of Escom

The financing of Escom resembles that of most business organisations, but there is no share capital. Capital expenditure and loan repayments are financed from internal and external sources. The manner in which this is done is prescribed by the Electricity Act.

External finance is obtained by raising loans on local and overseas capital markets, and through trade finance arranged in conjunction with suppliers of capital equipment. While most of the external finance is used to fund capital expenditure, a proportion is used to refinance loans which are of too short a duration to be amortised over their lives without undue strain being placed on electricity tariffs.

Internal finance, which is obtained by the retention of tariff income, is the only other source of funds available to Escom. In contrast to most

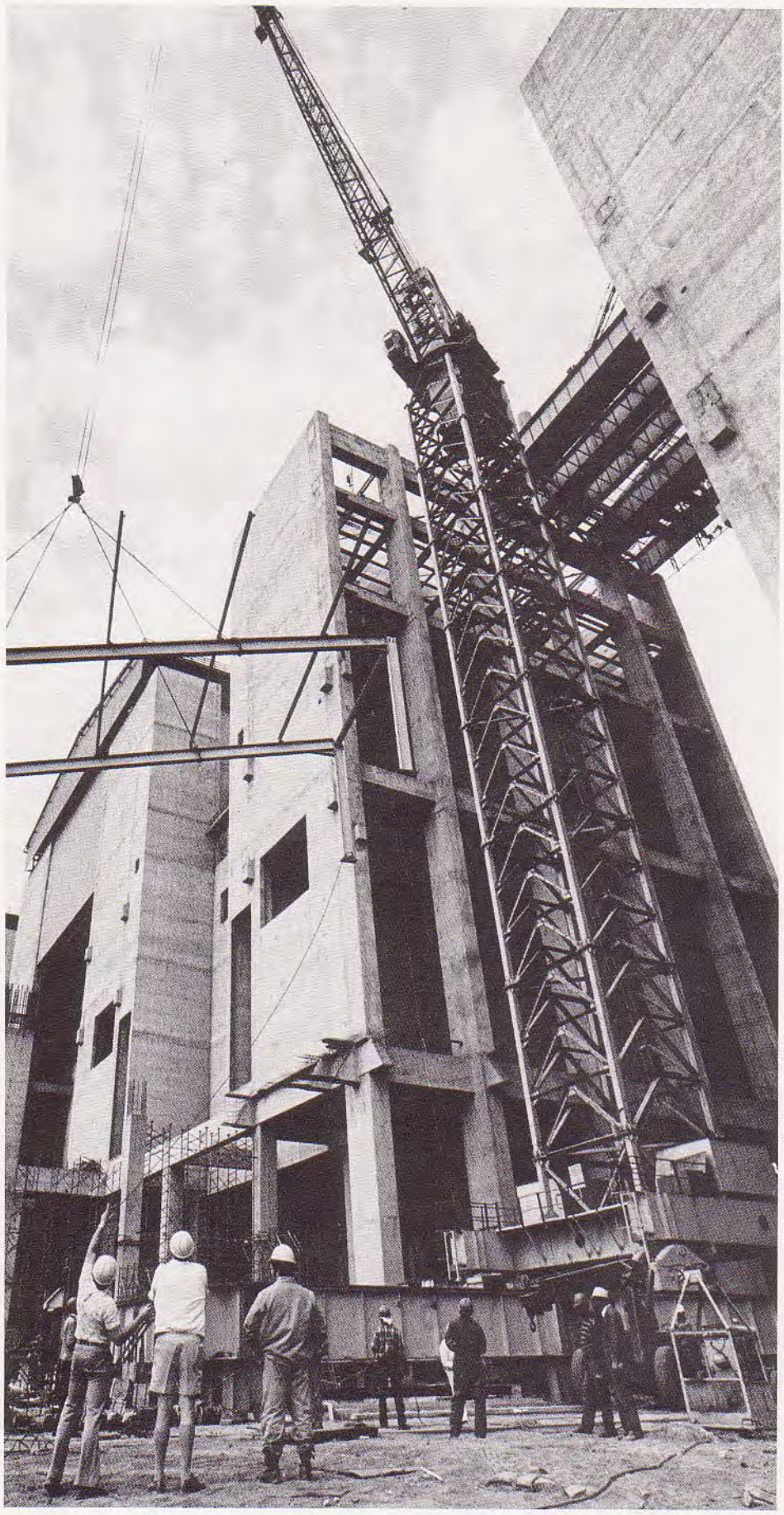
companies, Escom does not depreciate its fixed assets but instead it amortises the loans used to finance them. The amortisation of local loans is achieved on a sinking fund basis through the Redemption Fund. Contributions from tariff income are credited to the Fund and these, together with income from investments of the Fund, ensure that sufficient finance is available for the redemption of local loans. Separate provision is made for the repayment of foreign loans. Together with the Redemption Fund (which is akin to a depreciation reserve), Escom has the Capital Development Fund (used to finance part of its capital expenditure) and the Reserve Fund. The moneys in these three funds are invested either in Escom stock or in other prescribed investments, and the interest earned thereon provides additional finance.

The largest source of internal finance available to Escom is the Capital Development Fund. Amounts of up to 6 per cent of Escom's unredeemed loans at the end of each year may be set aside annually to this Fund and the Reserve Fund.

The Reserve Fund is used for the replacement of obsolete plant and machinery, and generally for the betterment of plant, exceptional repairs or emergencies. It is also used to a limited extent for self-insurance purposes, thereby reducing expenditure on insurance premiums.

Escom is an important borrower in the local capital market and, to a lesser extent, in the foreign capital market. It currently makes two local public issues a year, usually in April and October. It also makes use of foreign finance in the form of import financing facilities, direct placements and syndicated bank loans.

Over several years Escom has developed and promoted an active secondary market in its local registered stock which is actively traded on the Johannesburg Stock Exchange. Because its internal funds are invested primarily in its own stock, Escom is able to buy and sell such stock on behalf of these funds. In the immediate past years this operation has been an additional source of finance for Escom, the internal funds having been net sellers of Escom stock. The proceeds from these sales are reinvested by Escom on behalf of its funds in new issues.



Matla, a 3 600 MW coal-fired power station now being built on the eastern Transvaal highveld. The size of Escom's operations enables it to construct very large plant with concomitant economies of scale.

Kriel, believed to be the third largest coal-fired power station in the world, became fully operational in 1979. Planning for this 3 000 MW station began in the late 1960s and construction started in 1970. Because of the long lead times before a big, modern station is fully operational – nearly 14 years in the case of Kriel – Escom maintains development even during troughs in the business cycle.

Statistical highlights

Operating statistics for the year

Escom's share of electricity sent out in the Republic of South Africa	93,3 per cent
Total electricity sent out by Escom	86 037 million kW.h
From Escom power stations	75 643 million kW.h
From other sources (Cahora Bassa and Paul Sauer power stations)	10 394 million kW.h
Total electricity sold by Escom	80 583 million kW.h
Total coal burnt in Escom power stations	43 265 000 tons
Total water consumed in Escom power stations	206 318 megalitres
Maximum demand on the integrated Escom system (26 July 1979)	12 855 MW

Escom plant in service at 31 December 1979

Total nominal generating capacity:

179 boilers with a total steam-raising output of 16 206 kg/s

143 turbo-generators, including gas-turbine and hydro-sets, with a total power output of 15 974 MW

Major overhead transmission lines:

Direct current:

533 kV (monopolar)	1 030 km

Alternating current:

400 kV	7 412 km
275 kV	5 981 km
220 kV	965 km
132-165 kV	12 421 km
88 kV and below	82 892 km

Underground cables:

132 kV	20 km
33-88 kV	401 km
22 kV and below	6 900 km
Capacity of transformers	114 343 MVA

Financial

Total revenue for the year	R1 529,5 million
Total charges against revenue for the year	R1 511,7 million
Expenditure on fixed assets during the year	R1 374,6 million
Total fixed assets at 31 December 1979	R6 793,7 million
Average cost per kW.h sold	1,876 cents
Average price per kW.h sold	1,898 cents

Total staff employed at 31 December 1979	43 690

Chairman's review

The Sishen/Saldanha electric traction system came into full operation last year; increased electrification of railways is saving the country millions of litres of diesel fuel. The substitution of electricity for oil is also taking place in diverse industrial and other applications.

Economic upswing confirmed by electricity sales

The growth of 10,7 per cent in kilowatt-hours of electricity sold in 1979 is a clear indication that the South African economy has firmly entered a period of economic expansion, the early phases of which were evident in 1978 when a growth rate of 8,4 per cent was recorded over electricity sold in 1977.

Total revenue in 1979 amounted to R1 529,5 million, as opposed to R1 301,8 million in 1978. Total charges against revenue were R1 511,7 million, compared to R1 234,5 million the previous year.

Sales of Escom power rose from 72 780 million kW.h in 1978 to 80 583 million kW.h in 1979. On only five occasions during the past 30 years – in 1950, 1954, 1955, 1973 and 1974 – has Escom recorded a higher annual growth rate in electricity sales, and the 1979 figure is all the more remarkable inasmuch as it represents a dramatic recovery in sales from the modest 5,9 per cent growth in 1977, the lowest figure recorded over the past 15 years.

During the year the maximum demand on the integrated Escom system increased by 11,9 per cent (7 per cent in 1978) from 11 490 MW to 12 855 MW. Plant with a generating capacity of 1 600 MW, a record for any year, was taken into service during 1979, bringing Escom's total installed capacity at the year end to 15 974 MW, excluding the firm capacity of 1 384 MW available from Cahora Bassa.

Both in 1978 and in 1979 the actual growth in the sales of electricity exceeded the anticipated growth, with the result that Escom recorded a surplus in revenue at the end of both years (R61,8 million in 1978; R17,8 million in 1979). These surpluses, in turn, have helped Escom to defer tariff adjustments until 1 July 1980 in all but one of its eight distribution undertakings; a nominal tariff increase of 5,5 per cent, effective from January 1980, was announced in 1979 to offset the deficit accumulated in the Orange River Undertaking. The July 1980 adjustments, necessary if we are to avoid major increases in 1981, affect all eight of Escom's undertakings. Increases average 7,3 per cent for the whole of Escom, and are well below the current inflation rate.

It is important to note that we were able to meet the increased demand for electricity without holding back the present economic upswing through insufficient supplies. This was achieved despite pressure on Escom to reduce its expansion programme and cut its expenditure when the South African economy entered a downward phase in the mid-1970s. Escom then had to burden the consumer to help pay for expansion, because overseas loan capital had become difficult to obtain. Today, less than five years later, the consumer and the country in general are reaping the benefits of a step which was unpopular at the time, but of which the inevitability can only now be fully appreciated.

These events again indicate the complexity of electricity supply today and the long-term nature of our business. If we are to secure sufficient supplies of electricity at all times, we cannot enter into popular but short-term solutions which might ease the burden of increased electricity tariffs for some time, but which would quickly create severe restrictions to economic expansion in the medium and long term.

The truth of the matter is that, had Escom curtailed its expansion programme, we would by now be experiencing serious supply problems. With the long lead time required before a new power station can come on stream, these problems would take many years to rectify.

Growth broadly based

The growth in the demand for electricity in 1979 was broadly based, indicating that the upswing is not restricted to one particular component of the economy. Increased sales were recorded in each of Escom's consumer categories.

The highest growth rate was in the industrial category, namely 13,6 per cent (12,1 per cent in 1978). The mining category achieved a growth rate of 8 per cent (10,3 per cent in 1978), while sales to municipal supply authorities increased by 10,5 per cent (4,7 per cent in 1978). Traction, a smaller category representing about 5 per cent of Escom's total demand, increased by 12,5 per cent (2,2 per cent in 1978), while the category domestic and street lighting, representing less than 2 per cent of Escom's total

demand, showed a "negative" growth rate of 2,1 per cent (a negative growth rate of 6,8 per cent was also recorded in 1978). Escom's number of domestic consumers has decreased over the past few years following our policy of handing-over urban reticulation systems to municipalities wherever practical; in addition certain domestic users have been reclassified as industrial consumers.

Escom's electricity sales, expressed regionally, indicate that the economic upswing is also geographically broadly based.

In the Cape Northern Undertaking, electricity sales increased by 22,3 per cent, while a growth rate of 16,3 per cent was recorded in the Eastern Transvaal Undertaking. The Rand and Orange Free State Undertaking, Escom's largest distribution undertaking, showed an increase in sales of 9,4 per cent in 1979. In the Cape Western Undertaking electricity sales recovered in 1979 with a growth rate of 7,2 per cent, while the Natal Undertaking's sales grew by 10,7 per cent. In the Orange River Undertaking, sales grew by 12,0 per cent and in Border Undertaking by 6,1 per cent in the year under review. There was a marginal increase in the Cape Eastern Undertaking; this is a very small undertaking serving a predominantly rural area.

Escom's contribution to the economy

For many years there has been a very stable relationship between the growth of the economy and its net energy input – the so-called "energy intensity" of the economy. Escom plays an

important role in promoting the economic advancement of the nation by supplying a cheap and reliable supply of nearly 20 per cent of the energy required for the prosperity of all the peoples of South Africa.

Besides an estimated direct contribution of 3 per cent to the gross domestic product, Escom makes an important indirect contribution to economic activity through its ongoing capital expansion programme, by providing both direct and indirect employment and by its purchases of consumables such as coal, water and other inputs for the electricity production process. There is also the unquantifiable contribution which Escom makes to the mining, chemical, textile and iron and steel sectors and to the South African Railways – these sectors together account for almost 60 per cent of Escom's sales. Although expenditure on electricity by these sectors is relatively small compared to their total costs, electricity is an essential input.

Approximately 70 per cent of Escom's annual capital expenditure is incurred locally. Because of the steady phasing of capital expenditure through the long lead times associated with the design and construction of new power stations, Escom partially damps the severity of fluctuations in gross domestic fixed investment and thereby promotes stability in the engineering and other related sectors. For example, if Escom's domestic capital expenditure in 1977 had paralleled the downturn experienced by the rest of the economy, it has been estimated that the real economic growth rate in that year would have been 0,4 per cent lower.

In 1978, the most recent year for which reliable data is available,

Escom's local domestic capital expenditure on new buildings, civil works, transport equipment and machinery amounted to 4 per cent, 2 per cent, 1 per cent and 20 per cent respectively of the total national investment in these categories. At present Escom purchases more than 40 per cent of South African coal production. This coal is mainly of a low grade for which there is little other commercial use.

Through the years Escom has actively encouraged the development of the local manufacturing industry by giving preference to goods with a high local content.

Apart from the obvious economic attractions to these sectors of such expenditure, there is the added benefit of employment amounting to an estimated 2 per cent of the total non-agricultural labour force. In all, Escom is responsible for the employment of some 140 000 persons, either directly or indirectly.

A further aspect of Escom's role in the South African economy and one which is often not fully appreciated, is the provision of electricity supplies to remote areas. In this way Escom actively assists in the infrastructural development of South Africa and facilitates decentralised economic development.

Complexity of expansion

Planning to meet future electricity demand is an ongoing process. Projections are reviewed annually and programmes adapted accordingly. The growth rate in the demand for electricity has consistently been about 4 per cent above that of the national

Although the actual growth in electricity sales in both 1978 and 1979 was higher than anticipated, Escom could meet this demand and did not hold back the economic upswing through insufficient supplies of electricity.

Through the provision of electricity to remote areas, Escom facilitates decentralised economic development. Escom power plays, for example, an important role in exploiting the mineral wealth of the remote North-Western Cape, such as at this mining complex near Aggeneis.

economy. Because this situation is likely to persist, Escom will have to double its generating capacity every eight to ten years. While this feat was often performed in the past, the effects were less noticeable when our generating capacity was relatively small. Today, however, with a capacity of about 16 000 MW, a doubling represents a management, financial, technological and manpower challenge unequalled in the history of Escom. It means that what we have achieved over the past 57 years will have to be equalled in a fraction of that time.

Unlike many companies, whose expansion programmes can be accelerated, slowed down or stopped to coordinate more closely with the economic climate at any particular time, Escom has to expand its supply in terms of a sustained development plan. We are, therefore, constantly implementing expansion programmes, and because of the long lead time of eight to ten years to provide new generating capacity, we have to continue with such programmes even in times when there is little real growth in the national economy.

This situation often leads to public concern over Escom spending, sometimes imagined as being grandiose.

Escom understands this concern. It is difficult for any consumer, already burdened with electricity prices which although low by world standards are considerably higher than they were some years ago, to be confronted with expansion programmes requiring vast sums of money. Most people cannot comment on the merits of new power stations costing thousands of millions of rand, and their concern is often expressed in the form of searching for smaller, tangible proof that Escom is indeed wasteful in its ways, such as with the work environment and facilities for staff. The aim with these amenities is, however, to help Escom retain present staff and attract new employees from a highly competitive manpower market; they must therefore be seen as part of our total remuneration package. Theoretically such amenities would add to the cost of electricity, but only marginally so. Yet, if they allow us to retain and attract suitable staff, these costs are more than adequately recovered in terms of superior work output.

Power for the 1980s

For Escom to double its present generating capacity by the end of the 1980s, some R11 000 million will have to be spent. Details of this programme were announced late in 1979. Apart from the generating plant with a total capacity of 9 444 MW under construction or on order at the end of 1979, this programme includes the erection of three large coal-fired power stations, a pumped storage facility, extension of our head office building at Megawatt Park, and the establishment of an Escom training college.

These developments must not be seen as a unique programme reflecting unprecedented growth, but as part of a natural and continuous process which has always been part of Escom's activities and which will continue for as long as the demand for electricity grows. And although many people have in the past been inclined to view South Africa as a developed nation, we are very much a developing country in terms of our total population. This offers tremendous

and exciting prospects for the future, in which electricity supply will play a major role in developing the full potential of our country and its people.

Greater financial independence

South Africa is poised for a period of sustained growth. Escom will have to expand ahead of the national economy if it is to provide sufficient supplies of electricity. I do not, however, foresee that Escom will have to burden the consumer additionally to finance its expansion.

This situation is the result of Escom's determined endeavours to be financially more independent of short-term economic and political influences, both internally and overseas. This means that we can function in close cooperation with the State, as we should, but without being a burden to it or to the taxpayer. Further, we can provide South Africa with a service essential to everybody in the country, but which is less exposed to influences – both local and overseas – that may not be in the interest of electricity supply in the longer term.

The price of greater financial independence was a series of tariff increases in 1976, 1977 and 1978 which exceeded the general rate of inflation in order to strengthen our Capital Development Fund. Viewed in perspective, this was an investment – albeit forced on to the consumer – which is already paying handsome dividends in the form of assurance that this country will not run short of electricity in an energy-starved world.

Board of Trade and Industries investigation

During 1979 the report by the Board of Trade and Industries into the tariff policy and tariff structure in respect of the supply of electricity in South Africa was published. Escom has already acted on many of the recommendations which could be speedily implemented. Progress continues to be made on several other more complex changes which should be completed by early 1981.

Duvha, a 3 600 MW coal-fired power station under construction near Witbank. Power from here will be fed into Escom's national transmission grid, serving the entire subcontinent.

Contractors' boards at a construction site. Because Escom incurs about 70 per cent of its capital expenditure – R1 375 million in 1979 – locally, it acts as a constant stimulus to the South African economy and provides work – directly and indirectly – to more than 140 000 people.

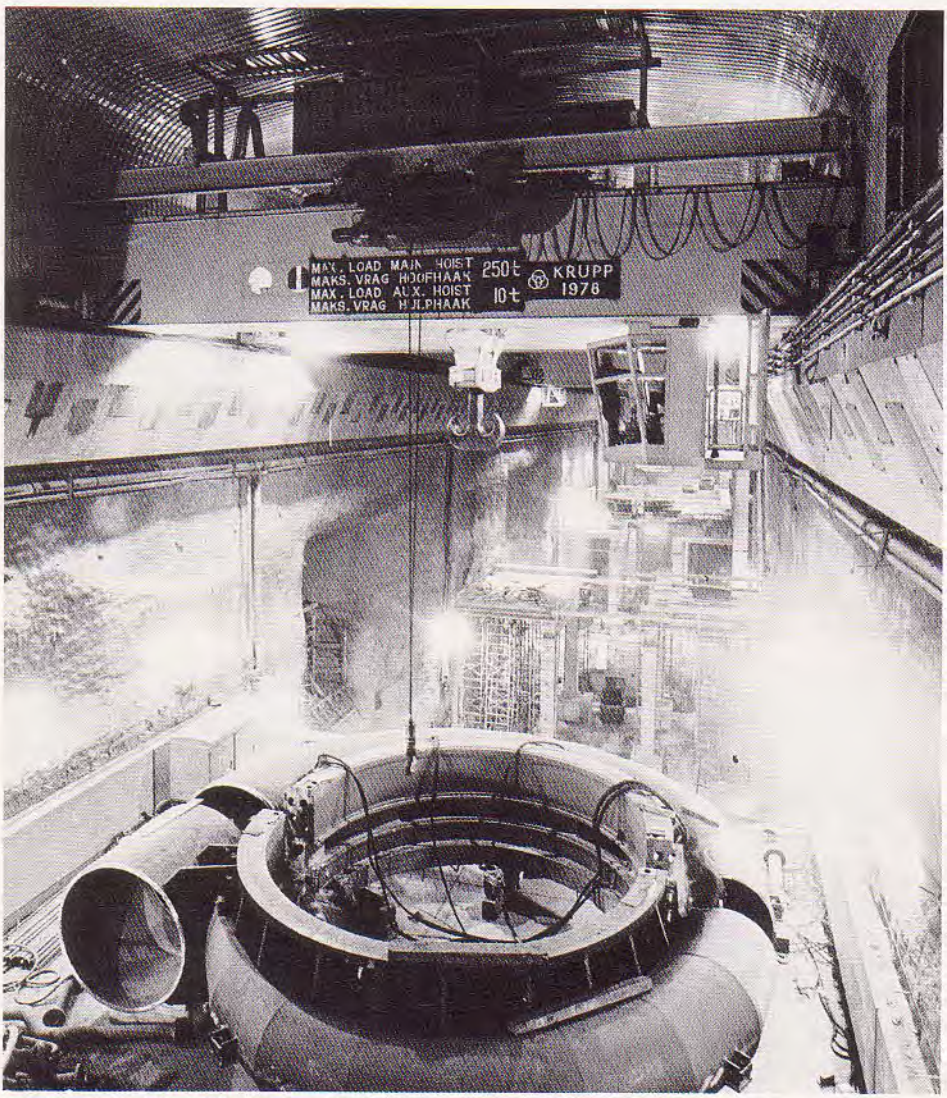
Cost of maintaining an electricity supply network

If an organisation is to continue to enjoy a sound financial structure, it has to ensure that it retains sufficient income with which to replace its assets at inflated prices when such replacement becomes necessary. The impact of inflation is extremely severe in the case of plant which has a long useful life. In short, profitability data derived without taking account of inflation is an overstatement of the real situation because the true cost for the usage of fixed assets has been ignored.

Depreciation based on the original or historical cost of assets does not make adequate provision for the replacement of such assets. In Escom, which invests in capital plant with an average useful life of 30 years, it is very difficult to ascribe a cost to the usage of its assets. If an annual inflation rate of 10 per cent prevails for 30 years, the historical cost of an asset is only 6 per cent of its replacement cost after 30 years. Clearly, if costs were to be based solely on historical prices paid many years ago, consumers today would not pay realistic tariffs in current terms.

It is therefore interesting to examine the tariff implications of Escom having to acquire its assets, in their actual condition of being partly used, at current prices and of having to finance this operation at the ruling rate of interest. To do this, the following assumptions have been made:

- The average useful life of assets in use is 30 years after which time they have negligible residual value;
- The current (1979) total capital cost



Machine hall of the 1 000 MW Drakensberg pumped storage scheme. Finance to build projects such as these is obtained by raising loans on the overseas and local capital markets, through trade finance arranged with suppliers of capital goods, and by the retention of tariff income.

(generation, transmission and distribution) of installing one kilowatt of capacity is R650;

- The average cost of finance raised in 1979 was 9,6 per cent. It is assumed that the interest burden would therefore have been 9,6 per cent of the replacement value of the assets in service in their present condition.
- Straight line depreciation is a reasonable measure of the cost of using the assets in the production of electricity.

The Income Statement would then read as follows:

	R000
Sales of electricity	1 529 474
Less operating costs . . .	668 268
	861 206
Less depreciation	343 568
Less interest	595 479
Loss for year	77 841

If the above "loss" of R77,8 million were to have been avoided, Escom would have had to raise its tariffs to a level of 5,1 per cent above those actually charged in 1979.

Major issues of the past

In the late 1940s Escom had a generating capacity of about 1 000 MW and provided just over 70 per cent of South Africa's electricity needs. Today, we have a generating capacity of about 16 000 MW and we supply over 93 per cent of South Africa's electricity requirements. In those early days we had about 9 000 employees as compared to nearly 44 000 in 1979.

Significantly, Escom expanded and developed with South Africa, always somewhat ahead, and was confronted with issues which have since been replaced by new priorities. But at the time, each was relevant and essential to sustained growth.

In the 1950s our preoccupation was with bringing sufficient supplies of electricity to the major load centres throughout the country. At the time, coal-fired power stations – small by today's standards – were built near such load centres and coal was transported over long distances to ensure a power supply.

By the 1960s technology had advanced sufficiently to enable us to build an integrated high-voltage network. It had become possible to

Komati, a 1 000 MW coal-fired station completed in the 1960s. Under inflationary conditions, the cost of replacing such a power station at the end of its useful lifetime of approximately thirty years can be more than 16 times its original cost. Recovery of only the historical cost of such fixed assets does not make adequate provision for financing their replacement.

Sharp rises in the price of liquid fuels have resulted in an unprecedented increase in applications for electricity from farmers and rural municipalities. It will take some time to connect all these applicants to the Escom system as numerous lines will have to be built. The work, however, is given priority where possible.

The 1980s will see the introduction of nuclear power in South Africa. Although this country has sufficient coal reserves, nuclear power offers a solution to the problem of major load centres far from the coalfields. Koeberg nuclear power station, now under construction north of Cape Town, will help to make the Western Cape more self-sufficient in its electricity requirements.

build bigger power stations on the coalfields and transport electricity by high-voltage transmission lines to load centres hundreds of kilometres away, reducing road and rail transport costs. As the load of the interconnected system grew, it became possible to construct very large power stations on the eastern Transvaal highveld and this resulted in savings of capital costs and skilled manpower, while increasing operating efficiencies.

By the 1970s we were importing hydro-power from Cahora Bassa in Mocambique; our extensive high-voltage transmission system was operational and the demand for electricity dictated a series of new, even bigger power stations. Nuclear power, as a solution to the problems of major load centres too far away from the coalfields, became a viable option.

Such was the demand for electricity that our operations started having an effect on the environment, and an issue

which was of minor concern to earlier generations now became a priority. The siting of power stations and power lines, in urban and rural areas, became a matter of consequence and our options were reduced, but not so the demand for more electricity. At the beginning of the 1970s it became clear that financing such vast expansion required special attention and this was an issue which dominated the last few years. The problem has largely been solved, although the consequences unavoidably mean that the era of artificially cheap electricity is over for ever.

As the decade drew to a close, the high price of liquid fuels caused an unprecedented spate of applications for electricity supply from farmers and smaller municipalities who had previously found it cheaper to generate power by means of diesel. While this additional demand for electricity is relatively small and can be met adequately by Escom, there is a problem inasmuch as these applicants are remotely situated in areas away from existing load centres. This means the planning and construction of numerous small lines, frequently in distant parts of the country, a process which unfortunately delays the linking up of these applicants to our system. At the moment, delays of up to two years may be expected. In addition, the high costs of this construction work have to be recovered from the new consumer and this invariably leads to a higher electricity price than in most other areas where the load density is greater.

While Escom's hands are bound in terms of its mandate stipulated by the Electricity Act, we are nevertheless concerned about this state of affairs. It is Escom's intention to make supplies available to these communities at the earliest possible dates.

New demands

Electricity supply is and always has been complex and capital intensive. Technology today is, however, a far cry from that in the industry as recently as 20 or even 10 years ago.

With this sophistication comes a new generation of issues and challenges which are inevitable if we are to produce electricity as cheaply as possible in a world where prices seem to go only in one direction. Hence,

whereas Escom had over the years developed into a predominantly technical organisation, the effectiveness of our electricity supply system will in future not be measured by its technical performance alone. There will also be increasing emphasis on broader management skills, methods to reduce costs, greater financial expertise, the environmental impact of our activities, and public interaction.

Undoubtedly the biggest issue confronting Escom now is the manpower shortage. Our future issues and problems can only be solved and overcome if we have personnel who can meet the challenges. Looking back towards the late 1940s we find that for every million kilowatt-hours of electricity sold, the services of 1,4 employees were required. In 1979 this figure was reduced to 0,5 per million kilowatt-hours. But while fewer employees today produce more electricity, the demands made on them are far greater.

For some years now the Commission has only with difficulty managed to recruit suitable staff and retain those already in its employ. Now, with the economy in an upward phase, we can expect the situation to deteriorate if adequate steps are not taken timeously. One of these measures is the establishment of an Escom College, announced during the year, which is to provide in-house staff training, essential if the full potential of all employees is to be developed.

On my retirement as Chairman of Escom, I should like to take this opportunity to wish my successor, Mr. Jan H. Smith, a long and successful term in office. Mr. Smith, who has been General Manager of Escom since 1971 and a member of the Commission since 1976, joined Escom in 1950 and has guided the organisation through a number of crucial issues over the years. Few people have his understanding and knowledge of the electricity supply industry, and it is with the greatest of confidence that I leave Escom in his hands.

I should also like to take this opportunity to thank my fellow Commission members, the Escom Management and Staff for their valuable support and assistance over the years. For me our association has been a rewarding and stimulating one.

Finally, my sincere thanks to the Government for having afforded me the privilege of serving Escom for so many years.

To meet the growing demand for electricity, Escom is giving top priority to its manpower position. While it is constantly recruiting employees from unskilled to graduate levels, it also has embarked on a programme to develop existing personnel to their full potential.

Report of the General Manager

Electricity sales

Over the 15 years from 1964 to 1979, Escom's electricity sales increased at an average rate of 9,3 per cent per annum. During this period the annual growth rates varied from 12,9 per cent in 1974 to 5,9 per cent in 1977. The onset of what promises to be a sustained economic upsurge is reflected in the 1978 growth of 8,4 per cent and the growth of 10,7 per cent experienced in 1979.

In each of the years 1978 and 1979 the actual growth in kilowatt-hours of sales exceeded Escom's expectations. Whilst this had a favourable impact on the trading results for the years concerned, it also underlines the importance of an adequate programme for the expansion of Escom's generating capacity to match the continued vigorous growth in the national demand for electricity.

A number of factors point towards a sustained high future growth rate in the national demand for electricity. Possibly amongst the most important of these is the high oil price and the consequent acceleration in the growth of the electricity component of total net energy consumption. The substitution of electricity for oil is taking place not only in the increased electrification of railways, but in diverse industrial and other applications.

The recent surge in the gold price has substantially improved not only the short term but also the longer term prospects of growth in electricity sales to the electricity-intensive gold mining industry. Other mining sectors, including coal, are also experiencing a new growth phase reflected in increased electricity demands.

There are continuing growth prospects in electricity-intensive industrial sectors such as ferro-alloy production. The oil-from-coal industry has become a major electricity consumer with large potential for growth in its electricity needs.

The impact of the electrification of Soweto and other Black townships will become apparent in the immediate future years. Escom has now been requested to provide a large power users supply to Soweto, which is expected to be in Escom's area of supply in future.

The promise of a sustained upswing in the economy is increasingly being realised, with the associated demand for electricity.

As shown in Table 1 supplies to industry have since 1975 represented the largest component of Escom's electricity sales, and in 1979 increased at the high rate of 13,6 per cent. The mix of industrial activity is changing towards more electricity-intensive sectors so that the growth in industrial electricity consumption is consistently and substantially higher than the increase in indices reflecting the physical volume of industrial production.

With favourable world market conditions, the ferro-alloy industry operated at near maximum capacity throughout the year 1979, and was amongst the most important contributors to the buoyant 1979 growth in the industrial demand for electricity. Growth prospects for this energy-intensive export-orientated industry remain promising and are favoured by electricity prices which are low in comparison with those in competing countries.

Approximately 30 per cent of Escom's total electricity sales are to municipal electricity undertakings and electricity supply authorities in neighbouring states (i.e. bulk sales). The larger part of these supplies is resold to the domestic consumers of the electricity supply authorities concerned, and the growth rate is therefore influenced by activity in the building sector. The 1979 growth rate of 10,5 per cent in Escom's sales to municipal electricity supply authorities (in comparison with 3,8 per cent in 1977 and 4,7 per cent in 1978) reflects the onset of a new growth phase in urban building activity which will be supported in the immediate future years by accelerated electrification in Black residential areas.

Mining accounts for 30 per cent of Escom's total electricity sales. As illustrated in Table 2 the gold and uranium sector remains overwhelmingly the largest consumer, while the high growth rates of the platinum, coal, iron and other sectors add to the longer term stable upward trend.

Electricity supplied for railway traction purposes increased by 12,5 per cent in 1979. This figure is well above the long term growth trend and was influenced by the commissioning of the Sishen/Saldanha electrified traction system and the electrification of the railway line from the Transvaal coalfields to Richards Bay harbour. The trend towards railway electrification is continuing and other major main line electrification projects are scheduled for the immediate future years.

During 1979 there was a decrease in the number of urban domestic consumers served directly by Escom. This resulted, inter alia, from Escom transferring its reticulation system serving the Randburg municipal area to the Randburg Municipality.

The third and final stage of the Cahora Bassa scheme became operational in 1979. A firm capacity of 1 384 MW is now available from this power station, which provided more than 10 000 million kW.h of energy to Escom during the year. Electricity is transmitted by way of 533 kV lines from Mocambique to South Africa.

Sales in Escom's undertakings

Electricity sales (in million kilowatt-hours) in Escom's distribution undertakings are summarised in Table 3. Exceptionally high 1979 growth rates were recorded in the Eastern Transvaal and Cape Northern undertakings.

The large increase of 22,3 per cent in sales of the Cape Northern Undertaking is mainly due to the expansion of the supply system to the Atlantic coast, the associated new and diversified mining development in that area and to the development of the Sishen-Saldanha railway line. On this line diesel traction was replaced by a fully electrified service early in 1979. As a result of the favourable domestic and export markets the diamond, copper, lead, silver, zinc, manganese, gypsum and lime mines increased their electricity consumption considerably. It is expected that this trend will continue.

The high growth figure of 16,3 per cent for the Eastern Transvaal Undertaking was the result of increased activity of the ferro-alloy industries, steel and ferro-chrome producers and the increase in supplies to most of the major towns, particularly Witbank. Coal mining generally continued to expand in the Highveld while the South African Railways will probably increase their electricity consumption.

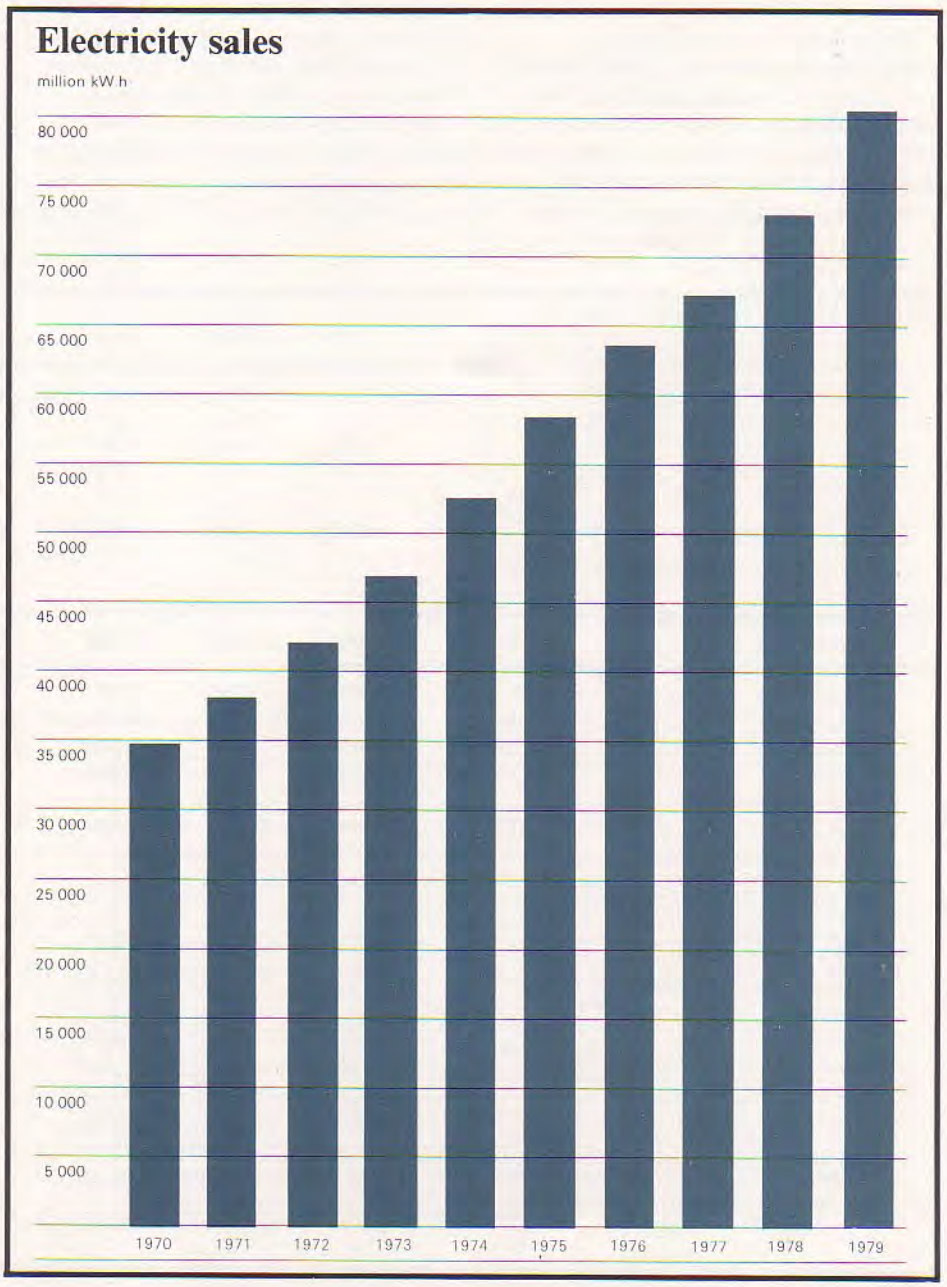
In the Natal Undertaking the increase in sales to the industrial and coal mining sectors stems from the demand for larger supplies of power, rather than for new supplies. It is expected that demand for electricity will increase substantially from the coal mining areas of northern Natal. Larger supplies are to be made available for reticulation in Black areas, such as Ozisweni in northern Natal, Ezikhaweni in Zululand and Witzieshoek in the Orange Free State.

In the Rand and O.F.S. Undertaking sales to the mining industry continued firmly upwards, and with gold topping 520 dollars an ounce at the year's end, the indications were that the mining industry would continue as a major factor in the Undertaking's sales growth. Traction sales to the South African Railways, bulk supplies to municipalities and other local authorities, and industrial sales, all showed substantial gains.

In the Cape Western Undertaking sales to traction stations of the South African Railways and to municipalities buying in bulk showed the highest growth rate, about 10 per cent. Cape Town Municipality was responsible for the major increase in bulk sales due to the night pumping load of the Steenbras pumped storage scheme. At year end, more than 4 000 new domestic consumers were connected, mainly in the Tygerberg municipalities. It is likely that domestic usage will increase further in 1980 as the building trade advances out of the recession of recent years.

The growth in sales to the Orange River Undertaking was mainly brought about by the 13,4 per cent increase in electricity sold to Port Elizabeth Municipality. In Border Undertaking growth was as anticipated, but in Cape Eastern Undertaking it was below expectations. In the former undertaking the electricity supply corporation of the Transkei commenced its hydro-generation during 1979 and in 1980 it will take over Escom's system from the Kei River to Umtata. It is foreseen that in the Orange River Undertaking sales will increase because of railway electrification and in the Cape Eastern system due to the extension of the Escom supply system from Humansdorp into the Langkloof.

Energy sent out to Escom's undertakings during 1979 amounted to 86 037 million kW.h (Table 5). This represents an increase of 10,5 per cent



over 1978 and is the highest growth in electricity demand since 1974. The energy supplied by Escom's own power stations rose by 6,7 per cent, the remainder being imports from Cahora Bassa (Statement 6 on page 64).

Rural applications

During the year 1 814 farm supplies were connected (Table 4). The high price of liquid fuels has resulted in a tremendous increase in rural applications for Escom power as this is now a less costly alternative. It is foreseen that this situation will continue in 1980 and Escom will have to deploy additional resources to meet this large number of applications as soon as possible.

In the Eastern Cape Region (comprising the Border, Cape Eastern and Orange River undertakings) the number of applications increased considerably. Supplies have been given to Hogsback and Elitha and to 77 farmers during 1979. Future projects

of this region include supplies to farmers in the Petrusville and Grahamstown areas and additional supplies in the Gamtoos Valley. Supplies will also be furnished to St. Francis Bay, Dordrecht, Aberdeen, Indwe, Strydenburg, Whittlesea and Sada.

In the Eastern Transvaal Undertaking the number of rural applications assumed unprecedented proportions. To deal adequately with the situation, construction teams are being diverted to rural work. During the year 298 farm supplies were connected.

In the Natal Undertaking there were equally pressing demands from farmers. Again there will be certain delays in making these supplies available, as many of them are coupled with strengthening the main supply system in the area. During the year, however, 334 farm supplies could be given.

In the Cape Western Undertaking the same phenomenon occurred. Applications for electricity rose sharply after June 1979 following the considerable increase in the price of diesel fuel to farmers. The applications came mainly from rural areas where there are no farmers' schemes. In rural areas where supply is available, requests were mainly for additional points, usually for pumps previously driven by diesel engines. The Ladismith farmers' scheme and Ladismith Municipality were given a supply in 1979.

Prior to June 1979 most applicants in the Rand and O.F.S. Undertaking within existing rural schemes or adjoining areas, could be provided with electricity within 12 months; construction of completely new rural schemes commenced about 12 months after the farmers had accepted a scheme. At the year's end it was estimated that if all applicants accepted terms it would take almost four years to clear the backlog with the present available resources. The Undertaking's rural planning and construction resources are therefore being rationalised to meet the challenges and every attempt is being made to supply applicants as soon as possible.

Numerous schemes are being

Table 1
Sales of electricity to categories of consumers

Category of supply	1974	1975	1976	1977	1978	1979	Percentage increase 1979/78	Average yearly increase over 5 years per cent
				Million kW.h				
*Sales to municipal supply authorities (bulk)	15 522	18 055	20 096	20 862	21 834	24 133	10,5	9,2
Direct supplies:								
Domestic and street lighting	909	1 014	1 132	**1 030	960	940	***–2,1	0,7
Industrial	16 105	18 049	19 907	21 586	24 182	27 475	13,6	11,3
Mining	16 941	17 444	18 746	20 139	22 219	24 000	8,0	7,2
Traction	3 108	3 307	3 475	3 508	3 586	4 035	12,5	5,4
Total	52 585	57 869	63 356	67 125	72 780	80 583	10,7	8,9
				Per cent of total				
*Sales to municipal supply authorities (bulk)	29,5	31,2	31,7	31,1	30,0	29,9		
Direct supplies:								
Domestic and street lighting	1,7	1,8	1,8	**1,6	1,4	1,2		
Industrial	30,7	31,2	31,4	32,1	33,2	34,1		
Mining	32,2	30,1	29,6	30,0	30,5	29,8		
Traction	5,9	5,7	5,5	5,2	4,9	5,0		
Total	100,0	100,0	100,0	100,0	100,0	100,0		

*This includes sales to electricity undertakings in neighbouring territories
**Change in definition of domestic use
***Drop in 1979 due to handing-over of Randburg distribution system to Randburg Municipality

launched in the Northern Cape Undertaking to supply groups of farmers in the Christiana, Jacobsdal, Douglas and Upington areas and possibly to include Carnarvon and Loxton. During the year 318 farm supplies were connected.

Tariffs

The 1979 average revenue per kilowatt-hour sold was 6,2 per cent higher than the figure for 1978. This is in marked contrast to the sharp rises which were necessary in 1976 and 1977 in order to

increase internal financing of capital expenditure to an acceptable level.

Since this level was achieved, tariff adjustments from 1978 onwards were, and should be, necessary only to cover the unavoidable escalation in operating and capital related costs whilst maintaining, but not increasing, the established adequate level of internal financing. In this connection, it is possible to confirm the view expressed by the Chairman in the Annual Report for 1978 that future tariff adjustments should not exceed the inflation rate. Regular annual tariff adjustments in line with unavoidable cost increases are imperative for the achievement of this objective.

It is Escom's normal practice to implement regular annual tariff adjustments with effect from January of the calendar year concerned, and to publish details of these tariff adjustments three months in advance. The 1979 increase of 6,2 per cent in the average revenue per kilowatt-hour sold (of which about 2 per cent is attributable to the increase in the cost of coal) thus followed on the tariff increases implemented with effect from January 1979.

Escom's tariff adjustments are aimed

Table 2
Sales of electricity to sectors of the mining industry, million kW.h

Mining category	1974	1975	1976	1977	1978	1979	Percentage increase 1979/78	Average yearly increase over 5 years per cent
Gold and uranium	12 803	13 108	13 918	14 708	16 241	17 201	5,9	6,1
Platinum	1 978	2 001	2 184	2 287	2 388	2 772	16,1	7,0
Coal	648	705	812	941	1 078	1 248	15,8	14,0
Copper	653	679	728	874	1 023	1 042	1,9	9,8
Diamonds	338	346	343	342	497	596	19,9	12,0
Asbestos	193	238	266	275	223	233	4,5	3,8
Iron	104	121	180	271	272	334	22,8	26,3
Chrome	52	42	61	84	106	126	18,9	19,4
Antimony	51	53	61	76	73	67	−8,2	5,6
Manganese	30	37	49	62	72	83	15,3	22,6
Other	91	114	144	219	246	298	21,1	26,8
Total	16 941	17 444	18 746	20 139	22 219	24 000	8,0	7,2

Table 3
Total electricity sales in Escom's undertakings, million kW.h

Undertaking	1974	1975	1976	1977	1978	1979	Percentage increase 1979/78	Average yearly increase over 5 years per cent
Border	551	598	675	727	779	826	6,1	8,4
Cape Eastern	11	13	14	22	30	30	—	22,2
Cape Northern	1 211	1 340	1 507	1 668	1 937	2 368	22,3	14,4
Cape Western	3 852	4 656	4 930	5 028	5 216	5 593	7,2	7,7
Eastern Transvaal	6 527	7 267	8 028	9 062	10 061	11 698	16,3	12,4
Natal	8 500	9 166	9 931	10 747	11 736	12 988	10,7	8,8
Orange River	786	915	1 035	1 037	1 047	1 173	12,0	8,3
Rand and O.F.S.	31 147	33 914	37 236	38 834	41 974	45 907	9,4	8,1
Total	52 585	57 869	63 356	67 125	72 780	80 583	10,7	8,9

Table 4
Total number of farm supplies at the year end

Undertaking	1974	1975	1976	1977	1978	1979	Percentage increase 1979/78	Average yearly increase over 5 years per cent
Border	773	805	864	940	1 000	1 054	5,4	6,4
Cape Eastern	475	511	525	512	521	535	2,7	2,4
Cape Northern	2 240	2 336	2 497	2 614	2 831	3 149	11,2	7,1
Cape Western	6 772	7 533	7 959	9 158	9 415	9 638	2,4	7,3
Eastern Transvaal	4 080	4 474	4 864	5 284	5 608	5 906	5,3	7,7
Natal	5 578	6 150	6 752	7 280	7 700	8 034	4,3	7,6
Orange River	137	173	197	207	225	234	4,0	11,3
Rand and O.F.S.	9 248	10 065	11 003	12 015	12 656	13 220	4,5	7,4
Total	29 303	32 047	34 661	38 010	39 956	41 770	4,5	7,3

at a balance between revenue and charges against revenue. Exact balance cannot, of course, be achieved in practice and buoyant economic conditions have led to an accumulated surplus which increased from R61,8 million in 1978 to R79,6 million at the end of 1979. In the light of this accumulated surplus the Commission decided that, despite rising costs, the next general upward adjustment of tariffs could be deferred to a date later than January 1980.

In the case of the Orange River Undertaking, however, a deficit has accumulated and the disparity between costs and income had so widened that the implementation of a nominal 5,5 per cent tariff increase in January 1980 became necessary to avoid disproportionate increases later.

Financial

Capital expenditure

The amount of R1 374,6 million expended on fixed assets during 1979 represented an increase of 10,3 per cent over the 1978 figure of R1 246,7 million and absorbed 70 per cent of the total funds flow for the year. With the exception of items of equipment, vehicles and furniture which are depreciated, Escom holds its fixed assets at cost in the books of account until they are decommissioned. Instead of depreciating such assets, it is our practice to amortise the loans used to finance them. This method of recovering the cost of capital expenditure applies to 99 per cent of

Escom's fixed assets.

At 31 December 1979 approximately 37 per cent of fixed assets were still in various stages of construction. This figure is higher than the 34 per cent in 1978, 32 per cent in 1977 and 28 per cent in 1976. Part of the reason for the increase lies in the fact that works under construction represent recent costs which, by virtue of sustained two digit inflation, are much higher than the cost of older assets which are still in commission.

Loans and capital markets

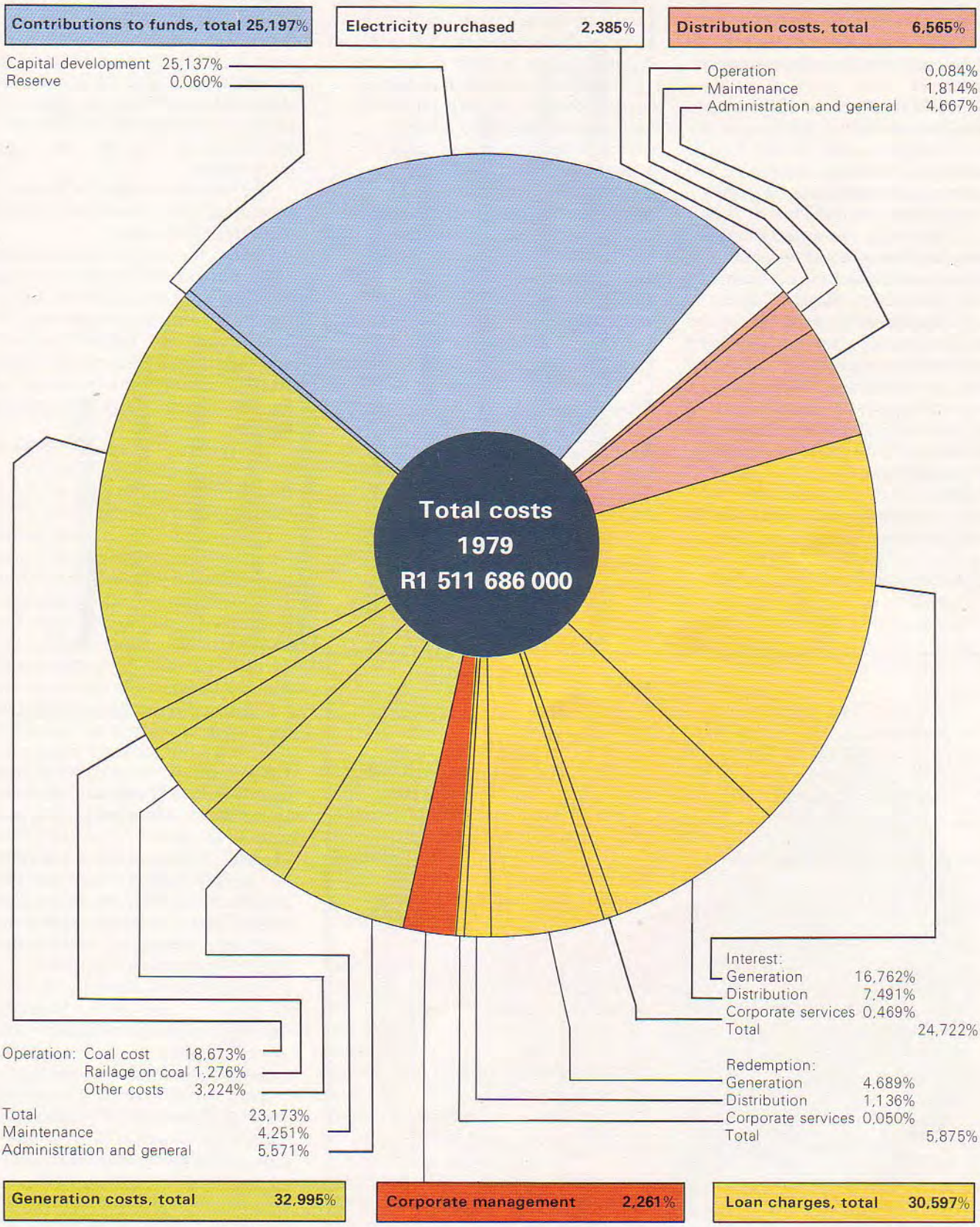
The favourable conditions on both the local and overseas capital markets in 1978 continued in 1979. Particularly gratifying was the sustained improvement in interest shown by overseas investors in Escom. Foreign financing increased from a modest 20 per cent of Escom's total funds requirement in 1977 to 31 per cent in 1978. By 1979 some 41 per cent of Escom's funds required to finance capital expenditure and loan repayments was of foreign origin. Approximately two-thirds of this finance was by way of import financing facilities and extended credit linked to capital projects. Much of this finance which is offered to Escom is for periods which are considerably longer than is commonly associated with project finance, and must therefore not be regarded as short term.

Local loans and increased net current liabilities provided 25 per cent (1978, 38 per cent) of total funds required. The improved availability of foreign finance enabled Escom to place a lesser demand on local financial

and money markets. In particular, net sales of internally registered Escom stock on the secondary market declined to R193 million (1978, R410 million). By reducing its withdrawal of funds from the local market, Escom contributed to the national economic revival by leaving more finance for use by entrepreneurs. Despite the approximate halving of proceeds from stock transactions, the nominal value of Escom traded stock increased by 32 per cent largely as a result of investors switching from short to long dated stocks. Besides being evidence of the marketability of Escom stock, this action has effectively increased the average term of Escom's debt and has strengthened the funding position. In addition to net sales of stocks on the secondary market, Escom raised R168 million in two highly successful primary issues in April and October. The South African capital market attaches considerable significance to Escom's traditional bi-annual appearances as a borrower and the interest rates associated with the issues are regarded as important indicators of the financial climate.

The final source of finance was generated internally via the statutory funds and depreciation charges on equipment, vehicles and furniture. This component increased marginally to 34 per cent (1978, 31 per cent) of total funds. The majority of the internal finance was obtained from the Capital Development Fund to which contributions from income of R380 million were made and which was credited with investment income of R111 million.

Breakdown of costs

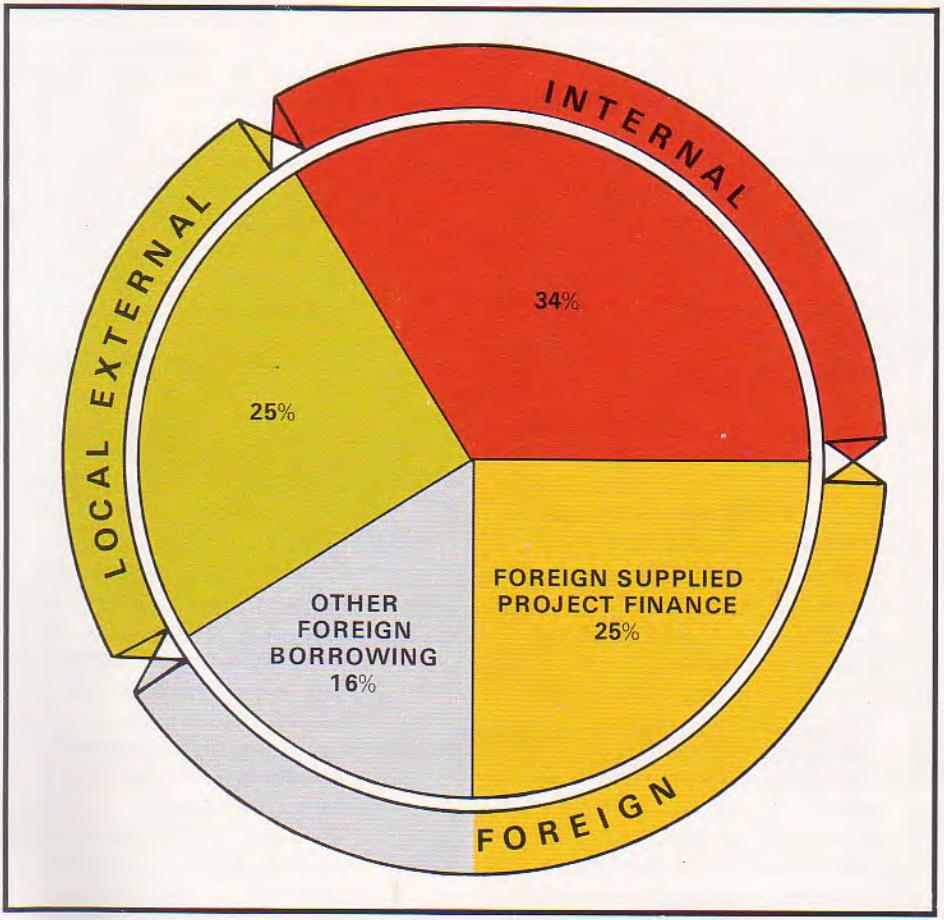


The relative contributions of each of the three sources of finance, namely foreign, local and internal are depicted graphically in the accompanying circle diagram.

Amendment of foreign exchange control regulations

During 1979 the Minister of Finance implemented certain of the recommendations made by the Commission of inquiry into the monetary system and monetary policy in South Africa, chaired by Dr. G. P. C. de Kock. The aspect of the report which has affected Escom most has been the cessation of the previous practice whereby the South African Reserve Bank supplied forward exchange cover for a low commission. Escom now has to purchase currencies forward at premiums or discounts relative to the spot rate determined partly by the South African Reserve Bank and partly by market forces.

As a result, the cost of forward cover has increased because the average premium on forward contracts exceeds the commission previously charged by the South African Reserve Bank. Escom accepts the rationale


INTERNAL
34%
LOCAL EXTERNAL
25%
FOREIGN SUPPLIED
PROJECT FINANCE
25%
OTHER
FOREIGN
BORROWING
16%
FOREIGN

that the cost of foreign exchange cover contract should be borne by organisations which enter into them instead of requiring the fiscus to make good any losses. Consequently it is expected that electricity tariffs will increase slightly in order to bear the additional cost of foreign exchange cover. However, virtually all foreign exchange commitments relate to capital projects in various stages of construction. Escom defers the charging of expenses relating to non-producing assets until such time as they have been placed in service. The total costs are then recovered over an extended period of time and any resultant increase in tariffs will occur gradually.

Operations

Plant capability and loading

Details of Escom's plant capabilities are given in Statements 1 and 2 on pages 56-58.

The fifth and sixth 500 MW turbo-generators at Kriel were completed during the year. This station is now

fully operational and is believed to be the third largest coal-fired power station in the world. Escom's first 600 MW turbo-generator set was put into service at Matla power station in September and is now operating after some initial teething problems were encountered. The Salt River 1 power station in Cape Town was taken out of service. One boiler at Colenso was also taken out of service after 26 years of operation.

The sent-out capacity of Escom's generating plant passed the 15 000 MW mark during the year.

Cahora Bassa commenced delivery of the third and final stage contractual supply in June after a further two generators were put into service. A firm capacity of 1 384 MW is now available from this source. A total of 10 302,7 million kW.h of energy was imported from Cahora Bassa during the year.

The reserve plant margin at the time of the system peak load decreased from 23,9 per cent in 1978 to 20,2 per cent in 1979. This includes the 1 384 MW firm capacity of Cahora Bassa. As a result of the exceptional growth in the demand for electricity during 1979, the reserve plant margin has been reduced still further below the level considered satisfactory for an adequate standard of system security and maintenance allowances on plant.

The one-hour maximum demand on the Escom interconnected system was 12 855 MW, which is an increase of 11,9 per cent over the corresponding figure for 1978 (Table 6). This is the largest increase in maximum demand since 1974.

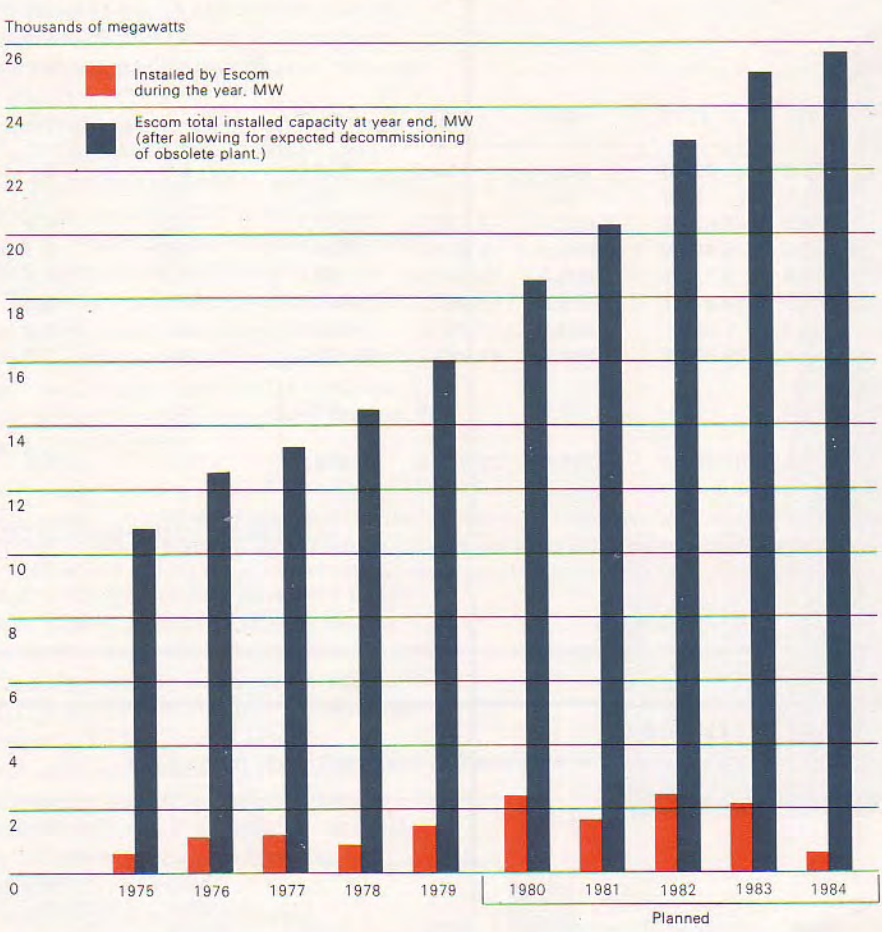
The exceptional growth in the energy sent out (10,5 per cent over last year) could not be met by the large inland stations alone, and resulted in a 34 per cent higher loading on power stations in the Western Cape, compared to 1978. While the load factors for both the Western Cape and the Natal power stations increased considerably, the overall system load factor remained virtually constant at 76,4 per cent.

Additions to the major transmission network, consisting of 152 km of 400 kV and 63 km of 275 kV lines, were taken into service (Statement 3 on page 59).

Performance and maintenance

The availability of generating plant has improved from 77,4 per cent in 1978 to 78,8 per cent in 1979. This was largely the result of the improved

Capacity of Escom's Power Stations, MW



availabilities of the very large stations such as Kriel and some middle-range stations such as Ingagane and Wilge. The reliability of generating plant was also marginally better in 1979. The forced outage rate decreased by 1,3 per cent during the year, in spite of problems experienced on several large generating units. Peak reserve margins were, however, down compared to last year because of the rapid growth in demand.

The overall thermal efficiency for the coal-fired power stations was 29,2 per cent compared with 28,9 per cent in 1978. This improvement was achieved despite the fact that the load factors of many less efficient stations were higher in 1979 than in 1978. The highest thermal efficiency was achieved by Kriel power station, which had an average efficiency of 34,5 per cent during the year.

Three stations – Kriel, Arnot and Hendrina – each achieved an output of 10 000 million kW.h or more during

the year. Kriel set an all-time record with a production of some 15 200 million kW.h, up 24 per cent on the record set the previous year by Hendrina.

Coal supplies

Escom burnt 43,3 million tons of coal during 1979, an increase of 9,3 per cent over the consumption for 1978. The energy sent out from the coal-fired power stations was 7,9 per cent higher than in 1978. The total energy production of the coal-fired power stations amounted to 86,6 per cent of the power system gross energy demand.

Kriel power station, which performed well with a good load factor, burnt 31,8 per cent more coal than planned and the output from the opencast pit had to be increased from 196 000 to 360 000 tons per month. Five other power stations – Vaal, Umgeni, Vierfontein, Klip, Hex River

and Salt River – burnt in excess of 25 per cent more coal during the year than planned.

Coal supplies to Escom's power stations generally remained good throughout the year and stocks were maintained at satisfactory levels. The low availability of Arnot, and the consequent low coal consumption, allowed surplus coal at this station to be used to advantage at Klip and Grootvlei power stations.

Coal supplied to Ingagane power station from Kilbarchan colliery continued to contain significant quantities with a low volatile content. This resulted in the output capability of the station being restricted by as much as 25 MW. The coal requirements of this station were therefore supplemented by supplies from third parties. At Vaal power station, load restrictions as high as 10 MW were imposed throughout the year due to the prevailing high ash in the coal.

At Hendrina the fluctuating and often high abrasive index of coal supplies affected mill performance adversely and consequently the plant availability levels.

Coal supplied to Highveld power station continued to be below the specified quality. Continuous load restrictions, up to 50 MW at times, were therefore a standard feature of operation.

At Coalbrook and Springfield collieries the technical problems of mining thick seam coal at depth have not yet been solved, but Usutu has had success in mining thin seam coal previously not considered workable. Opencast operations at Arnot, Optimum and Kriel have continued to deliver low cost coal and the restoration of disturbed land has kept pace with operations.

There is every indication that the inflation in coal prices is being contained. The major factors influencing the costs were a decrease in cost at Kriel which has now reached full production and the advent of Matla to the list of suppliers. With the commissioning of Matla and shortly Duvha power stations, the older power stations will be used mainly as peaking stations with the inevitable effect of coal costs rising at some of them as their coal requirements decrease.

The delay in commissioning the first set at Matla resulted in a relatively large build-up of coal at the station. To meet the anticipated demands of the second and third sets

Table 5
Electricity sent out to Escom's undertakings, million kW.h

Undertaking	1974	1975	1976	1977	1978	1979	Percentage increase 1979/78	Average yearly increase over 5 years per cent
Border	594,3	648,2	734,0	790,1	844,6	894,9	6,0	8,5
Cape Eastern	13,1	18,5	20,7	25,2	33,0	34,0	3,0	21,0
Cape Northern	1 345,9	1 494,9	1 674,6	1 832,4	2 170,7	2 647,1	21,9	14,5
Cape Western	4 241,3	5 098,6	5 402,8	5 555,9	5 817,7	6 138,7	5,5	7,7
Eastern Transvaal	6 679,0	7 309,6	8 122,1	9 400,4	10 358,1	12 190,4	17,7	12,8
Natal	9 087,1	9 671,5	10 471,1	11 319,8	12 457,8	13 899,5	11,6	8,9
Orange River	822,3	968,3	1 086,1	1 096,2	1 097,6	1 238,0	12,8	8,5
Rand and O.F.S.	33 459,3	36 304,4	39 902,3	41 244,7	44 994,2	48 935,9	8,8	7,9
Central Generating Undertaking: own consumption	16,8	19,3	*—	**26,8	52,6	58,0	10,3	28,1
Total supplied	56 259,1	61 533,3	67 413,7	71 291,5	77 826,3	86 036,5	10,5	8,9

*Extraneous supplies, such as river pumps, townships, workshops, etc., previously regarded as Central Generating Undertakings's own consumption, are now included in the distribution undertakings' supplies and treated as sales to Central Generating Undertaking.

**Energy consumed at Hendrik Verwoerd, Vanderkloof, Acacia and Port Rex power stations when operated in the synchronous condenser mode.

Table 6
Maximum one-hour demand on the respective systems of Escom's undertakings, megawatt

Undertaking	1974	1975	1976	1977	1978	1979	Percentage increase 1979/78	Average yearly increase over 5 years per cent
Border	114,0	127,0	145,0	152,2	168,0	175,3	4,3	9,0
Cape Eastern	5,1	5,2	5,7	6,8	7,0	7,2	2,9	7,1
Cape Northern	231,0	249,5	273,2	299,4	363,0	432,6	19,2	13,4
Cape Western	707,1	807,0	882,0	890,0	943,0	922,3	−2,2	5,5
Eastern Transvaal	924,6	1 019,8	1 197,1	1 316,3	1 464,7	1 715,9	17,2	13,2
Natal	1 438,0	1 498,0	1 618,0	1 761,0	1 962,0	2 167,4	10,5	8,6
Orange River	117,5	135,2	179,9	160,2	157,0	184,0	17,2	9,4
Rand and O.F.S.	5 147,0	5 455,5	6 074,8	6 363,2	6 720,0	7 468,3	11,1	7,8
Aggregate of non-simultaneous maximum demands	8 684,3	9 297,2	10 375,7	10 949,1	11 784,7	13 073,0	10,9	8,5
Maximum simultaneous one-hour demand on total Escom system MW	**1974** 09h00 4/9/74 **8 552**	**1975** 09h00 24/7/75 **9 185**	**1976** 09h00 23/6/76 **10 085**	**1977** 09h00 12/8/77 **10 735**	**1978** 09h00 23/6/78 **11 490**	**1979** 09h00 26/7/79 **12 855**	**11,9**	**8,5**

at Matla during 1980, colliery production was not curtailed. Coal in excess of Matla's requirements is to be transferred to Kriel as this coal is similar in quality to the Kriel underground supply.

Water supplies

With the filling of the water circuits for the two new power stations, Matla and Duvha, the volume of crude river water consumed in Escom's power stations increased by 8 per cent over the 1978 figure; specific water consumption increased from 2,72 to

2,77 litres per kilowatt-hour sent out. The favourable water consumption trend of previous years will be restored when these large and high-efficiency power stations carry an increased load. Further savings in water consumption will be achieved now that the programme to recycle effluents is being extended to older stations.

During the year, water supplies to Kriel and Matla power stations were strengthened when the first phase of the Usutu-Vaal River Government Scheme was partly taken into service. Kriel and Matla power stations can now be supplied from either of the two rivers.

Levels in the dams were lower than in previous years, but supplies were still more than sufficient. The drought which prevailed in the northern and eastern Transvaal last summer did not affect operations adversely.

The inflow of water to the Hendrik Verwoerd Dam was about that of 1978. Consequently the generation at the two Orange River hydro-stations had to be restricted, especially during the winter months.

Environmental matters

Environmental pollution at two of our older power stations – Highveld and Taaibos – was reduced dramatically when the recently installed electrostatic precipitators became fully operational towards the year's end. These precipitators drastically reduce the amount of coal-ash dust-particles emitted into the atmosphere, and tests have shown that at both power stations the efficiency of these installations exceeds planned expectations. Similar equipment will be installed at Komati power station. Power stations built over the past 20 years are fitted with electrostatic precipitators as a matter of routine.

Escom's latest power station designs provide for no effluent leaving the power station site which could otherwise pollute the country's water-courses.

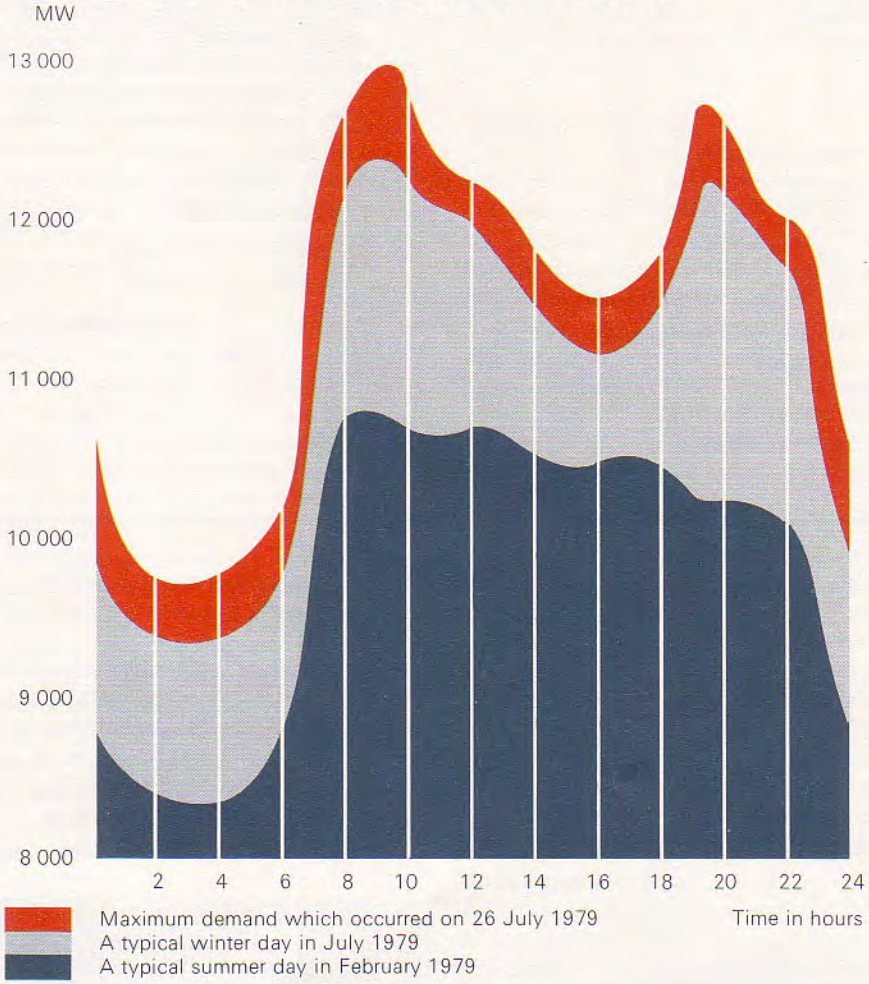
The danger that transmission lines pose to certain species of bird life received close attention during the year and tower designs that will enable birds to alight without danger are being developed.

To determine the transmission line towers that should be fitted with bird guards, areas of affected bird population and their flight paths are studied.

More emphasis is being placed on minimising environmental impact. This involves the use of cable feeds, the use of low-level structures in substations and the deviation of lines where economically possible.

Considerable progress was made during the year with the rehabilitation

The maximum demand on the Escom system in relation to the average summer and winter demands on the system during 1979



of land for productive use after open-cast mining operations.

Escom's environmental unit was involved in the selection of the coalfields to be used for the next three power stations and a comprehensive impact analysis procedure using impact matrices and overlay maps was used for this purpose.

Development

Power stations under construction

Plant with a generating capacity of 1 600 MW was taken into service in 1979, an all-time record. Escom's total installed capacity is now 15 974 MW.

Generating plant commissioned during 1979 and on order at the end of the year is shown in Table 7.

Koeberg nuclear power station

This twin set station with an ultimate capacity of 1 844 MW is situated

about 30 km north of Cape Town. Site construction started in August 1976.

During the year civil engineering work at the site reached a peak, while in the last quarter mechanical erection work commenced and will increase during 1980. Work on the basin to provide sea-water for once-through cooling of the condensers is now nearing completion.

The Atomic Energy Board (the statutory licensing authority) and Escom continue to study the circumstances of the accident at the Three Mile Island power station in the United States of America. If necessary, preventative measures will be taken at Koeberg.

Drakensberg pumped storage scheme

Construction work on this scheme started in January 1975. The four-set station with an ultimate capacity of 1 000 MW is being built inside the Drakensberg mountain range between Harrismith and Bergville. It is a

Table 7
Power station plant taken into service during 1979 and on order at 31 December 1979

Name of power station	Plant taken into service in 1979		Plant under construction or on order at 31 December 1979		Year of completion	
	Boilers kg/s	Generators MW	Boilers kg/s	Generators MW	First set	Last set
Coal-fired steam plant:						
Duvha	—	—	3 048	3 600	1980	1984
Kriel	880	1 000	—	—	1976	1979
Matla	508	600	2 540	3 000	1979	1983
Pumped-storage hydro-plant:						
Drakensberg	—	—	—	1 000	1981	1982
Nuclear plant:						
Koeberg	—	—	—	1 844	1982	1983

combined effort by Escom and the Department of Water Affairs.

Escom will pump water from the Kilburn Dam, fed from the Tugela River, to the Driekloof Dam which overflows into the Sterkfontein Dam. This dam feeds the Wilge River and in turn the Vaal Dam which serves the Pretoria-Johannesburg-Vereeniging complex. When not pumping water, the pump-turbines can be used to generate peaking power for Escom's national grid.

During the year all excavation work on the scheme was completed. A total volume of 1 120 000 cubic metres of rock has been excavated and work is progressing on the concrete lining of the waterway tunnels and shafts.

Work has commenced on the installation of the four pump-turbines. The spiral casing of the first pump-turbine passed the pressure test and is already embedded in reinforced concrete. Erection of the generator-motors will commence early in 1980. The first set will be commissioned in May 1981 with the second, third and fourth sets following at four-monthly intervals.

At Koeberg, Escom is involved in a project to reclaim dune wasteland. The aim is to prevent dunes from moving farther inland so destroying farmland. Similar projects are being undertaken by other organisations further up the coast.

Kriel power station
This six-set station is situated approximately 34 km north-west of Bethal. Construction was started in October 1970 and the station has now been completed to its designed capacity of 3 000 MW. The fifth and sixth sets were completed and put into commercial service in March and November 1979 respectively, with the latter being completed six weeks ahead of programme.

No serious slagging problems were experienced during 1979, but scheduled boiler modifications to overcome such problems will be carried out on the second and third boiler during 1980. This will complete the project.

During 1979 a mixture of open-cast and underground coal was burnt experimentally. This resulted in a better utilisation of the open-cast coal supply.

Matla power station
Construction on this six-set station started in October 1974. The station is situated near Bethal, adjoining Kriel power station, and has a designed capacity of 3 600 MW.

In September 1979 the first of the six 600 MW sets was taken into commercial service. Modifications were carried out during November and the set is now operational. The second set was run on partial load during December and should be available for commercial operation early in 1980.

All civil work for the first half of the station, including three cooling towers, has been completed. Progress on the second half of the station is satisfactory and work is slightly ahead of programme.

Duvha power station
Site construction started in November 1975 on this six-set station which will have an ultimate capacity of 3 600 MW. The station is close to Witbank and the operating and construction staff all live in the Witbank municipal area.

Construction work proceeded well during the year, good progress being made with the major civil and mechanical work. The raw water reservoir, water treatment plant, two cooling towers, the main cooling-water complex, a coal staith, the first of two chimneys and the ash-dam complex were completed.

Technical problems caused a delay in the commissioning programme of

Land disturbed by opencast mining operations to provide coal for Escom power stations is restored and made available for agricultural use. In this picture, opencast-mining activity is taking place in the background, while the previously disturbed land in the foreground has been restored to pasture.

the first set which is now expected to be taken into commercial service during the first quarter of 1980. Some problems have been experienced with the coal conveyor plant.

Tutuka power station
This station will be situated in the Standerton area. Site investigations are proceeding, and construction will start towards the end of 1980.

The station is planned to house six 600 MW sets. In order to meet the expected increased demand on the Escom system, it has been necessary to deviate from our normal tendering procedure and negotiate the contracts for boiler and turbo-generator plant with the main suppliers of Matla and Duvha power stations.

The first three 600 MW sets are scheduled to be taken into commercial operation in September 1985, June 1986 and March 1987 respectively.

Ilanga power station
This station will be sited at Ellisras in the north-western Transvaal and is planned to house six 600 MW sets. The first set is scheduled for commercial service by September 1986.

To use the limited water resources to the best advantage, the station will be dry cooled. This means that the waste heat of the turbines will be discharged to the atmosphere without evaporating any water, whereas the conventional wet-cooling system evaporates a certain amount of the water circulated in the cooling tower. Whilst this concept of air-cooled power stations is not new, it is possibly the first time in the world that it will be employed in a power station of this size.

Transmission system

Rand and O.F.S. Region

Croydon substation near Jan Smuts Airport, using mainly indoor gas insulated switchgear in order, inter alia, to reduce the impact on the environment, was commissioned during May to strengthen supplies to the industrial complexes of Isando and Spartan and also to nearby Bedfordview and Germiston.

A 275 kV line between Minerva and Craighall, which traverses in part the course of the Braamfontein Spruit through Sandton, was completed during December and is expected to be energised early in 1980. Power will be

supplied to the municipalities of Johannesburg, Sandton and Randburg from Craighall substation.

Supplies to the West Rand were strengthened by the commissioning of a 275 kV line from Bernina to Westgate and extensions at Westgate and Princess substations. The establishment during the year of Carmel substation near Welverdiend will improve supplies in the Doornfontein mining area.

Waterberg substation near Ellisras in the north-western Transvaal was commissioned in November to effect supply to Iscor's Grootegeluk colliery.

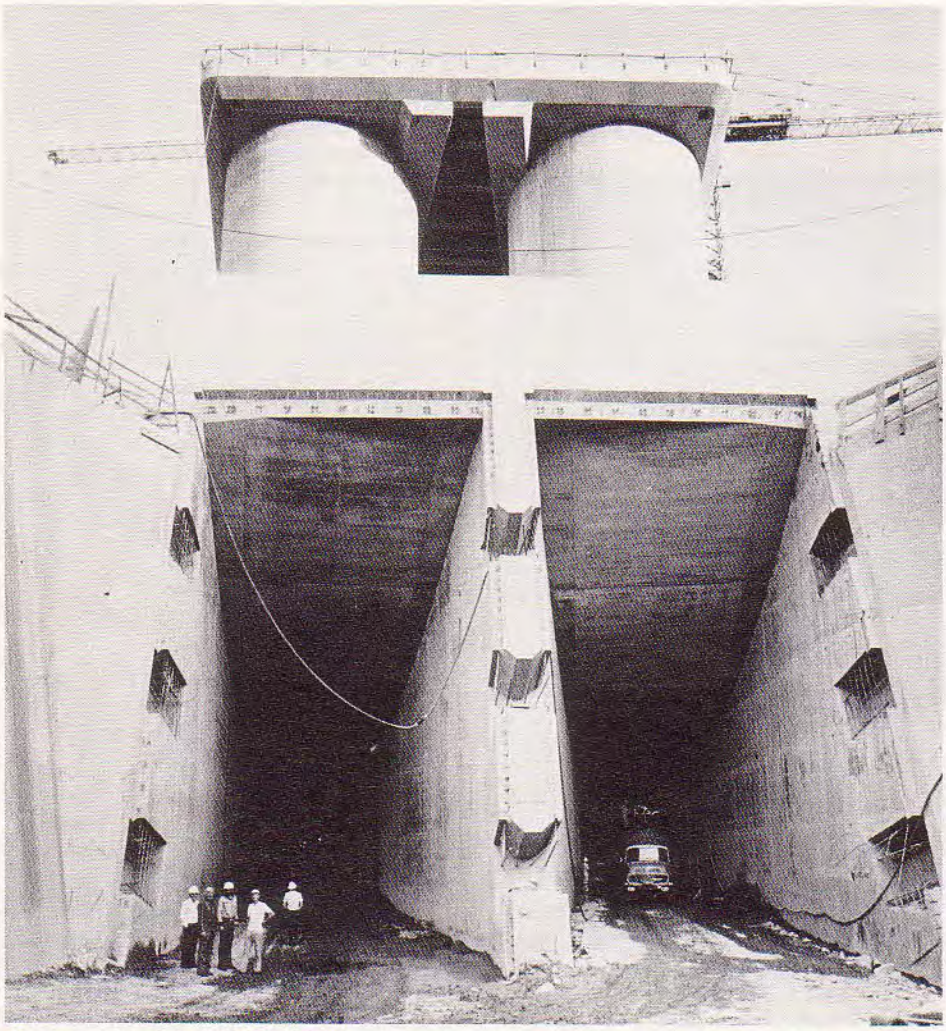
As an aid to system voltage control, capacitor banks were installed at Minerva and Pluto substations, while work is in progress to install further capacitors throughout the Region.

The third and final stage of the Cahora Bassa-Apollo direct-current scheme was placed in commercial operation during June 1979 and the converter stations at Cahora Bassa and Apollo are now fully equipped. The firm contractual supply is 1 384 MW and the maximum input received during 1979 was 1 822 MW.

Expansion of distribution and reticulation networks and associated substations has continued during the year.

Natal Region

The South African Railways are strengthening and extending their system to cope with increased traffic, particularly on the main rail route from the industrial and mining centres to the port at Richards Bay. In this region work was therefore related mainly to the 400 kV reinforcement scheme to the Richards Bay area. The 120 km long, 400 kV transmission line from Umfolozi substation to Invubu substation, near Richards Bay, was completed. Work is far advanced on Invubu substation itself and is expected to be completed early in 1980.



Headrace inlet of the 1 000 MW Drakensberg pumped storage scheme. This station is being built completely underground. Surface structures have been kept to a minimum and will blend in with the environment.

In order to connect the Drakensberg pumped storage scheme to the national grid, work was started on the construction of a 400 kV substation called Pegasus, near Dundee, as well as a 400 kV transmission line from this substation to the Drakensberg pumped storage station. A further 400 kV line from Drakensberg to Mersey substation, in the Pietermaritzburg area, is to be built during 1980.

To meet the increasing load requirements of Durban Corporation, extensions to Illovo substation were put in hand to provide an additional supply point to the Corporation.

Eastern Transvaal Region

Supply to Sasol II was made available early in the year via the 400/132 kV Sol substation near Trichardt. Plans for feeding Sasol III from the same site were finalized. Construction continued at the nearby Zeus 400 kV substation which is due for completion towards the end of 1980.

The first stages in the integration of Matla and Duvha power stations were completed when their respective 400 kV switchyards and the associated transmission lines went into service.

These developments necessitated electricity supplies for new water pumping stations. Supply was given to the Grootfontein pump station on the Usutu-Vaal water scheme, while the pump stations at Rietfontein and Kliphoek were supplied from the existing 88 kV system.

Shortly before the end of the year supplies to the Witbank area were augmented by the commissioning of an additional 250 MVA, 400/132 kV transformer at Vulcan substation.

To cope with new demands, the rural network had to be strengthened. Two 88 kV lines were built from Normandie substation, one to Bloedrivier in the Natal Region and the other to Kemp substation. Reinforcement of the Marble Hall/Groblersdal area was carried out with the commissioning of the 88 kV line from Mapoch substation (near Roossenekal) to Wolwekraal substation.

Western Cape Region

A double circuit 400 kV transmission line was built from the Acacia substation in Montague Gardens, Cape Town, to a new 400/132 kV substation at Philippi. The Philippi substation provides power at 132 kV to the Cape Town City Council, and

Koeberg, South Africa's first nuclear power station, will become operational in 1982 and 1983. It will have a capacity of 1 844 MW.

will cater for the future development of this area. It is also the infeed point for the City Council's Steenbras pumped storage scheme.

Northern Cape Region

A 132 kV static compensator with a range of +20 MVAr to –10 MVAr was installed at Ferrum substation, near Sishen, to correct unbalanced voltage conditions in the area resulting from the single-phase railway traction loads of the Sishen-Saldanha railway.

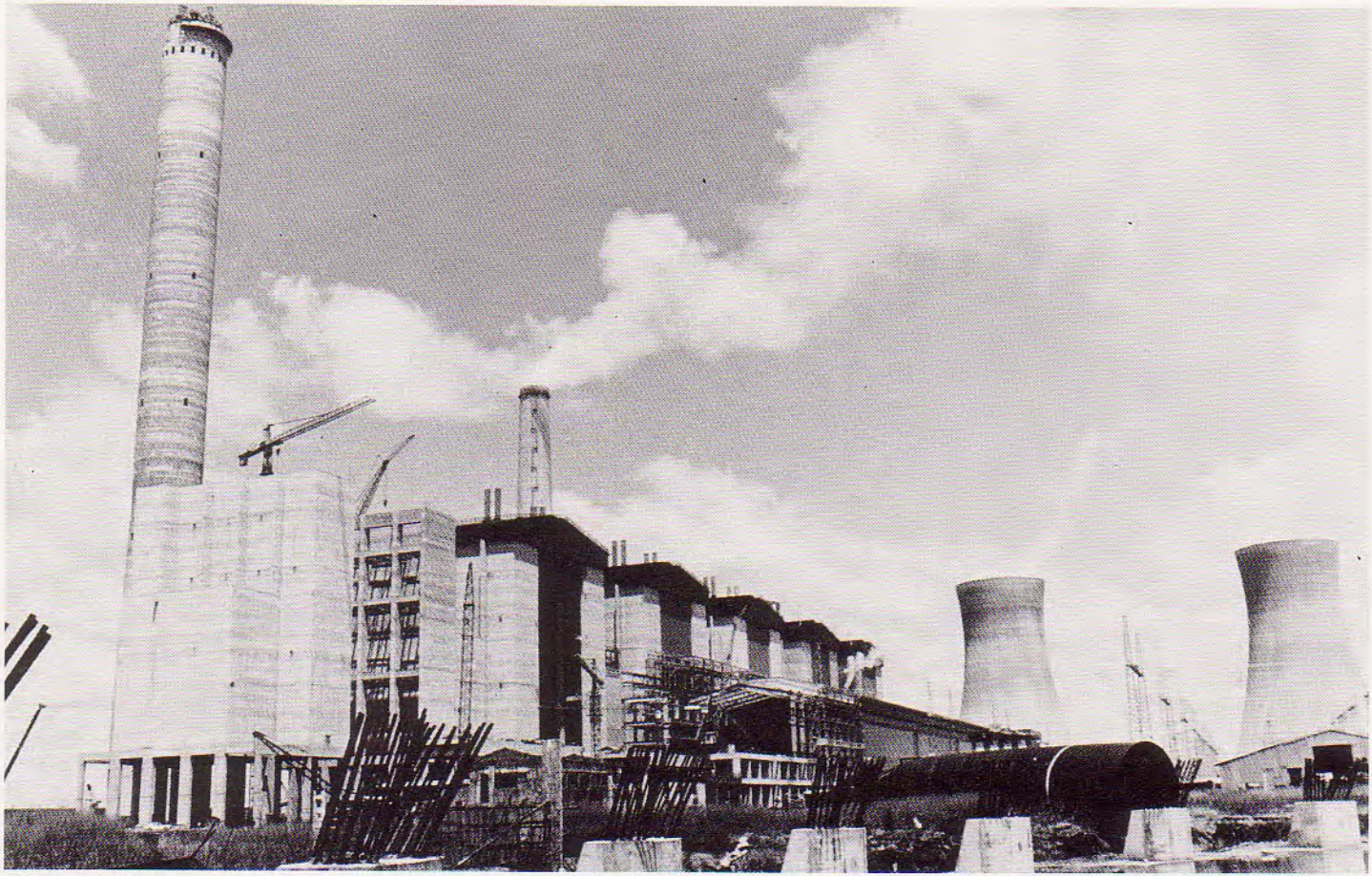
A new substation near Lime Acres will supply the Finsch diamond mine, while the nearby Silverstreams substation is being strengthened to provide for additional lime kilns.

The Pelladrift scheme, which supplies water from the Orange River to the Black Mountain mine at Aggeneis, was supplied over a 66 kV extension from Aggeneis substation. The municipalities of Pofadder and Port Nolloth started taking Escom supplies, as did the diamond recovery plant near Port Nolloth. Early in 1980 supplies will be extended to the diamond recovery complexes in the Richterveld and near Kleinzee as well as to the recovery area south of Alexander Bay.

Swawek is to receive supply at two irrigation projects along the Orange River and the possibility of supplying power to Swawek for Warmbad and Karasburg is now being examined. Some 400 km or more of lines will have to be built to serve all these consumers. These supplies are in addition to the supply to be furnished over an 800 km long transmission line to be constructed within the next four years between Aggeneis and Windhoek.

Eastern Cape Region

In this region the supply of power for the Ciskei irrigation scheme was secured by the construction of a 66 kV line from Dimbaza substation to the Amatola substation in the Keiskammahoek area. In July a 750 kVA supply was given to the Dimbaza bulk water scheme. Grahamstown closed its power station and took a full supply from Escom which was rendered



The first 600 MW set of Matla power station was taken into service in 1979. This coal-fired station with a capacity of 3 600 MW will be fully operational by 1983. Modern power stations use an enormous volume of water and more than 206 000 megalitres of water were consumed by Escom power stations last year.

possible by the completion of the 132 kV line between Pembroke and Albany substations.

Other projects

As a result of the increased electricity demand, consideration is being given to the possibility of utilizing 800 kV transmission lines to convey bulk power over long distances in the late 1980s. To optimize the design of the system components for South African conditions, some testing and research will be needed and suitable test facilities are being provided at Rosherville workshop and at Apollo substation.

With the larger sets now being installed in our power stations, our present balancing machine (handling rotors with a mass up to 65 tons) is inadequate as it will have to handle rotors with a mass up to 300 tons. The balancing machine is used when overhauling turbine rotors and spinning these at high speeds to ensure that no out-of-balance forces exist. There is no

such balancing machine in Africa and, because of the cost and security factors involved in sending the rotors overseas, Escom is to establish its own facility of this size. The project will be completed in 1982.

To implement and manage its expansion programme Escom will need additional staff, not only at its power stations, but also at its head office Megawatt Park in Sandton, where space will be at a premium in the early 1980s. An extension, to the south of the present building, will be completed in stages. It will be similar in design to the existing building and will eventually consist of a basement service floor, ground and three floors.

To accommodate construction and operating staff for the Ilanga power station at Ellisras, 600 permanent and 400 temporary houses will be constructed over a period of four years. In terms of Escom's policy to integrate Escom housing with proclaimed townships, where possible, it is intended to erect 600 permanent houses in Standerton over the next four years for operating staff required

for Tutuka power station as well as 500 houses for the mines personnel, with an additional 500 temporary houses for construction staff.

Accommodation is also being planned for approximately 6 000 single Black workers at each station. This number will be reduced to 1 100 on completion of the projects and will include both married and single accommodation. In the Western Cape Region a start will be made in 1980 on the provision of housing for Coloured staff. The first scheme is for 158 houses to be built in the Scottsdene Coloured Township.

Research

1979 was the first full year of operation of the combined Research and Development group which now comprises the chemical, electrical, mechanical and metallurgical divisions. It was found that problems, often of an interdisciplinary nature, could be dealt with more effectively.

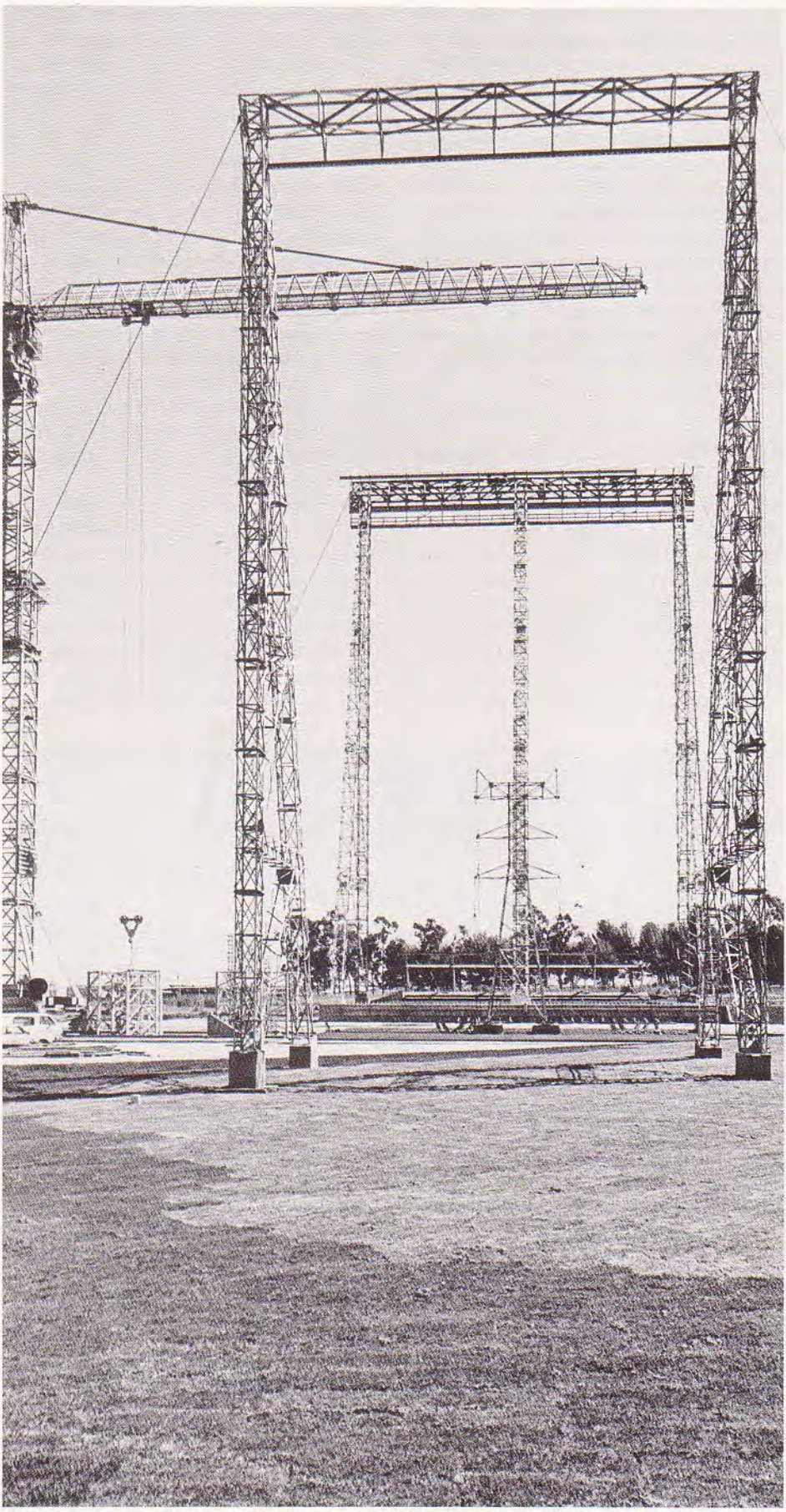
A chemical method is now being

The 3 000 MW Kriel power station, which became fully operational in November, set an all-time record with a production of some 15 200 million kW.h for the year. Coal-fired stations produced nearly 87 per cent of the electricity required for the Escom system in 1979, burning more than 43 million tons of coal.

used to help assess the slagging and fouling potential of pulverised coal. Throughout Escom monitoring of the bacteriological and health aspects of potable and industrial water continued.

In the electrical sphere, work continued on methods to improve the reliability and safety of electrical installations. Methods for the evaluation and design of earthing systems are being developed from studies made on models in an electrolytic tank. The effect of pollution on insulators is being examined in different parts of the country with the aid of field stations, while measurement of pollution along the proposed route of 800 kV lines has started.

On the mechanical side, work on air pollution projects was accelerated. The gaseous and particulate emissions from power stations were extensively studied and a three year programme to determine the air pollution levels in the eastern Highveld, on a continuous basis, was initiated in cooperation with the Council for Scientific and



With the possible introduction of 800 kV lines to carry increased loads over long distances in the late 1980s testing and research facilities are being provided at Rosherville workshop (above) and at Apollo substation to establish the behaviour of system components under South African conditions.

Industrial Research. Escom has installed and is operating nine monitoring stations in the area.

As part of the national objective to conserve fuel oil, Escom initiated a programme, in cooperation with the South African Coal and Oil Corporation to reduce its consumption of diesel oil in favour of heavier fuel oils. A research programme was commenced to investigate suitable boiler equipment capable of efficiently burning heavy fuel oils.

As dry cooling will be utilised for certain future power stations, a model testing and field testing programme was initiated to examine environmental effects on the performance of dry-cooling systems.

In the metallurgical field, parameters influencing the stress corrosion cracking of turbine rotor steels were investigated as part of a research project conducted jointly with South African universities and Continental turbine manufacturers. This research will include the effect of residual surface stresses.

Personnel

Manpower

Although the total staff employed at 31 December was 43 690, the average monthly employee complement for 1979 was 42 310, an increase of 4,3 per cent from 40 550 in 1978.

Because of the general shortage of manpower in South Africa, particularly in the artisan and certain professional and semi-professional categories and a highly competitive labour market, it was difficult to obtain a sufficient number of suitably qualified personnel. Consequently Escom experienced shortages of personnel in key areas, such as construction, operation and maintenance of plant which placed an added strain on existing resources. This situation will be further aggravated by Escom's continuous programme of expansion. It has become increasingly necessary to obtain specialists from other sources such as plant suppliers and manufacturers in order to carry out the planned maintenance programmes on major items of plant.

To improve the situation a more comprehensive manpower plan was developed to assess Escom's manpower position accurately and continuously and to facilitate short, medium and

long term manpower planning.

Based on this plan certain strategies are being implemented to refine the forecasting of manpower demand, establish further manpower planning systems, step-up overseas and local recruitment and to increase manpower supply by means of education, through the greater intake of apprentices, pupil technicians and the allocation of bursaries. This plan also makes provision for the reduction of the high labour turnover of certain critical employee categories, the better utilisation of manpower, the ensuring of competitive remuneration packages, the determination of priorities for the new Escom college and the expansion of existing training facilities.

Table 8
Average monthly employee complements

	1978	Percentage increase during 1978	1979	Percentage increase during 1979
Salaried	8 890	8,3	9 320	4,8
Monthly paid	6 000	2,5	6 030	0,5
Hourly paid	25 660	4,3	26 960	5,1
Total	40 550	4,9	42 310	4,3

Education and training

With a view to meeting Escom's education needs and requirements, more than 9 000 employees were enrolled for over 1 100 internal and external courses.

Escom's expansion has highlighted the need for specialist in-house training, particularly as increasingly sophisticated systems and equipment are being used. Training of this nature, geared to Escom's own special requirements, is not available on a coordinated basis at present. After extensive research, Escom has decided to provide a centralised training college which will cater for the educational needs of all its staff from unskilled to management level. A site

A comprehensive programme has been developed to assess Escom's manpower position accurately and continuously. There is, inter alia, increased emphasis on education and training, recruitment, the allocation of bursaries, reduction of labour turnover, the better utilization of manpower, and competitive remuneration packages.

has been purchased near Halfway House between Johannesburg and Pretoria. Construction will commence in 1980 and the college will be completed in phases. It is expected that the first courses at the college will commence in 1982.

Personnel relations

Sound personnel relations were maintained and fostered.

Through a continued process of consultation and negotiation with the trade unions, attention was given to the better utilisation of manpower. The main aim in this regard is the restructuring of tasks and activities where possible.

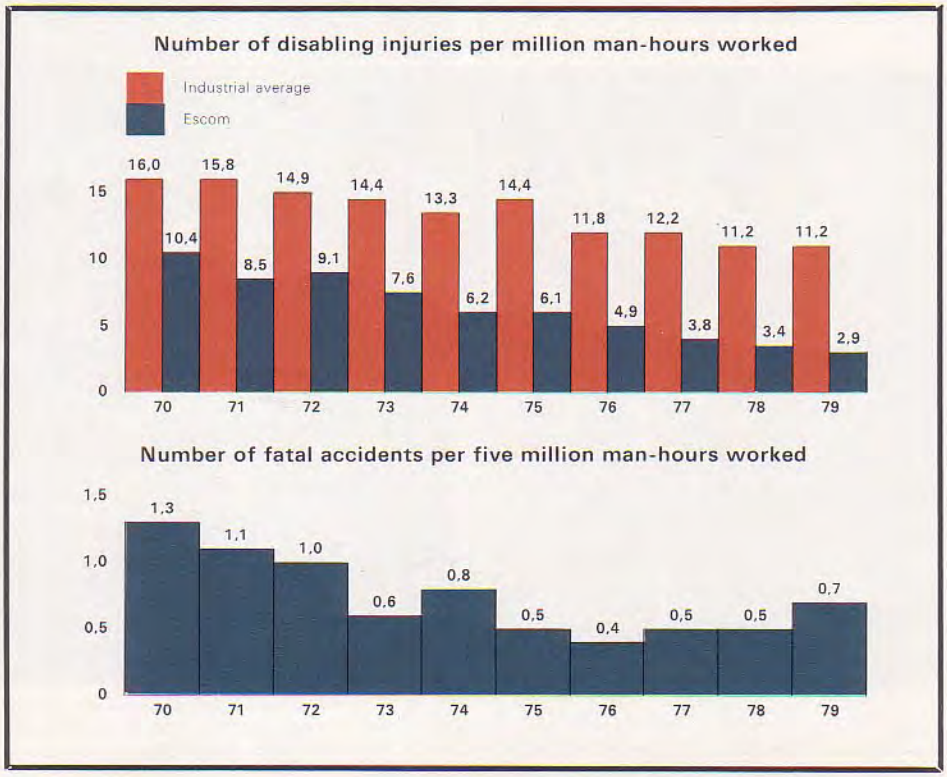
The personnel relations function in Escom was also strengthened to ensure that future developments resulting from the Wiehahn and Riekert reports could be satisfactorily dealt with. This includes, inter alia, improved channels of communication with all employees and the Commission's declared policy to strive for the elimination of racial discrimination in Escom.

Accident prevention

The accident prevention effort resulted in the lowest injury rate ever experienced by Escom, viz. 2,9 disabling injuries per million manhours worked. This is 75 per cent lower than the national industrial average for the Republic of 11,2 per million manhours. Unfortunately this achievement was marred by a slight rise in the fatality rate for 1979, viz. 0,7 fatalities per five million man-hours worked as compared to 0,5 in 1978.

Tremendous reductions in accident rates have also been experienced by contractors engaged in the construction of new power stations. Escom contractors are experiencing an average injury rate of 5,7 compared to the national construction average of 17 disabling injuries per million manhours worked.

Personnel working on construction sites are faced with numerous hazards in the course of their daily routines. Contractors join Escom personnel in accident prevention programmes at all construction sites to ensure a safer working environment.



Auditors' report and financial statements

Report of the auditors

The Chairman and Members
Electricity Supply Commission
Sandton

We have examined the financial statements of the Commission for the year ended 31 December 1979 and report as follows:

(a) The financial statements of the Commission are in order and present the information required by the Electricity Act, 1958 (the Act).

(b) Due provision, in terms of the Act, has been made for the redemption and repayment of monies borrowed by or advanced to the Commission.

(c) Sums fixed by the Commission have been set aside to the Reserve Fund and Capital Development Fund under section 13 of the Act.

(d) All our requirements as auditors have been complied with.

(e) Net expenditure under the heading Corporate Services has been allocated by the Commission to Capital and Reserve Fund expenditure and Electricity Supply Account of Undertakings. We have no reason to disagree with the apportionment so made.

In our opinion the financial statements fairly present the financial position of the Commission at 31 December 1979 and the results of its operations for the year ended on that date.

Deloitte Haskins & Sells
Alex. Aiken & Carter
Chartered Accountants (S.A.), Auditors

Sandton
25 March 1980

Balance sheet

at 31 December 1979

	Notes	R000 1979	1978
Fixed assets	3	6 793 699	5 452 427
Stores and materials	4	223 726	195 273
Other non-current assets	5	287 829	200 601
Current assets		257 067	260 585
Accounts receivable and payments in advance		157 502	141 294
Moneys at call		94 980	119 034
Bank balances and cash		4 585	257
		7 562 321	6 108 886
Financed by			
Loans and extended credit	6	4 558 520	3 798 683
Local registered stock, bond issues and direct placings (Schedule 2)	9	5 537 564	4 405 564
less Escom Stock held internally	9	2 080 888	1 408 841
		3 456 676	2 996 723
Import financing facilities and extended credit		888 712	497 515
Revolving credits and short-term advances		213 132	304 445
Current liabilities		425 476	360 397
Creditors and accrued liabilities		318 546	265 666
Interest accrued		106 930	82 664
Bank overdrafts		—	12 067
Total net debt		4 983 996	4 159 080
Statutory funds and reserves		2 578 325	1 949 806
Capital reserve	7	396 834	373 855
Capital Development Fund	8	1 291 349	801 903
Reserve Fund	8	210 351	202 640
Redemption Fund	8	483 458	413 770
Other reserves	10	116 731	95 824
Accumulated surplus	11	79 602	61 814
		7 562 321	6 108 886

Income statement

for the year ended 31 December 1979

	Notes	R000 1979	1978
Sales of electricity		1 529 474	1 301 829
Operating expenditure	12	668 268	548 562
Net operating income		861 206	753 267
less Loan charges		462 518	385 006
Loan amortisation charges		134 644	112 505
External interest and finance charges		199 123	181 703
Interest on Escom Stock held as investments of the Capital Development Fund and the Reserve Fund		128 751	90 798
		398 688	368 261
Amounts set aside to Capital Development and Reserve Funds in terms of Section 13 of the Electricity Act, 1958		380 900	300 900
Net surplus for the year as shown in the Electricity Supply Account	11	17 788	67 361
Accumulated surplus (deficit) at beginning of year		61 814	(5 547)
Accumulated surplus at end of year	11	79 602	61 814

Statement of source and application of funds

for the year ended 31 December 1979

	R000	
	1979	1978
Source of funds		
Funds generated internally	672 058	581 436
Net surplus	17 788	67 361
Add Items not affecting the flow of funds		
Depreciation on equipment,vehicles and furniture	9 975	9 872
Loan amortisation charges	134 644	112 505
Repayment of foreign loans	44 722	44 815
Redemption of local loans	44 078	31 221
Interest on internal investments of Redemption Fund	45 844	36 469
Amounts credited to Capital Development and Reserve Funds	509 651	391 698
Contributions	380 900	300 900
Interest on internal investments	128 751	90 798
Net proceeds of external finance	739 731	720 001
Loans and extended credit	1 022 758	807 440
Repayments	(476 193)	(493 354)
Sale of Escom Stock on secondary market	533 320	504 414
Purchase of Escom Stock on secondary market	(340 154)	(98 499)
Increase in net current liabilities	68 597	17 085
Other	6 736	1 685
	1 487 122	1 320 207
Application of funds		
Fixed assets, net	1 374 559	1 246 700
Increase in stores and materials	28 453	3 269
Deferred expenditure and deposits to secure future fuel supplies	63 356	53 634
Housing loans to employees	4 370	5 127
Reserve Fund expenditure	16 384	11 477
	1 487 122	1 320 207

Notes to the financial statements

at 31 December 1979

1. Accounting policies

The principal accounting policies adopted by the Commission are consistent with the previous year except as stated in note 2.

1.1 Fixed assets

(a) Fixed assets in commission

Fixed assets in commission are not depreciated but are reflected at historical cost. Long-term loans are raised to finance these assets. Because of the correlation between the loans so raised and fixed assets, the charge to revenue for loan amortisation takes the place of depreciation.

(b)Works under construction

Interest and a charge for corporate overhead expenses are capitalised during the period of construction.

(c) Equipment, vehicles and furniture

Equipment, vehicles and furniture are depreciated at rates considered appropriate to reduce original cost to estimated residual value over the useful lives of the assets.

Certain expenditure on fixed assets as provided for in Section 13(1)(a) of the Electricity Act, 1958 is written off in full against the Reserve Fund.

1.2 Stores and materials

The basis of valuation of stores and materials excluding fuel is the lower of cost, determined on the last-in-first-out basis, and replacement value. A provision for obsolescence is made where appropriate. Fuel stocks are valued at the three-monthly moving average delivered cost.

1.3 Foreign currencies

Foreign currency liabilities covered by forward exchange contracts are translated to Rand at the protected rates of exchange. Liabilities not covered by forward exchange contracts and foreign assets are translated to Rand at the rates of exchange ruling at the balance sheet date. The currencies most favourable to bondholders are used to translate loans raised in European Units of Account.

1.4 Deferred expenditure

Discount on loans issued is written off over the periods of the relevant loans.

Net losses arising from the translation of foreign long-term loan balances at the rates of exchange ruling at the balance sheet date and net forward exchange premiums are written off over the remaining periods of those loans.

Expenditure incurred to secure future fuel supplies is accumulated for amortisation once deliveries commence.

1.5 Amortisation of borrowings

A Redemption Fund has been established in terms of the Electricity Act, 1958 and provision for the redemption of local loans is made over periods not exceeding 25 years.

The State President, in terms of Section 10(2) of the Act, has directed that the provisions relating to the establishment of the Redemption Fund should not apply to foreign loans. Provision for repayment of such loans is made over periods not exceeding 25 years.

The Redemption Fund provisions are not applied to revolving credits and short-term advances, as these are made under the provisions of paragraph 1(3) of the Schedule to the Act.

1.6 Operating revenue and expenses

Meters are read on a cyclical basis and sales of electricity are accounted for concurrently. The revenue related to supplies between the date of the last reading and the end of the accounting period is not included in sales, whereas the related expenses are charged as incurred.

2. Change in basis of accounting

Effective 1 January 1979, the basis of valuing coal stocks was changed from the lower of cost, determined on the last-in-first-out basis, and replacement value to the three-monthly moving average delivered cost.

The average basis has been adopted to reflect a more realistic cost in view of the fast turn-over rate for coal. The effect of the change was to reduce operating expenditure by approximately R10,8 million.

3. Fixed assets

	R000 1979		R000 1978	
Assets in commission, at cost				
Land and rights	87 217		65 465	
Buildings and facilities	380 829		320 085	
Production plant	3 787 456		3 179 050	
Total in commission	4 255 502		3 564 600	
Works under construction	2 481 627	6 737 129	1 846 671	5 411 271
Equipment, vehicles and furniture, at cost	105 844		81 337	
less Accumulated depreciation	49 274	56 570	40 181	41 156
		6 793 699		5 452 427

4. Stores and materials

Construction material		100 871		101 751
Maintenance and consumable stores		59 682		59 468
Fuel		63 173		34 054
		223 726		195 273

5. Other non-current assets

	R000 1979		1978	
Listed investments held for				
Reserve Fund (schedule 4)	7 789		9 098	
Redemption Fund (schedule 5)	863	8 652	1 466	10 564
Housing loans to employees secured by first mortgage		39 133		34 763
Amounts owing in respect of reticulation systems sold		2 012		—
Deferred expenditure				
Discount on loans issued	71 460		59 624	
Unrealised exchange losses on foreign liabilities	28 040		20 474	
Expenditure and deposits to secure future fuel supplies	138 532	238 032	75 176	155 274
		287 829		200 601

6. Loans and extended credit

The current portion (excluding revolving credits) included in loans and extended credit amounts to approximately	371 000	324 000

Borrowings in the following currencies are not covered by forward exchange contracts:

	1979	1978
European units of account	10 560 000	12 620 000
Maltese pounds	5 000 000	5 000 000
Deutsche Marks	479 000	—

In accordance with the provisions of the Electricity Act, stock issued in respect of local loans raised, together with interest thereon has a first charge on all the assets of the Commission.

7. Capital reserve

Loans repaid	483 325	437 033
Production plant financed from Reserve Fund	10 360	10 360
	493 685	447 393
less Cost of commissioned assets scrapped or sold	96 851	73 538
	396 834	373 855

8. Statutory funds

The statutory funds are credited with amounts as provided for in the Electricity Act. These amounts are invested mainly in Escom Stock and the interest accrues to the respective funds.

The Redemption Fund provides, on a sinking fund basis, for the repayment of local loans.

The Reserve Fund is used, when required, for the replacement of obsolete machinery or plant and generally for the betterment of plant or for or in lieu of insurance, or for exceptional repairs or emergencies.

The Capital Development Fund provides internal financing for capital expansion.

Dealings in Escom Stock, held as investments for the Funds, at prices based on interest pattern rates above coupon rates result in certain stocks being sold at less than book value. The difference on such transactions is set-off against the higher future earnings on the re-invested proceeds over the period to maturity of the original investment.

To the extent that the difference has been deferred, the amounts available for investment are reduced as follows:

	R000 1979	1978
Capital Development Fund (schedule 7)	1 300 406	808 998
Difference between book value and proceeds of stock sold	9 057	7 095
	1 291 349	801 903
Reserve Fund (schedule 8)	224 151	220 116
Difference between book value and proceeds of stock sold	13 800	17 476
	210 351	202 640
Redemption Fund (schedule 9)	510 318	448 649
Difference between book value and proceeds of stock sold	26 860	34 879
	483 458	413 770

		R000			
		1979		1978	
9. Escom stock held for	Schedule	Book Value	Nominal Value	Book Value	Nominal Value
Capital Development Fund	3	1 354 845	1 367 864	782 265	789 974
Reserve Fund	4	202 843	212 286	189 456	200 904
Redemption Fund	5	486 674	495 270	394 118	411 451
Repayment of foreign loans	6	4 822	5 468	5 819	6 512
		2 049 184	2 080 888	1 371 658	1 408 841
Excess of nominal over book value			31 704		37 183

10. Other reserves		
Amounts set aside for repayment of foreign loans	83 015	58 641
Difference between nominal and book values of Escom Stock held internally	31 704	37 183
Deferred proceeds of reticulation systems sold	2 012	—
	116 731	95 824

11. Accumulated surplus

In terms of the Electricity Act, 1958, electricity is supplied at prices calculated to cover operating expenditure, loan amortisation charges and amounts to be set aside to the Reserve Fund and the Capital Development Fund. The surplus or deficit in any financial year is carried forward and taken into account when charges are adjusted from time to time.

A detailed analysis of the revenue and charges for each undertaking of the Commission is given in the Electricity Supply Account (schedule 1).

12. Operating expenditure includes:		
Leasing charges on equipment	5 451	7 929
Commitment fees with regard to overdrafts and other credit facilities	2 932	3 278
Depreciation of equipment, vehicles and furniture	9 975	9 635

13. Commitments

The Commission is committed for

1. Capital expenditure contracted for, excluding contract price adjustments and general sales tax, amounting to approximately	1 539 000	1 713 000
This expenditure will be financed from external borrowings and from cash generated internally.		
2. Payment in respect of housing loans granted to employees of approximately	1 926	1 295
3. Payment to the Electricity Supply Commission Pension and Provident Fund, in addition to the normal contributions, of	1 146	1 337
4. The purchase of R2 000 000 – 6,75 per cent 1991 Electricity Supply Commission Local Registered Stock at the option of the stockholder for	1 940	1 940

14. Contingent liabilities

The Commission has indemnified the Electricity Supply Commission Pension and Provident Fund against any loss resulting from the negligence, dishonesty or fraud of the Fund's officers or of the Trustees.

Electricity supply account

for the year ended 31 December 1979

Schedule 1

R000

1978 Total		1979 Total	Corporate Services	Central Generating	Distribution Total	Cape Western	Cape Northern	Cape Eastern	Border	Orange River	Natal	Eastern Transvaal	Rand and O.F.S.
1 301 829	**Electricity sold**	**1 529 474**	—	—	**1 529 474**	**138 950**	**71 983**	**1 513**	**25 745**	**23 842**	**241 490**	**219 440**	**806 511**
435 002	Industrial	519 943	—	—	519 943	49 614	5 334	928	3 322	1 177	87 076	136 714	235 778
388 398	Bulk	451 642	—	—	451 642	52 662	10 328	443	21 098	22 655	115 490	20 359	208 607
356 479	Mining	415 469	—	—	415 469	—	39 627	—	—	—	6 374	46 577	322 891
85 590	Traction	104 984	—	—	104 984	16 362	15 312	—	—	—	27 623	14 884	30 803
36 360	Domestic and lighting	37 436	—	—	37 436	20 312	1 382	142	1 325	10	4 927	906	8 432
548 562	**Operating expenditure**	**668 268**	**34 177**	**534 851**	**99 240**	**18 572**	**6 627**	**410**	**4 388**	**2 487**	**17 654**	**14 163**	**34 939**
317 828	Operations	352 117	538	350 313	1 266	135	117	—	65	63	280	161	445
66 264	Maintenance	91 887	196	64 268	27 423	4 309	1 374	182	1 217	550	4 713	5 344	9 734
26 364	Electricity purchased	36 061	—	36 061	—	—	—	—	—	—	—	—	—
138 106	Administration and general expenses	188 203	33 443	84 209	70 551	14 128	5 136	228	3 106	1 874	12 661	8 658	24 760
385 006	**Loan charges**	**462 518**	**7 846**	**324 268**	**130 404**	**17 221**	**15 478**	**388**	**4 282**	**3 793**	**15 563**	**21 925**	**51 754**
308 970	Interest and finance charges	373 718	7 092	253 391	113 235	15 051	13 838	344	3 838	3 378	13 053	19 074	44 659
31 221	Redemption of local loans	44 078	754	26 305	17 019	2 170	1 640	44	444	415	2 360	2 851	7 095
44 815	Repayment of foreign loans	44 722	—	44 572	150	—	—	—	—	—	150	—	—
300 900	**Contributions to funds**	**380 900**	—	—	**380 900**	**26 375**	**11 166**	**140**	**4 097**	**5 732**	**61 746**	**55 165**	**216 479**
900	Reserve Fund	900	—	—	900	—	—	—	200	200	500	—	—
300 000	Capital Development Fund	380 000	—	—	380 000	26 375	11 166	140	3 897	5 532	61 246	55 165	216 479
—	**Distribution of costs**	—	(42 023)	(859 119)	901 142	77 247	36 371	511	12 034	12 486	147 631	120 795	494 067
—	Corporate burden	—	(42 023)	28 500	13 523	1 774	1 294	34	395	315	1 748	2 206	5 757
—	Interconnectors	—	—	2 623	(2 623)	—	—	—	—	(933)	—	(182)	(1 508)
—	Use of circuits	—	—	—	—	—	320	18	121	(140)	—	(2)	(317)
—	Transmission costs	—	—	(28 893)	28 893	13 855	7 264	64	1 287	1 740	3 853	27	803
—	Electricity supplied	—	—	—	—	—	—	—	—	—	—	—	—
—	Excess local generating costs	—	—	—	—	—	—	—	—	—	—	—	—
—	Pooled generation	—	—	(861 349)	861 349	61 618	27 493	395	10 231	11 504	142 030	118 746	489 332
1 234 468	**Total charges against revenue**	**1 511 686**	—	—	**1 511 686**	**139 415**	**69 642**	**1 449**	**24 801**	**24 498**	**242 594**	**212 048**	**797 239**
67 361	**Surplus/(Deficit) for the year**	**17 788**	—	—	**17 788**	**(465)**	**2 341**	**64**	**944**	(656)	(1 104)	7 392	9 272
(5 547)	**Accumulated surplus/(deficit) at beginning of year**	**61 814**	—	—	**61 814**	**9 121**	**3 708**	**(80)**	**257**	(8 668)	54 721	2 942	(187)
61 814	**Accumulated surplus/(deficit) at end of year**	**79 602**	—	—	**79 602**	**8 656**	**6 049**	**(16)**	**1 201**	(9 324)	53 617	10 334	9 085

R000

1978 Total		Corporate Services	Central Generating	Distribution Undertakings Total	Cape Western	Cape Northern	Cape Eastern	Border	Orange River	Natal	Eastern Transvaal	Rand and O.F.S.
1 301 829	**Electricity sold**	—	—	**1 301 829**	**124 362**	**55 196**	**1 451**	**22 819**	**18 694**	**220 529**	**173 191**	**685 587**
435 002	Industrial	—	—	435 002	45 509	4 811	880	2 910	874	76 075	104 780	199 163
388 398	Bulk	—	—	388 398	47 895	9 373	434	18 713	17 818	107 431	15 323	171 411
356 479	Mining	—	—	356 479	—	31 606	—	—	—	5 740	39 849	279 284
85 590	Traction	—	—	85 590	12 414	8 211	—	—	—	26 485	12 338	26 142
36 360	Domestic and lighting	—	—	36 360	18 544	1 195	137	1 196	2	4 798	901	9 587
548 562	**Operating expenditure**	**21 701**	**443 347**	**83 514**	**16 100**	**4 979**	**374**	**3 969**	**2 186**	**15 297**	**10 847**	**29 762**
317 828	Operations	499	316 308	1 021	125	99	—	43	47	186	207	314
66 264	Maintenance	227	43 381	22 656	4 489	1 195	168	1 051	517	3 572	4 213	7 451
26 364	Electricity purchased	—	26 364	—	—	—	—	—	—	—	—	—
138 106	Administration and general expenses	20 975	57 294	59 837	11 486	3 685	206	2 875	1 622	11 539	6 427	21 997
385 006	**Loan charges**	**7 420**	**264 797**	**112 789**	**15 060**	**12 144**	**350**	**3 921**	**4 067**	**14 113**	**19 149**	**43 985**
308 970	Interest and finance charges	6 798	202 648	99 524	13 436	11 089	318	3 589	3 564	12 003	17 026	38 499
31 221	Redemption of local loans	622	17 519	13 080	1 624	1 055	32	332	503	1 925	2 123	5 486
44 815	Repayment of foreign loans	—	44 630	185	—	—	—	—	—	185	—	—
300 900	**Contributions to funds**	—	—	**300 900**	**21 496**	**7 982**	**122**	**3 409**	**4 516**	**48 867**	**41 350**	**173 158**
900	Reserve Fund	—	—	900	—	—	—	200	200	500	—	—
300 000	Capital Development Fund	—	—	300 000	21 496	7 982	122	3 209	4 316	48 367	41 350	173 158
—	**Distribution of costs**	(29 121)	(708 144)	737 265	68 035	24 254	440	11 548	9 235	124 006	93 443	406 304
—	Corporate burden	(29 121)	19 063	10 058	1 299	1 019	26	279	250	1 369	1 532	4 284
—	Interconnectors	—	2 400	(2 400)	—	—	—	—	(957)	—	(177)	(1 266)
—	Use of circuits	—	—	—	—	319	25	155	(180)	—	(2)	(317)
—	Transmission costs	—	(17 690)	17 690	9 888	2 477	54	1 314	1 220	2 029	—	708
—	Electricity supplied	—	—	—	—	—	—	—	—	—	838	(838)
—	Excess local generating costs	—	(7 093)	7 093	2 313	—	—	929	—	3 851	—	—
—	Pooled generation	—	(704 824)	704 824	54 535	20 439	335	8 871	8 902	116 757	91 252	403 733
1 234 468	**Total charges against revenue**	—	—	**1 234 468**	**120 691**	**49 359**	**1 286**	**22 847**	**20 004**	**202 283**	**164 789**	**653 209**
67 361	**Surplus/(Deficit) for the year**	—	—	**67 361**	**3 671**	**5 837**	**165**	(28)	(1 310)	**18 246**	**8 402**	**32 378**
(5 547)	**Accumulated surplus/(deficit) at beginning of year**	—	—	**(5 547)**	**5 450**	(2 129)	(245)	285	(7 358)	**36 475**	(5 460)	(32 565)
61 814	**Accumulated surplus/(deficit) at end of year**	—	—	**61 814**	**9 121**	**3 708**	(80)	257	(8 668)	**54 721**	**2 942**	(187)

Borrowings

at 31 December 1979

Schedule 2

Internal registered stock

Loan	R000	Per cent	Repayment date/s	R000 Out-standing	R000 1978
33	16 000	4,625	1975/80	**16 000**	**16 000**
34	16 000	4,875	1975/80	**16 000**	**16 000**
35	16 500	5,125	1976/81	**16 500**	**16 500**
36	20 000	5,125	1977/82	**20 000**	**20 000**
37	22 000	5,125	1976/82	**22 000**	**22 000**
38	24 000	5,125	1977/83	**24 000**	**24 000**
39	24 000	5,375	1978/83	**24 000**	**24 000**
40	22 000	5,625	1979/84	**22 000**	**22 000**
42	20 000	5,375	1979/84	**20 000**	**20 000**
43	16 000	5,375	1979/85	**16 000**	**16 000**
44	16 000	5,375	1980/85	**16 000**	**16 000**
45	17 000	5,5	1980/86	**17 000**	**17 000**
46	16 000	5,875	1981/86	**16 000**	**16 000**
47	18 000	6,25	1981/86	**18 000**	**18 000**
49	18 000	6,125	1982/87	**18 000**	**18 000**
50	22 000	5,25	1982/87	**22 000**	**22 000**
51	29 000	5	1983/88	**29 000**	**29 000**
52	40 000	5	1980/83	**40 000**	**40 000**
53	20 000	5	1982/84	**20 000**	**20 000**
54	20 000	5,5	1982/84	**20 000**	**20 000**
55	32 000	5,875	1983/85	**32 000**	**32 000**
56	38 000	6,5	1983/85	**38 000**	**38 000**
58	30 000	6,5	1989/91	**30 000**	**30 000**
60	35 000	6,75	1991	**35 000**	**35 000**
61	35 000	6,875	1992	**35 000**	**35 000**
64	12 000	6,5	1992	**12 000**	**12 000**
65	37 000	6,875	1992	**37 000**	**37 000**
70	10 000	6,5	1993	**10 000**	**10 000**
71	70 000	6,875	1993	**70 000**	**70 000**
75	22 000	6,5	1993	**22 000**	**22 000**
76	48 000	6,875	1993	**48 000**	**48 000**
78	20 000	6,5	1994	**20 000**	**20 000**
79	30 000	6,875	1994	**30 000**	**30 000**
81	10 000	6,5	1994	**10 000**	**10 000**
82	25 000	6,875	1994	**25 000**	**25 000**
83	18 000	7,5	1995	**18 000**	**18 000**
84	3 000	7	1995	**3 000**	**3 000**
85	35 000	8,75	1995	**35 000**	**35 000**
86	10 000	8,5	1995	**10 000**	**10 000**
87	45 000	9,25	1996	**45 000**	**45 000**
88	10 000	8,75	1996	**10 000**	**10 000**
89	20 000	9,25	1996	**20 000**	**20 000**
90	30 000	9,25	1996	**30 000**	**30 000**
91	10 000	8,75	1996	**10 000**	**10 000**
92	20 000	9,25	1997	**20 000**	**20 000**
93	22 000	9,125	1997	**22 000**	**22 000**
94	5 000	8,75	1997	**5 000**	**5 000**
95	25 000	8,5	1997	**25 000**	**25 000**
96	28 000	8,25	1997	**28 000**	**28 000**
97	7 000	8	1997	**7 000**	**7 000**
98	45 000	8,25	1997	**45 000**	**45 000**
99	30 000	8,25	1998	**30 000**	**30 000**
100	20 000	8,375	1998	**20 000**	**20 000**
101	5 000	8	1998	**5 000**	**5 000**
103	24 000	8	1998	**24 000**	**24 000**
104	6 000	7,625	1998	**6 000**	**6 000**
105	30 000	7,25	1979	**—**	**30 000**
106	45 000	8	1998	**45 000**	**45 000**
107	27 000	9	1999	**27 000**	**27 000**
108	3 000	8,5	1999	**3 000**	**3 000**
110	30 000	9,5	1999	**30 000**	**30 000**
111	11 000	10,75	2000	**11 000**	**11 000**
Carried forward				**1 400 500**	**1 430 500**

Loan	R000	Per cent	Repayment date/s	R000 Out-standing	R000 1978
Brought forward				**1 400 500**	**1 430 500**
112	29 000	10,75	2000	**29 000**	**29 000**
113	40 000	10,75	2000	**40 000**	**40 000**
114	25 000	10,75	2000	**25 000**	**25 000**
115	5 000	10,25	2000	**5 000**	**5 000**
116	30 000	10,75	2000	**30 000**	**30 000**
117	5 000	10,875	1985	**5 000**	**5 000**
118	55 000	11	2000	**55 000**	**55 000**
119	10 000	10,75	1980/95	**10 000**	**10 000**
120	4 000	11	1986	**4 000**	**4 000**
121	40 000	11,4	2001	**40 000**	**40 000**
122	6 000	11,1	1981/96	**6 000**	**6 000**
123	40 000	12,75	1996	**40 000**	**40 000**
124	10 000	12,65	1986	**10 000**	**10 000**
125	20 000	12,45	1981	**20 000**	**20 000**
126	40 000	12,5	2001	**40 000**	**40 000**
127	150 000	12,6	1999	**150 000**	**150 000**
128	20 000	12,45	1987	**20 000**	**20 000**
129	80 000	12,15	1982	**80 000**	**80 000**
130	50 000	11,5	1989	**50 000**	**50 000**
131	250 000	11,15	2002	**250 000**	**250 000**
132	250 000	11,75	2002	**250 000**	**250 000**
133	60 000	10,9	1988	**60 000**	**60 000**
134	170 000	10,75	2003	**170 000**	**170 000**
135	270 000	11,3	2003	**270 000**	**270 000**
136	7 800	7,25	1985/7	**7 800**	**7 800**
137	60 000	9,7	1986	**60 000** (a)	**60 000**
138	150 000	9,7	2003	**150 000** (b)	**150 000**
139	340 000	10,25	2003	**340 000** (c)	**340 000**
140	120 000	8	1986	**120 000**	**—**
141	130 000	8,65	2004	**130 000**	**—**
142	350 000	9,15	2004	**350 000**	**—**
143	50 000	7,55	1985	**50 000**	**—**
144	130 000	9,05	2005	**130 000**	**—**
145	270 000	9,55	2005	**270 000**	**—**
				4 667 300	**3 647 300**
Less payable by stockholders				**—**	**7 667**

137 not later than 15 January 1979	(a)	**374**
138 not later than 15 January 1979	(b)	**2 044**
139 not later than 15 January 1979	(c)	**5 249**

	4 667 300	**3 639 633**

Foreign bond issues

Loan	Foreign currency	R000	Per cent	Repay-ment date/s	R000 Out-standing	R000 1978
001	DM 50 000 000	(8 291)	6,5	1971/80	**892**	**1 784**
004	DM 100 000 000	(18 034)	6,5	1974/83	**7 213**	**9 017**
005	DM 100 000 000	(19 583)	8,5	1976/85	**11 750**	**13 708**
006	UA 12 000 000	(8 263)	9,25	1971/80	**2 536**	**5 242**
007	DM 100 000 000	(19 556)	8	1977/86	**13 689**	**15 645**
009	UA 20 000 000	(14 210)	8,25	1972/86	**19 782**	**23 350**
013	US$ 20 000 000	(14 304)	8,5	1974/86	**7 867**	**8 940**
017	DM 100 000 000	(25 132)	6,25	1977/87	**20 106**	**22 619**
020	SF 50 000 000	(8 293)	6,5	1979/88	**8 293**	**8 293**
023	DM 100 000 000	(24 975)	7	1979/88	**22 589**	**24 975**
027	US$ 15 000 000	(10 080)	9,25	1975/89	**8 400**	**8 736**
034	US$ 25 000 000	(17 028)	10	1980	**17 028**	**17 028**
035	DM 100 000 000	(27 851)	9,25	1980	**27 851**	**27 851**
037	US$ 30 000 000	(26 119)	10,25	1979/83	**12 289**	**16 233**
Carried forward					**4 847 585**	**3 843 054**

R000

Loan	Foreign currency	R000	Per cent	Repayment date/s	Out-standing	1978
Brought forward					**4 847 585**	**3 843 054**
Direct placings						
008	DM	10 000 000 (2 054)	8	1977/86	**1 438**	**1 643**
010	DM	20 000 000 (3 644)	8,5	1977/86	**2 551**	**2 915**
011	DM	20 000 000 (4 016)	8,5	1977/86	**2 811**	**3 213**
012	DM	40 000 000 (9 437)	8,5	1976/83	**4 719**	**5 898**
015	DFL	50 000 000 (11 740)	6,5	1976/79	**—**	**2 935**
021	SF	50 000 000 (8 324)	6,75	1980	**8 324**	**8 324**
024	SF	75 000 000 (16 304)	6,5	1980	**16 304**	**16 304**
028	SF	20 000 000 (4 318)	8,5	1979	**—**	**4 318**
029	US$	35 000 000 (23 839)	12,625	1975/82	**17 879**	**19 071**
031	DM	70 000 000 (20 138)	10,5	1979	**—**	**20 138**
032	SF	30 000 000 (8 003)	9	1982	**8 003**	**8 003**
033	US$	40 000 000 (27 244)	16,125	1978/90	**19 411**	**19 412**
036	SF	50 000 000 (13 298)	9	1980	**13 298**	**13 298**
040	M£	5 000 000 (10 743)	8,5	1981	**11 976**	**11 945**
042	SF	50 000 000 (17 185)	7,75	1980	**17 185**	**17 185**
043	DM	75 000 000 (25 351)	9,75	1980	**25 351**	**25 351**
044/01	US$	20 000 000 (17 384)	9,5625	1979	**—**	**3 465**
044/02	DM	8 000 000 (3 337)	5,875	1979	**—**	**3 337**
044/03	DM	10 000 000 (4 411)	5,75	1979	**—**	**4 411**
045	US$	10 000 000 (8 706)	8,5	1979	**—**	**1 350**
051	DM	10 000 000 (3 553)	7	1979	**—**	**937**
054	US$	10 000 000 (8 718)	12,8125	1978/83	**4 965**	**6 974**
067	DM	30 000 000 (11 758)	8,25	1980	**11 758**	**11 758**
068	DM	25 000 000 (9 376)	7,5	1979	**—**	**9 376**
069	DM	25 000 000 (10 290)	8,25	1981	**10 290**	**10 290**
070	DM	20 000 000 (7 773)	8	1979/80	**3 887**	**7 773**
071	SF	20 000 000 (8 132)	1,5	1979	**—**	**8 132**
073	US$	9 000 000 (7 836)	9,25	1979	**—**	**7 836**
074A	DM	19 000 000 (7 814)	6	1978/79	**—**	**7 814**
074B	DM	21 500 000 (8 745)	5,75	1978/79	**—**	**8 745**
075	DM	20 000 000 (8 251)	8	1980/81	**8 251**	**8 251**
076	DM	20 000 000 (8 208)	8	1980/81	**8 208**	**8 208**
077	SF	80 000 000 (36 347)	7	1981	**36 347**	**36 347**
078	SF	35 000 000 (16 253)	6,75	1978/81	**16 253**	**16 253**
080	SF	9 500 000 (4 247)	3,5	1979	**—**	**4 247**
081	SF	9 500 000 (4 208)	3,5	1979	**—**	**4 208**
082	DM	101 500 000 (41 648)	10	1983	**41 648**	**21 752**
083	SF	20 000 000 (9 331)	3,25	1979	**—**	**9 331**
084	US$	4 000 000 (3 483)	14,125	1980	**3 482**	**3 482**
085	US$	10 000 000 (8 706)	10,5625	1979	**—**	**8 706**
086	SF	20 000 000 (9 662)	4,5	1979	**—**	**9 662**
087	US$	31 545 250 (27 500)	6,5	1979/81	**18 000**	**27 500**
088/01	SF	5 000 000 (2 648)	5	1980/83	**2 659**	**2 659**
088/02	SF	4 500 000 (2 191)	5,5	1981/84	**2 456**	**—**
089	US$	12 000 000 (10 409)	6,0625	1979	**—**	**10 409**
090	SF	120 000 000 (68 278)	6,25	1982	**68 650**	**68 650**
091	DM	40 000 000 (20 192)	10,5	1981/84	**20 192**	**20 192**
092	DM	20 000 000 (10 096)	8	1984	**10 096**	**10 096**
093	DM	68 500 000 (30 690)	10	1983	**30 690**	**20 406**
094	SF	9 000 000 (4 616)	5	1983	**5 262**	**—**
094A	DM	17 000 000 (7 747)	8,375	1983	**8 559**	**—**
095	DM	40 000 000 (18 687)	7,7	1982/83	**18 748**	**—**
096	SF	9 000 000 (4 644)	4,25	1982	**4 661**	**—**
097	DM	60 000 000 (27 641)	8,4375	1982	**31 481**	**—**
098	SF	60 000 000 (30 071)	5,5	1984	**35 457**	**—**
100	DM	13 144 937 (5 894)	9,0125	1984	**6 549**	**—**
101	SF	20 000 000 (10 061)	2,25	1980	**10 373**	**—**
102	SF	8 500 000 (4 163)	4,25	1983	**4 741**	**—**
103	SF	20 000 000 (10 147)	3,375	1980	**10 510**	**—**
104	SF	20 000 000 (10 516)	4,25	1980	**10 516**	**—**
105	SF	9 000 000 (5 230)	5	1983	**5 229**	**—**
106	SF	9 000 000 (5 003)	5	1982	**5 003**	**—**
107	DM	20 000 000 (10 215)	8,75	1984	**10 215**	**—**
108	DM	20 000 000 (10 160)	8,75	1984	**10 160**	**—**
109	US$	11 000 000 (9 003)	12,0625	1980	**9 003**	**—**
110	US$	33 000 000 (30 231)	13,9375	1983/84	**24 450**	**—**
111A	US$	13 000 000 (11 845)	9,75	1983/84	**11 845**	**—**
111B	US$	5 000 000 (4 648)	10,25	1983/86	**4 648**	**—**
112	US$	12 000 000 (10 097)	13,6875	1982	**9 886**	**—**
113	SF	9 500 000 (5 601)	5,25	1983	**5 601**	**—**
Total borrowings					**5 537 564**	**4 405 564**

Investments of the Capital Development Fund

at 31 December 1979

Schedule 3

Description			Loan	Nominal value R000	Book value R000
Escom internal registered stock					
8,50	per cent	1997	95	7 000	6 765
8,25	per cent	1997	98	5 900	5 836
8,375	per cent	1998	100	202	201
8,00	per cent	1998	103	75	75
8,00	per cent	1998	106	108	108
9,50	per cent	1999	110	50	49
10,75	per cent	2000	112	168	164
10,75	per cent	2000	113	61	60
10,75	per cent	2000	114	17	17
11,00	per cent	2000	118	94	93
12,75	per cent	1996	123	61	61
12,60	per cent	1999	127	30 981	32 398
11,15	per cent	2002	131	148 750	141 761
11,75	per cent	2002	132	168 750	168 750
10,75	per cent	2003	134	2 863	2 737
11,30	per cent	2003	135	205 000	205 000
9,70	per cent	2003	138	431	410
10,25	per cent	2003	139	217 375	217 375
8,65	per cent	2004	141	92 528	88 096
9,15	per cent	2004	142	243 132	243 132
9,05	per cent	2005	144	55 000	52 439
9,55	per cent	2005	145	189 318	189 318
Total (Note 10)				1 367 864	1 354 845
Interest accrued					28 793
					1 383 638
Market value				1 511 742	

Investments of the Reserve Fund

at 31 December 1979

Schedule 4

R000

Description		Loan	Nominal value	Book value
Escom internal registered stock				
4,625 per cent	1975/80	33	3 007	2 982
4,875 per cent	1975/80	34	3 091	3 005
5,125 per cent	1976/81	35	4 293	4 117
5,125 per cent	1977/82	36	6 042	5 598
5,125 per cent	1976/82	37	6 073	5 527
5,125 per cent	1977/83	38	7 978	7 434
5,375 per cent	1978/83	39	10 979	10 182
5,625 per cent	1979/84	40	9 832	8 997
5,375 per cent	1979/84	42	7 558	6 799
5,375 per cent	1979/85	43	5 390	4 686
5,375 per cent	1980/85	44	3 784	3 249
5,50 per cent	1980/86	45	3 485	3 009
5,875 per cent	1981/86	46	5 365	4 632
6,25 per cent	1981/86	47	3 764	3 254
6,125 per cent	1982/87	49	2 442	2 088
5,25 per cent	1982/87	50	2 206	1 687
5,00 per cent	1983/88	51	1 817	1 336
5,00 per cent	1980/83	52	12 879	11 785
5,00 per cent	1982/84	53	5 087	4 491
5,50 per cent	1982/84	54	3 923	3 468
5,875 per cent	1983/85	55	3 268	2 950
6,50 per cent	1983/85	56	4 816	4 326
6,50 per cent	1989/91	58	3 477	3 100
6,75 per cent	1991	60	222	202
6,875 per cent	1992	61	2 324	2 223
6,50 per cent	1992	64	33	27
6,875 per cent	1992	65	1 879	1 827
6,875 per cent	1993	71	727	694
6,875 per cent	1993	76	131	108
7,50 per cent	1995	83	663	661
7,00 per cent	1995	84	25	23
8,75 per cent	1995	85	980	980
8,50 per cent	1995	86	99	96
8,75 per cent	1997	94	73	70
9,00 per cent	1999	107	—	—
10,875 per cent	1985	117	153	165
10,75 per cent	1980/95	119	1 785	1 785
11,00 per cent	1986	120	262	271
11,10 per cent	1981/96	122	660	668
12,65 per cent	1986	124	146	173
12,45 per cent	1981	125	1 154	1 229
12,45 per cent	1987	128	1 115	1 330
12,15 per cent	1982	129	6 282	6 795
11,50 per cent	1989	130	5 266	5 684
10,90 per cent	1988	133	15 433	16 751
11,30 per cent	2003	135	9 453	9 453
9,70 per cent	1986	137	6 674	6 735
Carried forward			176 095	166 652

R000

Description		Loan	Nominal value	Book value
Brought forward			176 095	166 652
10,25 per cent	2003	139	338	338
7,55 per cent	1985	143	34 853	34 853
9,55 per cent	2005	145	1 000	1 000
Total (Note 10)			212 286	202 843
Municipal stock				
Bloemfontein				
5,375 per cent	1975/80		100	98
Cape Town				
5,375 per cent	1980/85	203	600	550
5,50 per cent	1981/86	208	850	768
5,50 per cent	1983/88	219	611	537
5,50 per cent	1980	227	100	100
6,50 per cent	1981	240	210	208
Durban				
5,375 per cent	1976/80	70	800	792
5,00 per cent	1984	84	500	452
5,50 per cent	1982	87	450	430
6,00 per cent	1980	88	500	497
6,00 per cent	1981	91	1 000	980
6,50 per cent	1981	93	1 000	988
Germiston				
5,375 per cent	1985	16	150	135
Pretoria				
5,00 per cent	1961/81	7	246	240
6,25 per cent	1977/82	49	200	195
5,50 per cent	1980/83	56	200	188
6,50 per cent	1981/84	59	200	194
Rand Water Board				
6,50 per cent	1984	33	250	241
7,00 per cent	1987	35	200	196
External investments (Note 5)			8 167	7 789
			220 453	210 632
Interest accrued				2 643
				213 275
Market value			221 366	

Investments of the Redemption Fund

at 31 December 1979

Schedule 5

Description		Loan	Nominal value R000	Book value R000
Escom internal registered stock				
4,625 per cent	1975/80	33	2 166	2 161
4,875 per cent	1975/80	34	—	—
5,125 per cent	1976/81	35	674	664
5,125 per cent	1977/82	36	19	18
5,125 per cent	1976/82	37	226	220
5,125 per cent	1977/83	38	150	144
5,375 per cent	1978/83	39	39	37
5,625 per cent	1979/84	40	880	829
5,375 per cent	1979/84	42	1 775	1 645
5,375 per cent	1979/85	43	2 430	2 254
5,375 per cent	1980/85	44	194	175
5,50 per cent	1980/86	45	1 628	1 493
5,875 per cent	1981/86	46	416	376
6,25 per cent	1981/86	47	159	145
6,125 per cent	1982/87	49	378	337
5,25 per cent	1982/87	50	306	257
5,00 per cent	1983/88	51	164	123
5,00 per cent	1980/83	52	82	78
5,00 per cent	1982/84	53	27	25
5,50 per cent	1982/84	54	197	183
5,875 per cent	1983/85	55	207	192
6,50 per cent	1983/85	56	69	66
6,50 per cent	1989/91	58	257	216
6,75 per cent	1991	60	51	43
6,875 per cent	1992	61	215	202
6,50 per cent	1992	64	2 305	2 055
6,875 per cent	1992	65	1 480	1 325
6,50 per cent	1993	70	1 792	1 616
6,875 per cent	1993	71	8 859	7 791
6,50 per cent	1993	75	1 173	963
6,875 per cent	1993	76	3 467	2 484
6,50 per cent	1994	78	2 639	2 274
6,875 per cent	1994	79	9 984	8 735
6,50 per cent	1994	81	1 765	1 541
6,875 per cent	1994	82	7 522	7 042
7,50 per cent	1995	83	1 325	1 069
7,00 per cent	1995	84	531	412
8,75 per cent	1995	85	11 375	11 021
8,50 per cent	1995	86	2 427	2 254
9,25 per cent	1996	87	2 198	2 127
8,75 per cent	1996	88	204	182
9,25 per cent	1996	89	1 878	1 775
9,25 per cent	1996	90	742	719
8,75 per cent	1996	91	6 602	6 265
9,25 per cent	1997	92	956	817
9,125 per cent	1997	93	2 264	2 129
8,75 per cent	1997	94	421	386
8,50 per cent	1997	95	930	874
8,25 per cent	1997	96	3 864	3 566
8,00 per cent	1997	97	126	110
8,25 per cent	1997	98	1 278	1 198
8,25 per cent	1998	99	2 866	2 542
8,375 per cent	1998	100	1 429	1 291
8,00 per cent	1998	101	452	401
8,00 per cent	1998	103	206	174
7,625 per cent	1998	104	1 413	1 208
8,00 per cent	1998	106	2 496	2 153
9,00 per cent	1999	107	1 119	1 053
8,50 per cent	1999	108	506	457
Carried forward			101 303	91 892
Brought forward			101 303	91 892
9,50 per cent	1999	110	3 013	2 992
10,75 per cent	2000	111	2 297	2 525
10,75 per cent	2000	112	3 233	3 466
10,75 per cent	2000	113	2 580	2 853
10,75 per cent	2000	114	234	257
10,25 per cent	2000	115	264	268
10,75 per cent	2000	116	2 049	2 238
10,875 per cent	1985	117	81	91
11,00 per cent	2000	118	3 214	3 492
11,00 per cent	1986	120	148	167
11,40 per cent	2001	121	6 341	7 299
11,10 per cent	1981/96	122	8	9
12,75 per cent	1996	123	99	124
12,65 per cent	1986	124	90	110
12,45 per cent	1981	125	564	609
12,50 per cent	2001	126	1 070	1 325
12,60 per cent	1999	127	338	424
12,45 per cent	1987	128	794	962
12,15 per cent	1982	129	15 968	17 652
11,50 per cent	1989	130	500	582
11,15 per cent	2002	131	18 604	19 509
11,75 per cent	2002	132	20 207	20 739
10,90 per cent	1988	133	1 142	1 297
10,75 per cent	2003	134	57 333	56 453
11,30 per cent	2003	135	10 362	10 567
9,70 per cent	1986	137	176	190
9,70 per cent	2003	138	36 152	34 543
10,25 per cent	2003	139	48 169	48 440
8,00 per cent	1986	140	63 376	63 491
8,65 per cent	2004	141	21 114	20 102
7,55 per cent	1985	143	11 000	11 000
9,05 per cent	2005	144	53 447	51 006
9,55 per cent	2005	145	10 000	10 000
Total (Note 10)			495 270	486 674
Republic of South Africa				
6,00 per cent	1985		500	491
Municipal stock				
Bloemfontein				
5,375 per cent	1975/80		80	79
Cape Town				
5,375 per cent	1980/85	203	300	275
Germiston				
5,375 per cent	1985	16	20	18
External investments (Note 5)			900	863
			496 170	487 537
Interest accrued				9 716
				497 253
Market value			520 584	

Investments in Escom foreign loan bonds

at 31 December 1979 — Schedule 6

Description		Loan		Foreign currency	Nominal value R000	Book value R000
German	6,5 per cent 1965/80	FFOO1	DM	158 200	28	26
German	6,5 per cent 1968/83	FF004	DM	2 025 000	365	326
German	8,5 per cent 1970/85	FF005	DM	1 423 000	279	258
Units of Account	9,25 per cent 1970/86	FF006	UA	—	—	—
German	8 per cent 1971/86	FF007	DM	3 609 000	706	615
Units of Account	8,25 per cent 1971/86	FF009	UA	—	—	—
Euro-dollar	8,5 per cent 1971/86	FF013	$	425 000	305	285
German	6,25 per cent 1972/86	FF017	DM	5 017 000	1 261	1 026
German	7 per cent 1973/88	FF023	DM	4 404 000	1 100	903
Euro-dollar	9,25 per cent 1974/89	FF027	$	644 000	433	403
Euro-dollar	Floating 1975/82	FF029	$	300 000	204	204
Euro-dollar	10 per cent 1975/80	FF034	$	528 000	360	352
Euro-dollar	10,25 per cent 1975/83	FF037	$	491 000	427	424
Total (Note 10)					5 468	4 822
Interest accrued						194
Market value				9 381		

Capital Development Fund Account

for the year ended 31 December 1979

Schedule 7

	R000			
	1979		1978	
Amounts set aside		380 000		300 000
Cape Western Undertaking	26 375		21 496	
Cape Northern Undertaking	11 166		7 982	
Cape Eastern Undertaking	140		122	
Border Undertaking	3 897		3 209	
Orange River Undertaking	5 532		4 316	
Natal Undertaking	61 246		48 367	
Eastern Transvaal Undertaking	55 165		41 350	
Rand & Orange Free State Undertaking	216 479		173 158	
Central Generating Undertaking	—		—	
Investment income		111 408		70 168
Interest earned	111 264		70 091	
Adjustments of investment values	144		77	
Balance at beginning of year		808 998		438 830
Balance at end of year		1 300 406		808 998

Reserve Fund Account

for the year ended 31 December 1979

Schedule 8

	R000			
	1979		1978	
Amounts set aside		900		900
Cape Western Undertaking	—		—	
Cape Northern Undertaking	—		—	
Cape Eastern Undertaking	—		—	
Border Undertaking	200		200	
Orange River Undertaking	200		200	
Natal Undertaking	500		500	
Eastern Transvaal Undertaking	—		—	
Rand & Orange Free State Undertaking	—		—	
Central Generating Undertaking	—		—	
Investment income		19 519		21 619
Interest earned	17 395		20 321	
Adjustments of investment values	2 124		1 298	
		20 419		22 519
Expenditure		16 384		11 477
Cape Western Undertaking	—		4	
Cape Northern Undertaking	187		15	
Cape Eastern Undertaking	—		—	
Border Undertaking	3		—	
Orange River Undertaking	2		—	
Natal Undertaking	770		1 541	
Eastern Transvaal Undertaking	75		194	
Rand & Orange Free State Undertaking	294		804	
Central Generating Undertaking	15 053		8 919	
		4 035		11 042
Balance at beginning of year		220 116		209 074
Balance at end of year		224 151		220 116

Redemption Fund Account

for the year ended 31 December 1979

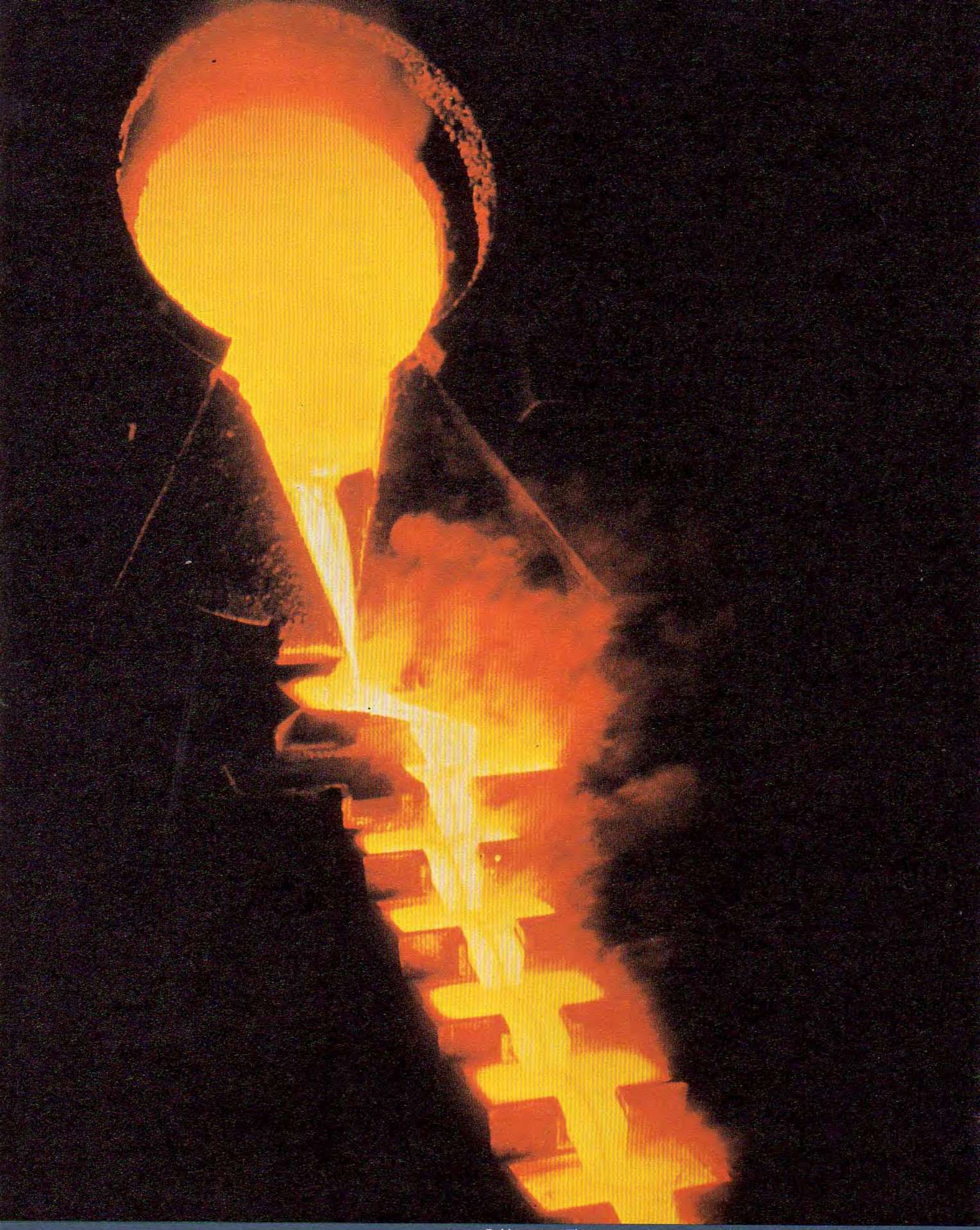
Schedule 9

	R000			
	1979		1978	
Amounts contributed		43 324		30 599
Cape Western Undertaking	2 170		1 624	
Cape Northern Undertaking	1 640		1 055	
Cape Eastern Undertaking	44		32	
Border Undertaking	444		332	
Orange River Undertaking	415		503	
Natal Undertaking	2 360		1 925	
Eastern Transvaal Undertaking	2 851		2 123	
Rand & Orange Free State Undertaking	7 095		5 486	
Central Generating Undertaking	26 305		17 519	
Other contributions		754		622
Proceeds of sales of fixed property		4 124		852
Investment income		43 467		34 010
Interest earned	43 689		34 738	
Adjustments of investment values	(222)		(728)	
		91 669		66 083
Repayment of internal registered stock		30 000		—
7,25 per cent 1979 (loan 105)				
		61 669		66 083
Balance at beginning of year		448 649		382 566
Balance at end of year		510 318		448 649

We have examined the accounting records of the Redemption Fund. In our opinion proper records have been kept and the Fund has been maintained in accordance with the requirements of the Electricity Act, 1958.

Deloitte Haskins & Sells
Alex. Aiken & Carter
Chartered Accountants (S.A.)
Auditors

Sandton
25 March 1980



Gold pouring. The mining industry is one of Escom's major consumer categories.

Statistical and other statements

Power stations: principal equipment installed

at 31 December 1979

Statement No. 1

Power station	Station capacity			Boilers		Main turbo-generators		Steam conditions at turbine inlet	
	Boilers kg/s	Gene-rators MW	Assigned sent-out rating MW	No.	Maximum continuous rating each kg/s	No.	Normal rating each MW	Pressure MPa (abs)	Temper-ture °C
Coal-fired station, Eastern Cape									
West Bank 2	85,6	45,0		4	21,4	3	15,0	2,9	427
	53,0	40,0		2	26,5	2	20,0	2,9	427
Sub-total	138,6	85,0	80	6		5			
Coal-fired stations, Natal									
Colenso	90,8	75,0		4	22,7	3	25,0	2,0	385
	50,4	30,0		2	25,2	1	30,0	2,0	385
	141,2	105,0	84	6		4			
Ingagane	567,0	500,0	465	5	113,4	5	100,0	8,4	510
Umgeni	181,6	120,0		8	22,7	4	30,0	4,2	454
	164,0	120,0		5	32,8	2	60,0	4,2	454
	345,6	240,0	222	13		6			
Sub-total	1 053,8	845,0	771	24		15			
Coal-fired stations, Transvaal and O.F.S.									
Arnot	1 998,6	2 100,0	1 980✓	6	333,1	6	350,0	15,9/3,98	510/510
Camden	1 814,4	1 600,0	1 520✓	8	226,8	8	200,0	10,3	538
Grootvlei	1 071,0	1 200,0		5	214,2	6	200,0	10,3	538
	230,6			1	230,6			10,3	538
	1 301,6	1 200,0	1 140	6		6			
Hendrina	2 142,0	2 000,0	1 900✓	10	214,2	10	200,0	10,3	538
Highveld	554,4	480,0	440	8	69,3	8	60,0	6,3	482
Klip	567,5	396,0		25	22,7	12	33,0	2,5	390
		*28,0							
	567,5	424,0	372	25		12			
Komati	567,0	500,0		5	113,4	5	100,0	8,4	510
	566,8	500,0		4	141,7	4	125,0	8,4	510
	1 133,8	1 000,0	925✓	9		9			
Kriel	2 640,0	3 000,0	2 850✓	6	440,0	6	500,0	16,0/3,17	510/510
Matla	508,2	600,0	575✓	1	508,2	1	600,0	16,1/3,68	535/535
Taaibos	584,0	480,0	440	8	73,1	8	60,0	4,2	441
Vaal	430,2	297,0		18	23,9	9	33,0	2,5	427
		†21,0							
	430,2	318,0	282	18		9			
Vierfontein	503,5	360,0	336	19	26,5	12	30,0	4,2	441
Wilge	62,8			4	15,7				
	201,6	60,0		4	50,4	2	30,0	4,2	454
	73,1	180,0		1	73,1	3	60,0	4,2	454
	337,5	240,0	221✓	9		5			
Sub-total	14 515,7	13 802,0	12 981	133		100			

Power station	Station capacity			Boilers		Main turbo-generators		Steam conditions at turbine inlet	
	Boilers kg/s	Generators MW	Assigned sent-out rating MW	No.	Maximum continuous rating each kg/s	No.	Normal rating each MW	Pressure MPa (abs)	Temperature °C
Coal-fired stations, Western Cape									
Hex River	100,8 69,2	60,0 60,0		4 2	25,2 34,6	3 2	20,0 30,0	4,2 4,2	427 482
	170,0	120,0	114	6		5			
Salt River 2	328,0	120,0 120,0		10	32,8	4 2	30,0 60,0	4,2 4,2	482 482
	328,0	240,0	228	10		6			
Sub-total	498,0	360,0	342	16		11			
Total, coal-fired stations	16 206,1	15 092,0	14 174	179		131			
Gas turbine stations									
Acacia (Western Cape)		171,0	171			3	57,0		
Port Rex (Eastern Cape)		171,0	171			3	57,0		
Total, gas turbine stations		342,0	342			6			
Hydro-electric stations, conventional storage									
Hendrik Verwoerd		320,0	320			4	80,0		
Vanderkloof		220,0	220			2	110,0		
Total hydro stations		540,0	540			6			
Total, all Escom	16 206,1	15 974,0	15 056	179		143			

Other Power Sources

	Firm capacity available to Escom MW
Cahora Bassa	1 384

*Four 7 MW house sets installed at Klip.
†Three 7 MW house sets installed at Vaal.

Price or rent of land or rights or interests in or over land or any other property acquired or hired by the Commission during the year ending 31 December 1979

Statement No. 2

Undertakings	Immovable property acquired for considerations amounting to	Servitudes and other interest in or over land or other property acquired or hired
Central Generating Undertaking	—	R118 361,00
Cape Western Undertaking	R421 277,00	R675 838,00
Cape Northern Undertaking	R330 800,00	R213 965,00
Orange River Undertaking	R119 216,00	R48 311,00
Border Undertaking	R461 476,00	R40 274,00
Natal Undertaking	R426 780,00	R467 535,00
Eastern Transvaal Undertaking	R228 348,83	R177 583,55
Rand and O.F.S. Undertaking	R367 380,00	R482 095,74
Head Office (Operations)	R1 910 320,00	R367 084,97
Cape Eastern Undertaking	R10,00	R8 746,00

Transmission system: principal equipment installed

Circuit kilometres (excluding service connections on reticulation systems) of lines and cables and capacity of transformers in service at 31 December 1979

Statement No. 3

Undertaking	Transmission lines							Total	Capacity of transformers MVA
	533 kV DC (Mono-polar)	400 kV	275 kV	220 kV	165 kV to 132 kV	88 kV to 33 kV	22 kV and below		
Border				160	169	850	2 583	3 762	1 697
Cape Eastern							601	601	44
Cape Northern		196	580	305	2 439	937	4 107	8 564	4 049
Cape Western		24			1 299	2 290	10 583	14 196	7 456
Eastern Transvaal			1 263		2 722	1 720	13 208	18 913	11 936
Natal			1 331		1 328	3 400	11 154	17 213	11 186
Orange River				392	153	759	1 509	2 813	3 779
Rand and O.F.S.		430	2 807		4 294	10 212	18 979	36 722	47 765
Central Generating	1 030	6 762		108	17			7 917	26 431
Total	1 030	7 412	5 981	965	12 421	20 168	62 724	110 701	114 343

	Underground cables							Total
Border							119	119
Cape Eastern							3	3
Cape Northern							38	38
Cape Western					20	125	3 655	3 800
Eastern Transvaal							274	274
Natal						4	713	717
Orange River							2	2
Rand and O.F.S.						272	2 096	2 368
Total					20	401	6 900	7 321

	Total lines and cables						Total	Total capacity of transformers MVA
1979	1 030	7 412	6 946	12 441	20 569	69 624	118 022	114 343
1978	1 030	7 260	*6 883	11 739	20 062	67 217	*114 191	*110 585
Additions	—	152	63	702	507	2 407	3 831	3 758

*Amended figures.

Power station operating statistics, 1979

Statement No. 4

Power station	Sent-out rating on 31 December 1979 MW	Energy sent out million kW.h	Maximum demands 1 hour sent out MW	Station load factors per cent *A	Station load factors per cent **B	Overall thermal efficiency per cent Sent out	‡Availability per cent	Fuel burnt tons	kg of coal/kW.h sent out	Heat content of coal (as received) MJ/kg	Station heat rate MJ/kW.h sent out
Coal-fired station, Eastern Cape											
West Bank	80	190,9	88	27,2	37,6	21,3	72,4	121 265	0,635	26,55	16,87
Coal-fired stations, Natal											
Colenso	†84	202,9	92	26,3	34,6	18,4	76,0	154 350	0,761	25,78	19,60
Ingagane	465	3 106,8	476	76,3	86,9	27,7	87,7	1 749 197	0,563	23,03	13,01
Umgeni	222	741,6	220	38,1	49,1	21,6	77,6	498 799	0,673	24,76	16,65
Sub-total	771	4 051,3	—	59,7	71,5	25,7	83,5	2 402 346	0,593	23,57	14,01
Coal-fired stations, Transvaal and O.F.S.											
Arnot	1 980	10 874,0✓	1 658	62,7	92,1	33,0	68,1	5 269 765✓	0,485	22,49	10,93
Camden	1 520	8 646,8✓	1 327	65,0	87,4	29,2	74,3	4 651 310✓	0,538	22,88	12,31
Grootvlei	1 140	6 839,3	1 118	68,5	85,6	30,5	79,9	3 786 022	0,554	21,28	11,82
Hendrina	1 900	11 651,8✓	1 817	70,0	89,8	31,1	77,9	5 860 027✓	0,503	23,01	11,59
Highveld	440	2 117,3	419	55,0	68,1	26,7	80,9	1 733 289	0,817	16,46	13,50
Klip	372	1 362,4	335	42,0	53,8	17,6	77,9	1 434 131	1,049	19,53	20,49
Komati	925	4 688,4✓	801	58,0	87,8	27,0	66,1	2 837 952✓	0,603	21,99	13,31
Kriel	†2 850	15 197,4✓	2 728	73,0	89,5	34,5	81,6	7 797 630✓	0,513	20,24	10,42
Matla (under construction)	†575	597,6✓	667	34,6	75,4	30,7	45,9	336 311✓	0,527	21,05	11,73
Taaibos	440	2 374,7	464	61,8	68,4	24,9	90,3	2 108 771	0,886	16,32	14,49
Vaal	282	1 677,6	286	68,3	76,0	19,3	89,9	1 727 074	1,024	18,20	18,63
Vierfontein	336	1 615,2	347	54,9	59,2	20,9	92,8	1 491 254	0,890	19,32	17,19
Wilge	221	1 579,3✓	228	81,8	90,5	23,4	90,4	1 126 971✓	0,712	21,63	15,42
Sub-total	12 981	69 221,8	—	65,3	84,9	29,5	77,0	40 160 507	0,579	21,00	12,18
Coal-fired stations, Western Cape											
Hex River	114	290,9	117	29,2	32,5	22,2	89,8	179 687	0,617	26,31	16,24
Salt River 1 and 2	228	729,8	247	36,6	39,7	25,6	92,2	401 143	0,550	25,56	14,05
(Salt River 1 decommissioned July 1979)											
Sub-total	342	1 020,7	—	34,2	37,4	24,5	91,4	580 830	0,569	25,79	14,67
Total for all coal-fired stations	14 174	74 484,7	—	63,9	82,2	29,2	77,7	43 264 948	0,580	21,22	12,33
Gas turbine stations											
Acacia (Western Cape)	171	7,9	177	0,5	0,5		96,8	2 821			
Port Rex (Eastern Cape)	171	6,5	174	0,4	0,5		94,0	2 922			
Total for gas turbine stations	342	14,4	—	0,5	0,5		95,4	5 743			
Hydro-electric stations											
Hendrik Verwoerd	320	486,2	391	17,3	18,0		95,9				
Vanderkloof	220	657,4	258	34,1	35,4		96,1				
Total for hydro-stations	540	1 143,6	—	24,1	25,1		96,0				
Total/weighted average	15 056	75 642,7	—	60,9	77,3		78,8				

*Station load factors A = $\frac{\text{kW.h s.o.} \times 100}{\text{(assigned s.o. rating)} \times \text{hours in year}}$

**Station load factors B = $\frac{\text{Station load factors A} \times 100}{\text{Availability}}$

†Operating statistics are based on average capacity during the year.

‡Availability = $\frac{\text{Capacity hours available} \times 100}{\text{Total capacity hours in year}}$

Summary of operating statistics

Statement No. 5

Calendar year	Coal-fired power stations: Coal used: Thousands of tons	Average heat content (as received) MJ/kg	kg per kW.h sent out	Average heat rate MJ/kW.h sent out	Overall thermal efficiency sent-out basis per cent	Coal cost: Total R000	Average rand/ton	Cents per kW.h sent out	Total power stations million kW.h sent out: Coal-fired stations	Hydro-electric stations (conventional dam storage)	Diesel and gas turbine stations	Total power station output	Total power station capacity assigned sent-out rating MW as at 31 December	Average power station plant load factor sent-out basis per cent
1950	6 323,4	22,72	0,869	19,74	18,2	5 302	0,84	0,072 9	7 276,4	6,6	3,5	7 286,5	1 290	64,7
1951	6 662,9	22,72	0,855	19,43	18,5	6 553	0,98	0,084 0	7 797,2	6,3	3,3	7 806,8	1 361	66,1
1952	7 113,4	22,75	0,865	19,68	18,3	8 520	1,20	0,103 7	8 219,7	6,4	1,2	8 227,3	1 454	66,9
1953	7 393,9	23,08	0,837	19,32	18,6	9 862	1,33	0,111 6	8 838,2	6,6	0,6	8 845,4	1 635	65,5
1954	8 024,9	23,06	0,805	18,56	19,4	11 329	1,41	0,113 6	9 971,5	5,7	0,2	9 977,4	1 846	66,4
1955	8 999,7	22,89	0,788	18,04	20,0	13 709	1,52	0,120 1	11 419,1	5,8	0,2	11 425,1	2 145	65,9
1956	9 688,5	22,96	0,765	17,56	20,5	13 653	1,62	0,123 6	12 663,2	6,4	0,3	12 669,9	2 498	61,2
1957	10 220,6	22,79	0,750	17,09	21,1	17 256	1,69	0,126 6	13 633,5	6,3	0,2	13 640,0	2 555	61,1
1958	10 784,1	22,73	0,743	16,89	21,3	19 039	1,77	0,131 2	14 510,5	4,8	0,5	14 515,8	2 748	62,0
1959	11 548,7	22,44	0,732	16,43	21,9	20 970	1,82	0,132 9	15 774,5	2,5	0,1	15 777,1	2 983	62,6
1960	12 512,6	22,52	0,723	16,28	22,1	25 373	2,03	0,146 6	17 305,5	2,0	—	17 307,5	3 091	65,2
1961	13 194,9	22,39	0,722	16,17	22,3	27 713	2,10	0,151 6	18 282,2	1,8	—	18 284,0	3 226	66,2
1962	13 955,5	22,22	0,719	15,98	22,5	29 230	2,09	0,150 7	19 401,2	2,8	0,1	19 404,1	3 406	65,8
1963	14 721,1	22,15	0,708	15,68	23,0	31 009	2,11	0,149 2	20 789,2	4,3	0,1	20 793,6	3 788	65,7
1964	15 654,7	22,15	0,692	15,33	23,5	32 367	2,07	0,143 0	22 634,1	4,5	—	22 638,6	4 077	65,2
1965	16 726,7	22,39	0,680	15,23	23,6	34 986	2,09	0,142 3	24 582,6	—	0,1	24 582,7	4 181	67,4
1966	16 982,3	22,20	0,666	14,79	24,4	37 901	2,23	0,148 6	25 504,1	—	—	25 504,1	4 377	67,1
1967	18 307,7	22,44	0,645	14,47	24,9	42 053	2,30	0,148 2	28 370,9	—	—	28 370,9	5 328	66,8
1968	19 133,9	22,63	0,620	14,03	25,6	44 604	2,33	0,144 6	30 843,5	—	—	30 843,5	5 800	62,9
1969	19 982,9	22,73	0,595	13,52	26,6	47 453	2,37	0,141 2	33 598,2	—	—	33 598,2	6 441	62,1
1970	21 630,6	22,97	0,580	13,32	27,0	48 807	2,26	0,130 8	37 320,8	—	—	37 320,8	7 060	62,9
1971	23 416,2	23,30	0,576	13,42	26,8	52 705	2,25	0,129 7	40 645,8	93,6	—	40 739,4	8 373	61,3
1972	24 952,8	22,89	0,571	13,07	27,5	56 113	2,25	0,128 5	43 662,2	812,9	—	44 475,1	8 849	59,6
1973	27 907,9	22,47	0,563	12,65	28,5	66 837	2,39	0,134 8	49 569,8	189,3	—	49 759,1	9 482	62,5
1974	30 891,4	22,42	0,560	12,56	28,7	90 269	2,92	0,163 7	55 140,9	1 110,3	—	56 251,2	10 002	66,3
1975	34 231,7	22,21	0,567	12,59	28,6	*138 592	*4,05	*0,229 5	60 399,7	1 098,7	—	61 498,4	10 522	68,6
1976	37 257,4	21,87	0,579	12,66	28,4	*200 781	*5,39	*0,312 2	64 309,2	1 853,0	25,9	66 188,1	11 688	66,8
1977	37 505,6	21,78	0,576	12,55	28,7	*233 229	*6,22	*0,358 2	65 113,8	1 924,6	12,1	67 050,5	12 756	61,9
1978	39 589,5	21,61	0,574	12,44	28,9	*263 880	*6,67	*0,382 4	69 004,2	1 887,1	11,1	70 902,4	13 595	60,7
1979	43 264,9	21,22	0,580	12,33	29,2	301 273	6,96	0,404 5	74 484,7	1 143,6	14,4	75 642,7	15 056	60,9

*Amended figures

Integrated Escom system: electricity sent out and sold

Statement No. 6

Calendar year	Escom's share in national electricity supply		Electricity sent out				
	Republic of S.A. total mill. kW.h sent out	Escom mill. kW.h sent-out as % of Republic	mill. kW.h sent out from Escom power stations	mill. kW.h purchased from other sources	mill. kW.h sent out Escom system	Peak demand on integrated Escom system MW	Integrated Escom system load factor per cent
1950	†10 437	71,1	7 286,5	131,4	7 417,8	†1 182	71,6
1951	†11 098	72,1	7 806,8	194,6	8 001,3	†1 212	75,4
1952	†11 678	74,1	8 227,3	423,9	8 651,3	†1 265	77,9
1953	†12 823	73,3	8 845,4	550,4	9 395,8	†1 394	76,9
1954	†14 167	73,5	9 977,4	437,3	10 414,7	†1 570	75,7
1955	†16 021	73,4	11 425,1	339,3	11 764,4	†1 806	74,4
1956	†17 293	74,8	12 669,9	257,2	12 927,0	†2 001	73,5
1957	18 720	73,7	13 640,0	162,8	13 802,9	†2 151	73,3
1958	19 765	74,3	14 515,8	164,1	14 679,9	†2 249	74,5
1959	21 051	75,4	15 777,1	93,6	15 870,7	†2 429	74,6
1960	22 717	76,3	17 307,5	15,3	17 322,8	†2 605	75,7
1961	23 760	77,0	18 284,0	8,4	18 292,4	†2 733	76,4
1962	25 599	75,8	19 404,1	12,6	19 416,7	†2 925	75,3
1963	27 335	76,1	20 793,6	18,6	20 812,2	†3 183	74,6
1964	†29 547	76,8	22 638,6	41,0	22 679,6	†3 460	74,6
1965	31 939	77,4	24 582,7	126,6	24 709,3	3 669	76,9
1966	†33 929	77,0	25 504,1	‡629,9	26 134,0	3 906	76,4
1967	36 897	77,1	28 370,9	69,6	28 440,5	4 227	76,8
1968	†39 761	77,6	30 843,5	7,9	30 851,4	4 658	75,4
1969	42 847	78,4	33 598,2	8,0	33 606,2	5 055	75,9
1970	47 456	77,7	37 320,8	7,3	37 328,1	5 622	75,8
1971	51 081	79,8	40 739,4	8,3	40 747,7	6 115	76,1
1972	55 298	80,4	44 475,1	9,7	44 484,7	6 630	76,4
1973	60 080	82,8	49 759,1	11,3	49 770,4	7 350	77,3
1974	†65 498	85,9	56 251,2	7,9	56 259,1	8 552	75,1
1975	69 883	88,1	61 498,4	34,9	61 533,3	9 185	76,5
1976	75 381	89,4	66 188,1	1 225,5	67 413,7	10 085	76,1
1977	79 491	89,7	67 050,5	4 241,0	71 291,5	10 735	75,8
1978	84 812	91,7	70 902,4	6 923,9	77 826,3	11 490	77,3
1979	92 244	93,3	75 642,3	10 394,3	86 036,6	12 855	76,4

†Estimates based on limited information.
‡Includes purchases from City of Johannesburg during serious drought.

Electricity sales				Employees		Assets in commission at 31 December	
Ratio mill. kW.h sold / mill. kW.h s.o.	mill. kW.h sold	Growth for the year per cent	Average selling price cents/ kW.h	Total number as at 31 December	Number per mill. kW.h sold	R000	R000/ mill. kW.h sold
0,932	6 910,6	11,1	0,274 1	9 352	1,353	*—	—
0,932	7 456,5	7,9	0,292 2	10 336	1,386	—	—
0,934	8 080,6	8,4	0,311 5	10 889	1,348	—	—
0,929	8 732,2	8,1	0,354 2	11 518	1,319	—	—
0,929	9 676,6	10,8	0,380 8	12 317	1,273	—	—
0,932	10 964,0	13,3	0,413 9	12 490	1,139	—	—
0,930	12 019,5	9,6	0,428 5	12 977	1,080	—	—
0,925	12 763,1	6,2	0,447 8	13 421	1,052	—	—
0,927	13 602,1	6,6	0,473 3	14 312	1,052	370 030	27,20
0,928	14 724,5	8,3	0,495 1	13 947	0,947	428 183	29,08
0,929	16 094,1	9,3	0,507 9	14 654	0,911	450 853	28,01
0,930	17 013,2	5,7	0,515 5	15 441	0,908	468 416	27,53
0,933	18 121,0	6,5	0,516 4	16 467	0,909	518 722	28,63
0,937	19 500,0	7,6	0,517 7	16 804	0,862	577 530	29,62
0,937	21 247,5	9,0	0,510 1	17 172	0,808	639 639	30,10
0,937	23 143,3	8,9	0,507 6	17 851	0,771	673 626	29,11
0,940	24 554,3	6,1	0,525 4	18 579	0,757	714 213	29,09
0,937	26 657,1	8,6	0,546 7	19 817	0,743	846 818	31,77
0,936	28 885,0	8,4	0,555 0	20 893	0,723	911 479	31,56
0,937	31 505,6	9,1	0,556 5	21 644	0,687	1 074 503	34,11
0,935	34 890,6	10,7	0,554 5	22 700	0,651	1 180 860	33,84
0,934	38 040,0	9,0	0,577 2	25 050	0,659	1 390 095	36,54
0,936	41 648,9	9,5	0,610 8	26 937	0,647	1 526 697	36,66
0,936	46 578,4	11,8	0,648 4	28 559	0,613	1 699 279	36,48
0,935	52 585,1	12,9	0,682 2	29 891	0,568	1 847 484	35,13
0,940	57 869,2	10,0	0,795 0	33 999	0,588	2 008 917	34,71
0,940	63 355,7	9,5	1,036 0	36 915	0,583	2 311 725	36,49
0,942	67 125,4	5,9	1,535 3	39 112	0,583	2 851 103	42,47
0,935	72 780,4	8,4	1,788 7	41 040	0,564	3 564 600	48,98
0,937	80 582,8	10,7	1,898 0	43 690	0,542	4 255 502	52,81

*Figures not available.

Summary of consolidated revenue and expenditure account

Statement No. 7

Year	Total Escom mill. kW.h sold		Total Escom costs: Interest	Redemption and other provision for loan repayment	Reserve Fund	Capital Development Fund	Total Escom costs: Sub-total capital related costs	Purchase of electricity	Fuel	Other power station operating and maintenance costs	Distribution, operation and maintenance costs	General expenses	Total costs	Total revenue
1967	26 657,1	R(000)	37 312	24 536	9 912	—	71 760	313	42 488	14 618	7 146	10 603	146 928	146 783
		c/kW.h sold	0,140 0	0,092 0	0,037 2	—	0,269 2	0,001 2	0,159 4	0,054 8	0,026 8	0,039 8	0,551 2	0,550 6
		% of total cost	25,39	16,70	6,75	—	48,84	0,21	28,92	9,95	4,86	7,22	100,00	99,90
1968	28 885,0	R(000)	43 282	23 884	12 300	—	79 466	121	45 117	17 016	8 097	12 176	161 993	161 475
		c/kW.h sold	0,149 8	0,082 7	0,042 6	—	0,275 1	0,000 4	0,156 2	0,058 9	0,028 0	0,042 2	0,560 8	0,559 0
		% of total cost	26,72	14,74	7,59	—	49,06	0,07	27,85	10,50	5,00	7,52	100,00	99,68
1969	31 505,6	R(000)	50 943	20 809	13 605	—	85 357	102	48 035	19 038	9 264	13 578	175 374	176 106
		c/kW.h sold	0,161 7	0,066 0	0,043 2	—	0,270 9	0,000 3	0,152 5	0,060 4	0,029 4	0,043 1	0,556 6	0,559 0
		% of total cost	29,05	11,87	7,76	—	48,67	0,06	27,39	10,86	5,28	7,74	100,00	100,42
1970	34 890,6	R(000)	59 484	23 654	15 202	—	98 340	89	49 440	21 955	10 594	15 448	195 866	193 475
		c/kW.h sold	0,170 5	0,067 8	0,043 6	—	0,281 9	0,000 3	0,141 7	0,062 9	0,030 4	0,044 3	0,561 4	0,554 5
		% of total cost	30,37	12,08	7,76	—	50,21	0,05	25,24	11,21	5,41	7,89	100,00	98,78
1971	38 040,0	R(000)	70 266	30 928	8 568	—	109 762	82	53 587	26 276	11 492	18 440	219 639	219 584
		c/kW.h sold	0,184 7	0,081 3	0,022 5	—	0,288 5	0,000 2	0,140 9	0,069 1	0,030 2	0,048 5	0,577 4	0,577 2
		% of total cost	31,99	14,08	3,90	—	49,97	0,04	24,40	11,96	5,23	8,40	100,00	99,97
1972	41 648,9	R(000)	86 631	30 575	3 056	13 596	133 858	95	57 259	31 586	13 486	21 737	258 021	254 394
		c/kW.h sold	0,208 0	0,073 4	0,007 3	0,032 6	0,321 4	0,000 2	0,137 5	0,075 8	0,032 4	0,052 2	0,619 5	0,610 8
		% of total cost	33,58	11,85	1,18	5,27	51,88	0,04	22,19	12,24	5,23	8,42	100,00	98,59
1973	46 578,4	R(000)	101 858	34 200	3 760	15 366	155 184	117	68 634	38 685	17 082	26 460	306 162	302 034
		c/kW.h sold	0,218 7	0,073 4	0,008 1	0,033 0	0,333 2	0,000 3	0,147 4	0,083 1	0,036 7	0,056 8	0,657 3	0,648 4
		% of total cost	33,27	11,17	1,23	5,02	50,69	0,04	22,42	12,64	5,58	8,64	100,00	98,65
1974	52 585,1	R(000)	114 308	27 151	66	28 114	169 639	86	92 530	48 572	20 617	32 611	364 055	358 768
		c/kW.h sold	0,217 4	0,051 6	0,000 1	0,053 5	0,322 6	0,000 2	0,176 0	0,092 4	0,039 2	0,062 0	0,692 3	0,682 2
		% of total cost	31,40	7,46	0,02	7,72	46,60	0,02	25,42	13,34	5,66	8,96	100,00	98,55
1975	57 869,2	R(000)	136 963	30 814	1 400	40 730	209 907	114	141 913	*44 980	*18 477	*71 758	487 149	460 073
		c/kW.h sold	0,236 7	0,053 2	0,002 4	0,070 4	0,362 7	0,000 2	0,245 2	0,077 7	0,031 9	0,124 0	0,841 8	0,795 0
		% of total cost	28,12	6,33	0,29	8,36	43,09	0,02	29,13	9,23	3,79	14,73	100,00	94,44
1976	63 355,7	R(000)	173 829	41 470	1 700	53 584	270 583	2 399	208 316	62 477	19 712	92 835	656 322	656 381
		c/kW.h sold	0,274 4	0,065 5	0,002 7	0,084 6	0,427 1	0,003 8	0,328 8	0,098 6	0,031 1	0,146 5	1,036 0	1,036 0
		% of total cost	26,49	6,32	0,26	8,16	41,23	0,37	31,74	9,52	3,00	14,14	100,00	100,01
1977	67 125,4	R(000)	224 418	63 403	900	224 000	512 721	15 501	239 228	76 294	19 859	133 494	997 097	1 030 552
		c/kW.h sold	0,334 3	0,094 5	0,001 3	0,333 7	0,763 8	0,023 1	0,356 4	0,113 7	0,029 6	0,198 9	1,485 4	1,535 3
		% of total cost	22,51	6,36	0,09	22,47	51,42	1,55	23,99	7,65	1,99	13,39	100,00	103,36
1978	72 780,4	R(000)	308 970	76 036	900	300 000	685 906	26 364	271 222	89 193	23 677	138 106	1 234 468	1 301 829
		c/kW.h sold	0,424 5	0,104 4	0,001 2	0,412 1	0,942 4	0,036 2	0,372 6	0,122 5	0,032 5	0,189 7	1,696 1	1,788 7
		% of total cost	25,03	6,16	0,07	24,30	55,56	2,14	21,97	7,22	1,92	11,19	100,00	105,46
1979	80 582,8	R(000)	373 718	88 800	900	380 000	843 418	36 061	319 428	95 887	28 689	188 203	1 511 686	1 529 474
		c/kW.h sold	0,463 7	0,110 1	0,001 1	0,471 5	1,046 6	0,044 7	0,396 3	0,118 9	0,035 6	0,233 5	1,875 9	1,898 0
		% of total cost	24,72	5,87	0,06	25,14	55,79	2,39	21,13	6,34	1,90	12,45	100,00	101,18

*Basis of allocation changed in 1975.

Escom's national grid serves the whole of South Africa. It permits the siting of power stations where coal is cheapest and transmits electric power to distribution centres throughout the subcontinent.

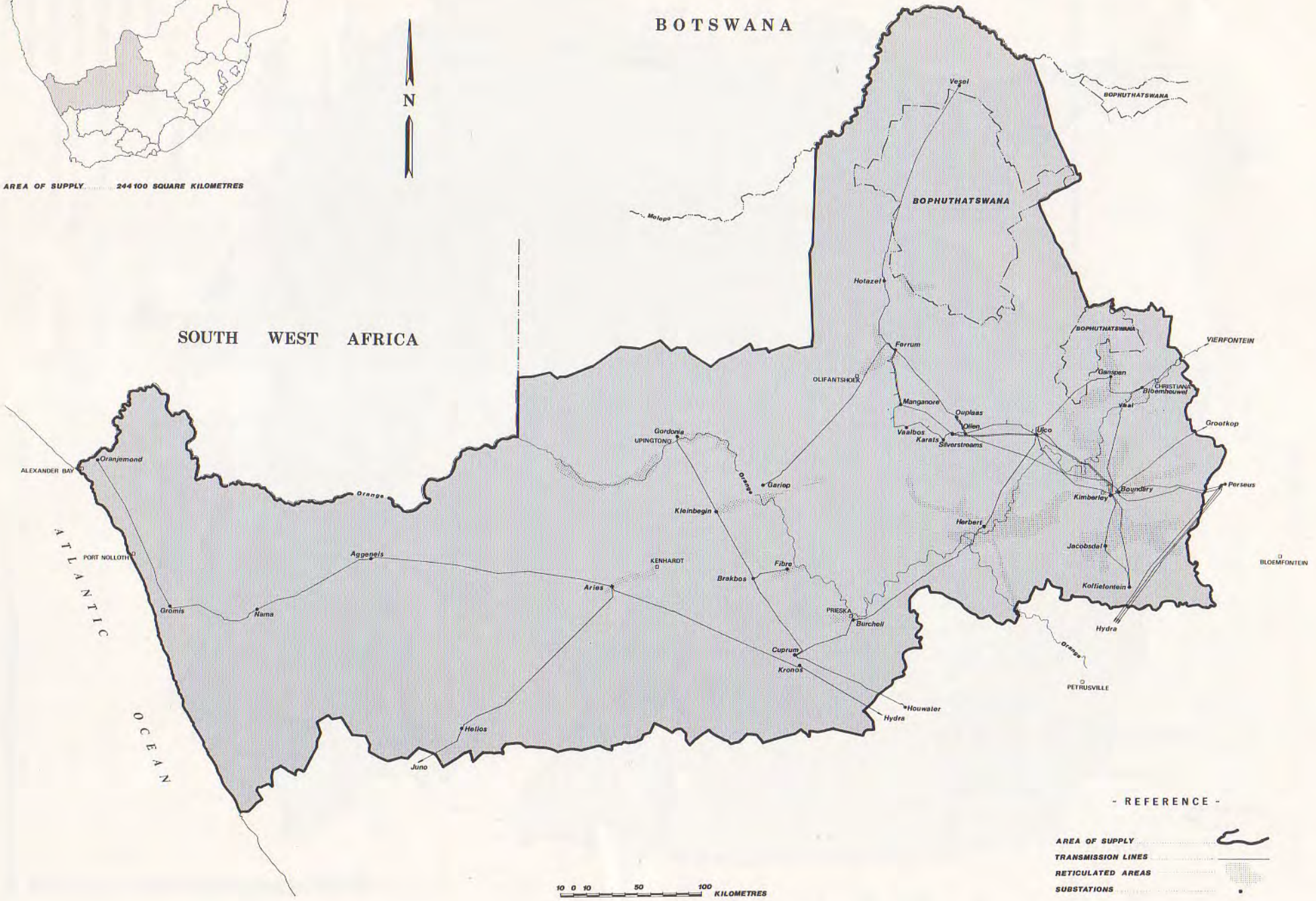
Border, Cape Eastern and Orange River Undertakings

AREA OF SUPPLY

BORDER UNDERTAKING	55 400 SQUARE KILOMETRES
CAPE EASTERN UNDERTAKING	8 000 SQUARE KILOMETRES
ORANGE RIVER UNDERTAKING	137 000 SQUARE KILOMETRES

Cape Northern Undertaking

AREA OF SUPPLY ..... 244 100 SQUARE KILOMETRES



- REFERENCE -

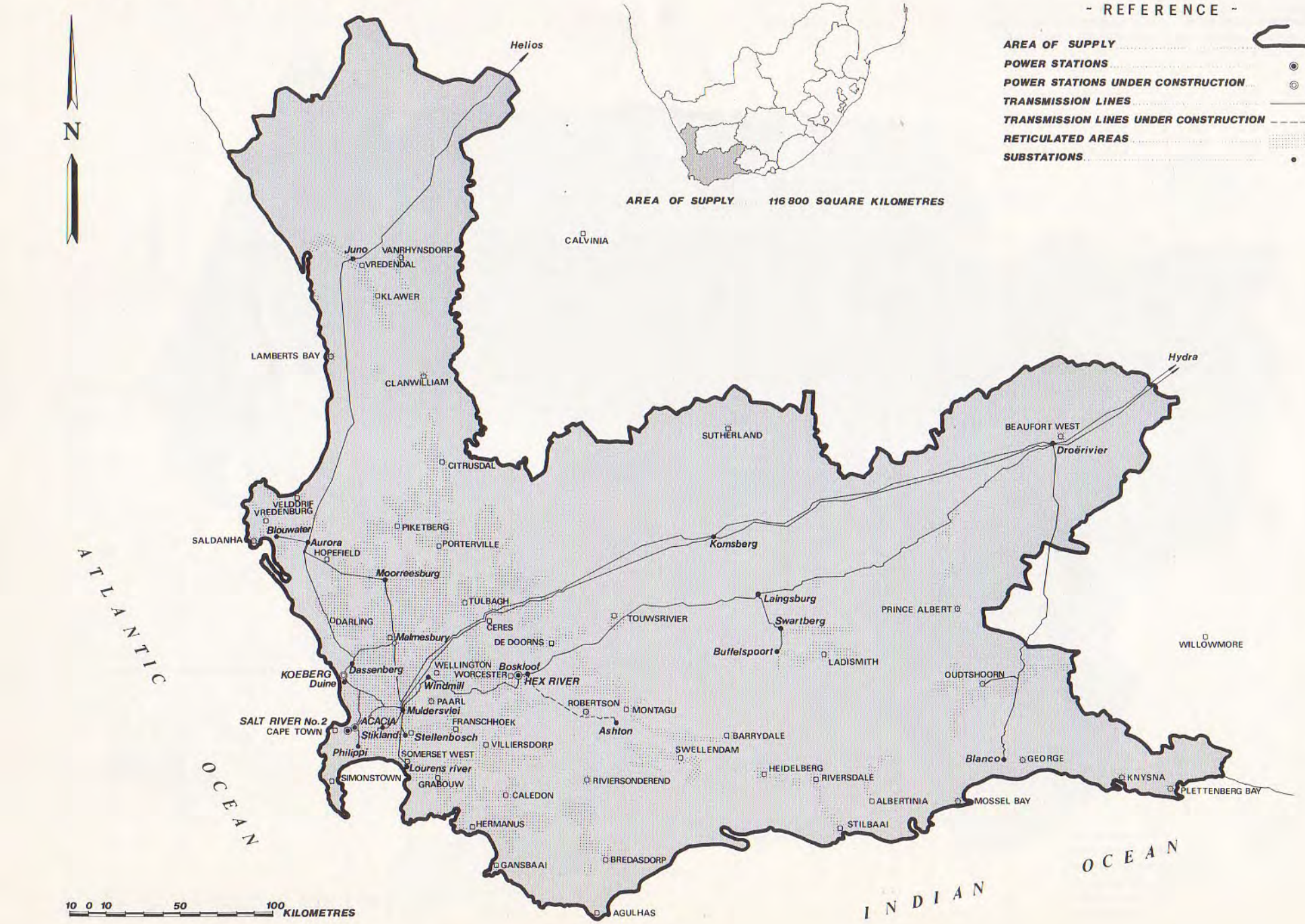
AREA OF SUPPLY .....

TRANSMISSION LINES .....

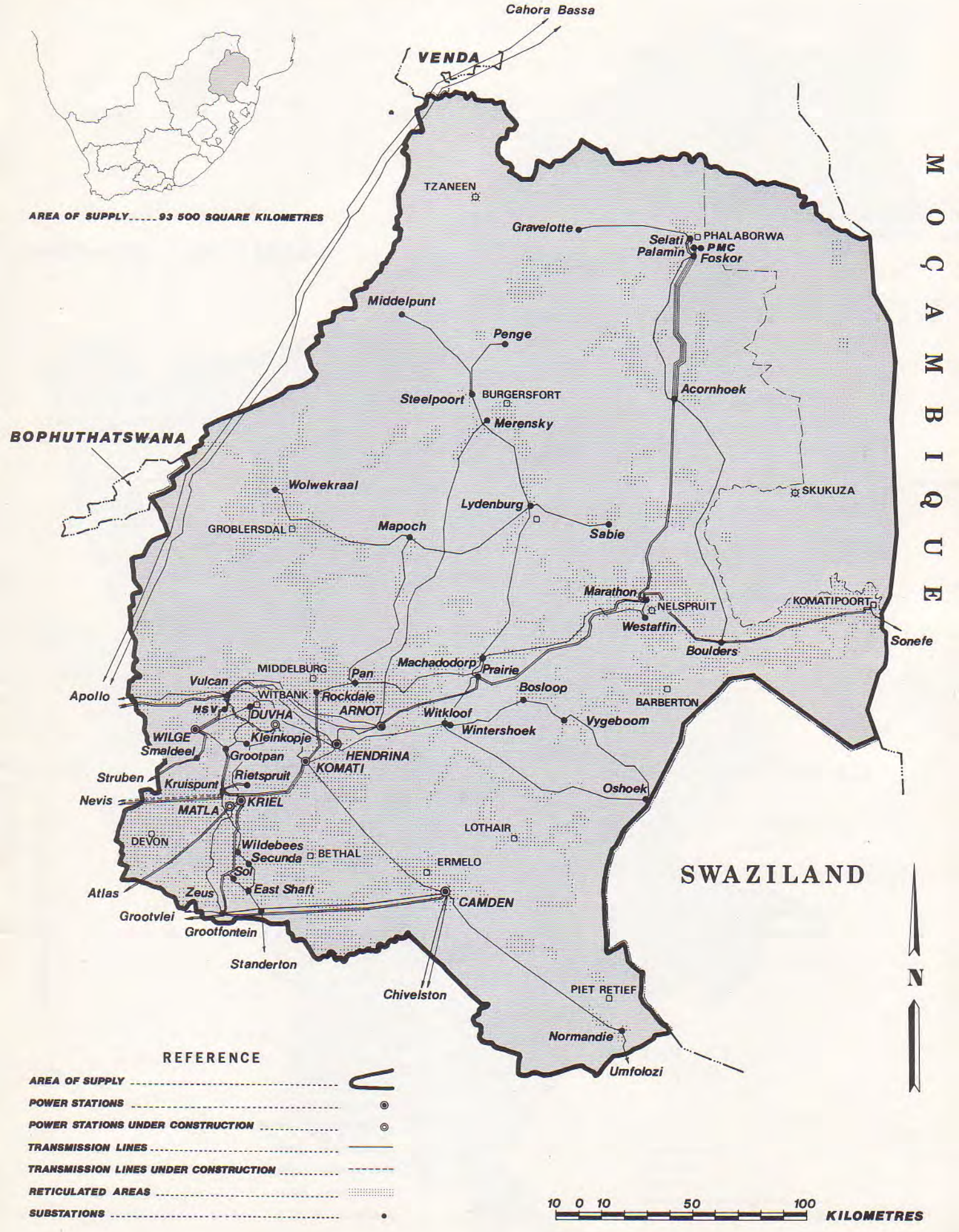
RETICULATED AREAS .....

SUBSTATIONS .....

Cape Western Undertaking



Eastern Transvaal Undertaking



Natal Undertaking

AREA OF SUPPLY ..... 106 700 SQUARE KILOMETRES

CAMDEN
SWAZILAND
MOÇAMBIQUE
Normandie
VOLKSRUST
VREDE
Pongola
PETRUS STEYN
UTRECHT
Mkuze
REITZ
NEWCASTLE
Incandu
Chivelston
VRYHEID
LINDLEY
INGAGANE
Bloedrivier
Kroonstad
Jordan
Kransfontein
GLENCOE
DUNDEE
Hluhluwe
BETHLEHEM
HARRISMITH
Pegasus
Umfolozi
Groenkop
ULUNDI
Mtubatuba
DRAKENSBERG
Tugela
LADYSMITH
Danskraal
Jagersrust
Invubu
Rabbit
COLENSO
Impala
Driel
Bloukrans
Alusaf
Empangeni
WEENEN
RICHARD'S BAY
ESHOWE
ESTCOURT
GREYTOWN
Sithebe
Sappi
MOOI RIVER
Mandini
STANGER
Mersey
HOWICK
Shakaskraal
LESOTHO
Bishopstowe
Driefontein
PIETERMARITZBURG
Pentrich
Abattoir
Feralloys
UNDERBERG
Georgedale
UMGENI
Elangeni
RICHMOND
DURBAN
Klaarwater
Coedmore
Illovo
IXOPO
Nkonka
MATATIELE
TRANSKEI
KOKSTAD
HARDING
Oribi
PORT SHEPSTONE
TRANSKEI
INDIAN OCEAN
N

10 0 10 50 100 KILOMETRES

REFERENCE

- AREA OF SUPPLY
- POWER STATIONS
- POWER STATIONS UNDER CONSTRUCTION
- TRANSMISSION LINES
- TRANSMISSION LINES UNDER CONSTRUCTION
- RETICULATED AREAS
- SUBSTATIONS

Rand and Orange Free State Undertaking

Border Undertaking

Category	Consumer details: Number		Sales of electricity: Per cent of total		kW.h sold		Per cent change		Revenue from sales in Rand		Average price in cents per kW.h sold	
	1978	1979	1978	1979	1978	1979	78/77	79/78	1978	1979	1978	1979
*Bulk supplies	20	22	88,58	88,35	689 802 940	730 111 358	7,06	5,84	18 713 306	21 098 041	2,712 8	2,889 7
Direct supplies:												
Domestic and street lighting	3 395	3 639	3,27	3,18	25 434 714	26 313 006	−15,04	3,45	1 196 007	1 325 249	4,702 3	5,036 5
Industrial	1 694	1 786	8,16	8,47	63 520 387	70 000 066	19,75	10,20	2 910 134	3 321 508	4,581 4	4,745 0
Mining	—	—	—	—	—	—	—	—	—	—	—	—
Traction	—	—	—	—	—	—	—	—	—	—	—	—
Total	5 109	5 447	100,00	100,00	778 758 041	826 424 430	7,07	6,12	22 819 447	25 744 799	2,930 2	3,115 2

Cape Eastern Undertaking

Category	Consumer details: Number		Sales of electricity: Per cent of total		kW.h sold		Per cent change		Revenue from sales in Rand		Average price in cents per kW.h sold	
	1978	1979	1978	1979	1978	1979	78/77	79/78	1978	1979	1978	1979
*Bulk supplies	2	2	48,74	48,61	14 437 720	14 467 360	70,87	0,21	433 665	442 872	3,003 7	3,061 2
Direct supplies:												
Domestic and street lighting	283	287	5,22	5,18	1 545 536	1 541 248	− 0,53	− 0,28	137 110	142 322	8,871 4	9,234 2
Industrial	646	665	46,04	46,21	13 635 680	13 752 180	11,49	0,85	880 140	928 180	6,463 9	6,749 3
Mining	—	—	—	—	—	—	—	—	—	—	—	—
Traction	—	—	—	—	—	—	—	—	—	—	—	—
Total	931	954	100,00	100,00	29 618 936	29 760 788	33,22	0,48	1 450 915	1 513 374	4,898 7	5,085 1

Cape Northern Undertaking

Category	Consumer details: Number		Sales of electricity: Per cent of total		kW.h sold		Per cent change		Revenue from sales in Rand		Average price in cents per kW.h sold	
	1978	1979	1978	1979	1978	1979	78/77	79/78	1978	1979	1978	1979
*Bulk supplies	32	33	19,99	17,59	387 161 346	416 546 742	6,18	7,59	9 372 658	10 328 330	2,420 9	2,479 5
Direct supplies:												
Domestic and street lighting	3 490	3 529	1,54	1,38	29 894 202	32 757 289	4,03	9,58	1 195 183	1 382 053	3,998 0	4,219 1
Industrial	1 033	1 048	7,20	6,49	139 355 655	153 702 271	15,66	10,29	4 810 692	5 334 458	3,452 1	3,470 6
Mining	86	86	57,89	57,32	1 121 198 223	1 357 176 529	27,02	21,05	31 606 009	39 627 064	2,818 9	2,919 8
Traction	5	5	13,38	17,22	259 215 800	407 755 800	− 4,53	57,30	8 211 291	15 311 601	3,167 7	3,755 1
Total	4 646	4 701	100,00	100,00	1 936 825 226	2 367 938 631	16,12	22,26	55 195 833	71 983 506	2,849 8	3,039 9

Cape Western Undertaking

Category	Consumer details: Number		Sales of electricity: Per cent of total		kW.h sold		Per cent change		Revenue from sales in Rand		Average price in cents per kW.h sold	
	1978	1979	1978	1979	1978	1979	78/77	79/78	1978	1979	1978	1979
*Bulk supplies	58	64	51,73	52,75	2 698 192 969	2 950 336 701	1,53	9,34	47 894 533	52 661 718	1,775 1	1,784 9
Direct supplies:												
Domestic and street lighting	62 574	66 704	8,33	8,03	434 643 466	449 186 253	4,70	3,35	18 544 380	20 312 024	4,266 6	4,522 0
Industrial	16 400	16 769	31,14	30,15	1 624 476 519	1 686 537 850	8,76	3,82	45 509 481	49 614 498	2,801 5	2,941 8
Mining	—	—	—	—	—	—	—	—	—	—	—	—
Traction	7	9	8,80	9,07	458 890 042	507 064 676	− 0,66	10,50	12 413 598	16 361 392	2,705 1	3,226 7
Total	79 039	83 546	100,00	100,00	5 216 202 996	5 593 125 480	3,73	7,23	124 361 992	138 949 632	2,384 1	2,484 4

*Supplies to municipal and other supply authorities.

Eastern Transvaal Undertaking

Category	Consumer details: Number		Sales of electricity: Per cent of total		kW.h sold		Per cent change		Revenue from sales in Rand		Average price in cents per kW.h sold	
	1978	1979	1978	1979	1978	1979	78/77	79/78	1978	1979	1978	1979
*Bulk supplies	30	30	8,53	9,10	854 330 200	1 064 546 350	– 5,59	24,61	15 323 432	20 359 038	1,793 6	1,912 5
Direct supplies: Domestic and street lighting	2 479	2 567	0,21	0,22	20 569 318	25 904 941	–29,29	25,94	900 789	906 256	4,379 3	3,498 4
Industrial	7 604	7 997	64,48	65,64	6 459 656 980	7 578 690 702	15,78	18,87	104 780 225	136 714 423	1,622 1	1,780 4
Mining	128	128	22,79	20,91	2 283 271 514	2 445 851 659	7,41	7,12	39 848 437	46 576 772	1,745 2	1,904 3
Traction	13	5	3,99	4,13	443 036 424	483 180 000	11,75	9,06	11 500 648	14 883 446	2,877 6	3,080 3
Total	10 254	10 727	100,00	100,00	10 060 864 436	11 698 173 652	16,27	16,26	172 353 531	219 439 935	1,720 5	1,875 8

Natal Undertaking

Category	Consumer details: Number		Sales of electricity: Per cent of total		kW.h sold		Per cent change		Revenue from sales in Rand		Average price in cents per kW.h sold	
	1978	1979	1978	1979	1978	1979	78/77	79/78	1978	1979	1978	1979
*Bulk supplies	34	35	51,95	50,30	6 097 026 418	6 532 193 296	5,65	7,14	107 431 096	115 490 353	1,762 0	1,768 0
Direct supplies: Domestic and street lighting	17 168	15 585	1,00	0,99	118 013 698	128 450 749	– 4,10	8,84	4 798 151	4 932 353	4,065 8	3,839 9
Industrial	12 905	12 890	35,30	37,21	4 142 588 511	4 832 107 954	18,01	16,64	76 075 263	87 070 175	1,836 4	1,801 9
Mining	34	33	2,26	2,24	265 258 520	291 024 060	8,02	9,71	5 739 631	6 374 163	2,163 8	2,190 3
Traction	12	10	9,49	9,27	1 113 518 267	1 203 978 456	1,56	8,12	26 484 931	27 622 706	2,378 5	2,294 3
Total	30 153	28 553	100,00	100,00	11 736 405 414	12 987 754 515	9,21	10,66	220 529 072	241 489 750	1,879 0	1,859 4

Orange River Undertaking

Category	Consumer details: Number		Sales of electricity: Per cent of total		kW.h sold		Per cent change		Revenue from sales in Rand		Average price in cents per kW.h sold	
	1978	1979	1978	1979	1978	1979	78/77	79/78	1978	1979	1978	1979
*Bulk supplies	40	40	98,16	98,24	1 027 965 461	1 152 477 930	1,71	12,11	17 817 780	22 655 341	1,733 1	1,990 4
Direct supplies: Domestic and street lighting	8	30	0,01	0,01	19 826	123 626	–66,35	523,55	1 895	9 837	9,559 6	7,957 1
Industrial	290	299	1,83	1,75	19 295 852	20 551 538	–27,71	6,51	874 176	1 176 892	4,530 4	5,726 5
Mining	—	—	—	—	—	—	—	—	—	—	—	—
Traction	—	—	—	—	—	—	—	—	—	—	—	—
Total	338	369	100,00	100,00	1 047 281 139	1 173 153 094	0,94	12,02	18 693 851	23 482 071	1,785 0	2,056 5

Rand and O.F.S. Undertaking

Category	Consumer details: Number		Sales of electricity: Per cent of total		kW.h sold		Per cent change		Revenue from sales in Rand		Average price in cents per kW.h sold	
	1978	1979	1978	1979	1978	1979	78/77	79/78	1978	1979	1978	1979
*Bulk supplies	170	178	23,98	24,56	10 064 675 720	11 273 071 710	5,94	12,01	171 411 176	208 607 054	1,703 1	1,850 5
Direct supplies: Domestic and street lighting	19 920	9 451	0,78	0,60	329 370 630	275 396 650	–19,36	–16,39	9 586 560	8 432 402	2,910 6	3,061 9
Industrial	25 225	24 202	27,92	28,36	11 719 785 470	13 019 488 553	8,67	11,09	199 162 741	235 777 965	1,699 4	1,811 0
Mining	106	110	44,20	43,36	18 549 280 769	19 905 631 305	9,86	7,31	279 284 044	322 890 796	1,505 6	1,622 1
Traction	2	2	3,12	3,12	1 311 362 008	1 432 923 901	4,51	9,27	26 142 209	30 802 773	1,993 5	2,149 6
Total	45 423	33 943	100,00	100,00	41 974 474 597	45 906 512 119	8,09	9,37	685 586 730	806 510 990	1,633 3	1,756 9

*Supplies to municipal and other supply authorities.

The distribution undertakings

Tables showing consumer details, sales of electricity

Maps showing licensed areas of supply