Matla power station

Electricity Supply Commission

Escom Centre, 204 Smit Street, Johannesburg

The Minister of
Economic Affairs
House of Parliament
Cape Town
2 July 1975

Sir,

As required by Section 19 of the Electricity Act, 1958, the Commission has the honour to present its fifty-second Annual Report and Accounts covering its work for the financial year ended 31 December 1974.

R. A. Brazier

Standing: H. H. L. Abrahamse, Jan H. Smith, A. Anson Lloyd
Seated: Dr. A. J. du Toit, Dr. R. L. Straszacker, D. J. Malan, E. Pavitt

Members of Commission and Management

Members of the Electricity Supply Commission

Dr. R. L. Straszacker, *Chairman*

W. H. Andrag (Retired 31/3/74)

Dr. A. J. du Toit

D. J. Malan

E. Pavitt

H. H. L. Abrahamse

A. Anson Lloyd

Jan H. Smith (Appointed 24/5/74)

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.(Mech.Eng.)B.Sc.(Elec.Eng.)(Witwatersrand)

Senior Manager (Operations)
F. W. Stutterheim
Pr.Eng.,B.Sc.(Eng.)(Witwatersrand)

Senior Manager (Design and Construction)
N. T. van der Walt
Pr.Eng.,M.Sc.(Eng.)(Witwatersrand)

Financial Manager
J. A. Bothma
C.A.(S.A.),B.Com.(Pretoria)

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.)

Economic Consultant
H. M. Torr
B.Com.(Witwatersrand)

Personnel Manager
J. L. van der Walt
Pr.Eng.,B.Sc.(Eng.)(Witwatersrand),B.Admin.(UNISA)

Managers of the Commission's Undertakings

Border
F. O. Pearce
Pr.Eng.,B.Sc.(Eng.)(Witwatersrand)

Cape Eastern
J. P. Rodger (Acting) (Until 14/7/74)
F. O. Pearce (Acting) (From 15/7/74)

Cape Northern
J. L. Rothman
Pr.Eng.,B.Sc.,B.Sc.(Eng.)(Stellenbosch)

Cape Western
G. D. G. Davidson
Pr.Eng.,M.Sc.(Tech.)(Manchester),B.Sc.(Eng.)(Witwatersrand)

Central Generating
I. C. McRae
Pr.Eng.,B.Sc.(Eng.)(Witwatersrand)

Eastern Transvaal
J. S. van Velden
Pr.Eng.,B.Sc.(Eng.)(Witwatersrand)

Natal
H. P. Alexander
Pr.Eng.,B.Sc.(Eng.)(Witwatersrand)

Orange River
J. P. Rodger (Until 14/7/74)
Pr.Eng.,B.Sc.(Eng.)(Cape Town)
F. O. Pearce (From 15/7/74)

Rand and Orange Free State
J. H. Harden
Pr.Eng.,B.Sc.(Eng.)(Witwatersrand)

Swawek (General Manager)
J. P. Brand
Pr.Eng.,M.Sc.(Eng.)(Cape Town)

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The year in brief

Sales

The strong upward trend in Escom's electricity sales since the beginning of the seventies was again maintained in 1974. The exceptional growth rate of 11,8 per cent in 1973 was exceeded in 1974 when electricity sales reached a total of 52 585 million units: 12,9 per cent higher than the 46 578 million units sold in 1973. With this remarkable achievement Escom's annual average growth rate for the past five years was boosted to a peak of 10,8 per cent.

The factors largely responsible for this exceptional rate of growth in 1974 were further sharp increases in bulk supplies to municipalities and in supplies to industrial consumers, as well as a sustained rate of growth in supplies to the mining industry. Bulk supplies to municipalities in 1974 were 21,7 per cent more than in 1973 when an increase of 19,0 per cent over the preceding year was recorded. Bulk supplies to municipalities have more than doubled since 1969 and this sales category now ranks a close third behind the mining and industrial categories. The surge of growth in bulk sales to municipalities in the years 1973 and 1974 was conspicuously due to the vigorous growth experienced in new bulk supplies to the five major municipalities—Johannesburg, Pretoria, Cape Town, Port Elizabeth and Bloemfontein.

Sales to industrial consumers increased by 13,6 per cent in 1974 as against 11,0 per cent in 1973; the rate of growth in sales to the mining sector was slightly down to 7,2 per cent in 1974 from the 8,9 per cent achieved in 1973.

Central Generating Undertaking

The year under review—the third year of existence of Escom's Central Generating Undertaking—provided further evidence of the benefits of integrated operation on a national scale. Following their connection to the national transmission network at the end of 1973, the City of Port Elizabeth and Escom's Border Undertaking received substantial supplies from the high-voltage transmission system from the North during the year 1974. West Bank power station, previously controlled by the Border Undertaking, was formally transferred to the Central Generating Undertaking on 1 January 1974. The Border Undertaking consequently became a distribution undertaking, and for the year 1974 obtained 60 per cent of its electricity requirements by transmission from the North.

The Minister's approval has been obtained for the integration of the small Cape Eastern Undertaking with the Orange River Undertaking. Formal application for this change has also been made to the Electricity Control Board whose approval has, however, not yet been received.

The co-ordinated operation of the interconnected power stations of the Central Generating Undertaking has allowed a further reduction of the electricity sent out from the coal-fired power stations in the other coastal provinces. During the year under review, only 26 per cent of the electricity requirements of the Cape Western Undertaking was sent out from the power stations situated in the Western Cape, the remainder being imported from the North via the two existing 400 kV transmission lines. The corresponding figure a year earlier was 32 per cent. In the case of Natal, the equivalent figures were 42 per cent during the year 1974 as compared with 46 per cent a year earlier.

National grid

The second 400 kV transmission line from Newcastle to the vicinity of Pietermaritzburg was taken into service during the year. As a result, the security of supply to Natal has greatly improved, and a further reduction of local generation is consequently expected in 1975. At the Mersey distribution station near Pietermaritzburg two 800 MVA, 400/275 kV transformers were installed. One of these was manufactured in the Republic; it is the largest transformer ever manufactured in this country, and transported on our roads. Design work commenced during the year on a third 400 kV line to the Western Cape. Besides improving the security of supply in the Western Cape, this line will also serve the future needs of the north-western Cape area and Saldanha Bay, including traction supplies for the electrification of the Sishen-Saldanha railway line, and will be linked with the proposed Koeberg nuclear power station.

The planned route of this important line is from De Aar via Copperton, Aries, Kromrivier, Olifantsrivier, Langebaanweg and Melkbosstrand, to Muldersvlei. Surveying of all the transmission line routes in the north-western Cape area is in progress, and is expected to be completed in 1975.

Coal-fired power stations under construction

It is expected that, in the foreseeable future, the coal resources of the Eastern Transvaal will continue to be the major source of primary energy for Escom's new power stations. During the year under review, a fifth 350 MW set was commissioned at Arnot power station, and a seventh 200 MW set at Hendrina power station.

New head office

The erection of a new head office complex for Escom to the north of Johannesburg is progressing. However, there has been a slight delay in proclamation of the area as a township, due to uncertainty concerning the system of future roads which will be provided, and the consequent freezing of all applications for proclamation by the provincial authorities. It is hoped that this issue will be settled shortly and proclamation will follow during the course of 1975. Occupation of the new head office buildings is still planned for the first half of 1977. The residential township is being surveyed, and stands should be available for sale within a year.

Capital expenditure

Escom's capital expenditure for 1974 was R229,4 million. The latest estimate of capital expenditure for 1975 is R300 million. The estimated total capital expenditure for the years 1975 to 1978 inclusive is R2 500 million.

Loans

Long-term loans raised during the year total R184 million, comprising R174 million obtained from local sources and R10 million from foreign capital markets. R45 million of long-term loans were repaid, comprising R34 million local and R11 million foreign money.

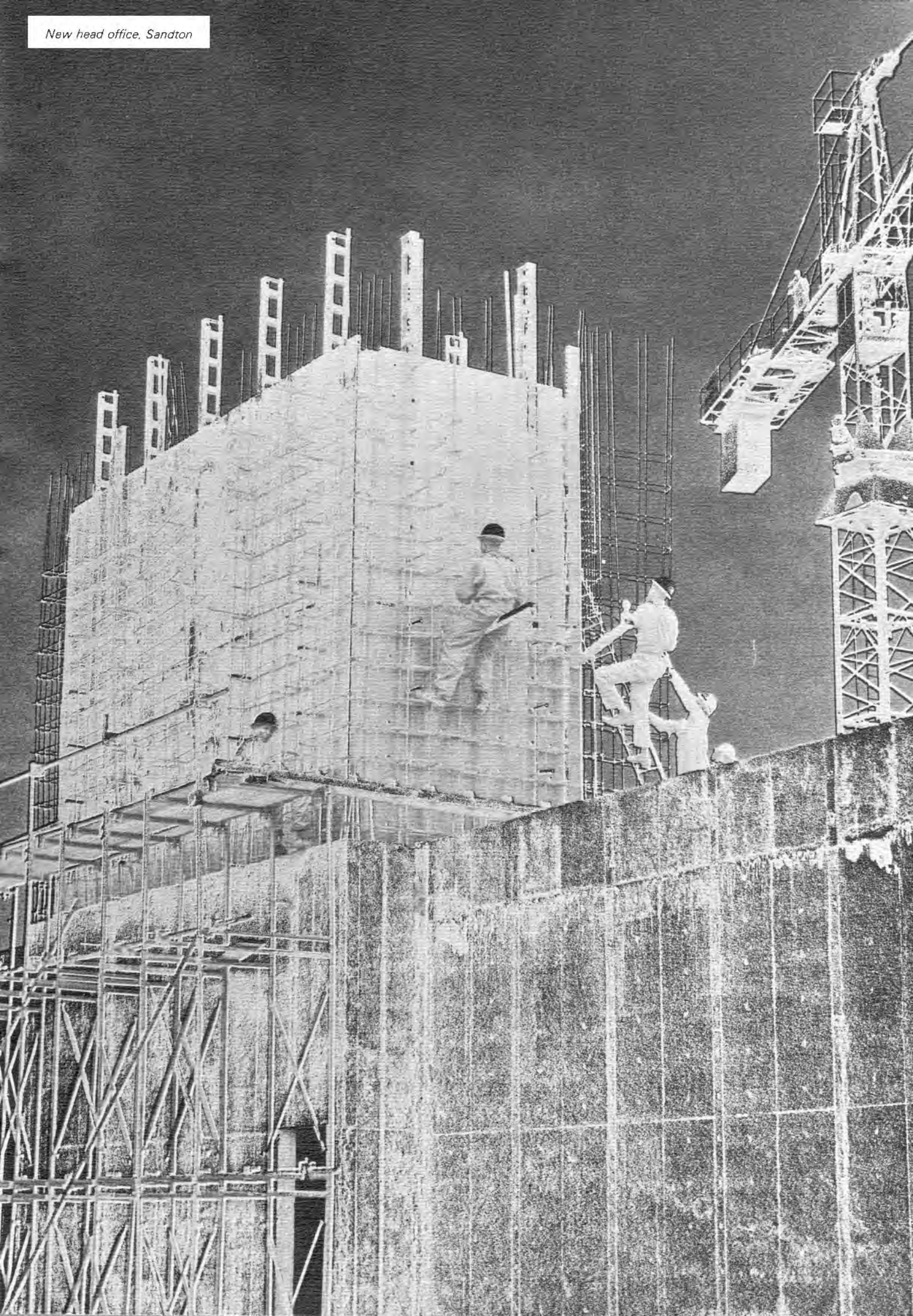
Short-term loans totalled R130 million of which R20 million were local and R110 million foreign loans. Repayments amounted to R52 million, comprising R24 million local and R28 million foreign money.

The tightening of capital market conditions from the latter half of 1973 was again evident during the second and third quarters of 1974, and funds were in short supply. Because of the tight domestic market, Escom had to divert its borrowing operations abroad by utilising the revolving credit loans which had been temporarily repaid during the previous year. This situation changed in the fourth quarter of 1974, when institutional investors returned to the market for fixed-interest securities.

Swawek

Escom acts as an agent to the S.W.A. Water and Electricity Corporation in connection with, inter alia, the design and construction of power stations and transmission systems. The excavation work for the construction of the Ruacana hydro-electric power station in northern South West Africa is proceeding satisfactorily, and access for Escom's contractors is expected by the middle of May 1975. Present indications are that the first of the three 80 MW turbo-generator sets to be installed initially will be commissioned before the winter of 1977. To ensure adequate security of supplies, the 90 MW capacity of the completed coal-fired Van Eck power station near Windhoek is to be supported by a new power station, Paratus, near Walvis Bay. For this power station an order was placed during the year for four 6,6 MW diesel-electric generating sets. These sets will be designed for operation on heavy residual fuel oil, and are planned for commissioning by the winter of 1976.

It is hoped that supplies will be provided in 1975 to the new mines at Otjihase and Rössing. By the end of 1974, construction of the Otjihase and Rössing substations was progressing satisfactorily. Surveying of the 330 kV transmission line over the 510 km distance from Ruacana to Omburu was completed during the year.



New head office, Sandton

Statistical highlights

Operating statistics for the year
Escom produced 84,4 per cent of all electricity generated in the Republic of South Africa in 1974.

Maximum one-hour simultaneous demand on total interconnected system	8 552 MW
Total electrical energy sent out from all power stations	56 251 million units
Total coal burnt	30,892 million metric tons
Total amount of water consumed	168 515 megalitres

Plant in service at 31 December 1974
Total nominal generating capacity–
186 boilers with steam-raising capacity of 12 196 kg/s
137 turbo-generators with capacity of 10 691,5 MW

Major overhead transmission lines–

400 kV	5 040 km
275 kV	4 417 km
220 kV	638 km
132 kV	9 412 km
88 kV and below	63 869 km

Underground cables–

132 kV	15 km
33–88 kV	285 km
22 kV and under	4 545 km

Capacity of transformers	65 900 MVA

Financial

Total revenue for the year	R358 768 000
Total expenditure for the year	R364 055 000
Total capital investment in commercial operation at 31 December 1974	R1 847 484 000
Average price per unit sold	0.682 2 cents

Staff–total employed

Whites	11 017
Non-whites	18 874

Items of special interest

An unprecedented rate of growth

Detailed statistics given in later sections of this report illustrate the high rate of growth during the year under review in the demand for electricity throughout the country.

The one-hour peak demand on Escom's interconnected system during the year 1974 was 1 202 MW above the figure for the previous year. The corresponding increase for 1973 was 720 MW. Although the 1974 peak was due to the unusual weather conditions experienced in September, it is nevertheless clear that if the demand on the national interconnected system grows in the future at the rate expected, and if due allowance is made for the reserve generating capacity required, Escom will in the immediate future have to install more than 1 000 MW of new generating plant every year. Appropriate strengthening of the high-voltage transmission and distribution network will also have to be provided.

The extraordinary growth of the demand from Escom's power stations has made it necessary, wherever possible, to accelerate the commissioning programmes of future sets in the power stations under construction. The programme for 1975 therefore comprises an additional 350 MW (sixth) set at Arnot, an additional 200 MW (eighth) set at Hendrina, an additional 80 MW (third) set at Hendrik Verwoerd, and the first 500 MW set at the new Kriel power station. The construction programme for Kriel has also been accelerated: the original completion date of this power station to its ultimate installed capacity of 3 000 MW has been advanced by one year to the winter of 1980.

The expected commencement of power imports from Cabora Bassa during the last quarter of 1975 will further augment the reserves of generating plant available to the Escom system.

New coal-fired power stations

Two new coal-fired power stations were announced during the year:

Matla (Sotho word for power)

The next coal-fired pithead power station to follow Kriel will be Matla, situated 4 km to the south-west of Kriel which is between Bethal and Ogies. This power station is planned for an ultimate installed capacity of 3 600 MW, made up of six 600 MW boiler/turbo-generator sets.

Wet cooling towers will be used with the first three turbo-generators, and the station has been laid out in such a manner that dry cooling towers can be used with the last three to save water. The decision on which type of cooling to use will be made later, after more experience has been gained with the 200 MW dry-cooled set at Grootvlei power station.

Duvha (Venda word for sun)

Escom's plans include the provision of this coal-fired

power station, virtually identical to Matla, on a coalfield some 14 km south-east of Witbank. A contract for the coal supplies required was placed at the end of the year.

To avoid delays and to expedite construction of this power station, the size, technical specifications, and number of the boiler/turbo-generator sets decided upon were the same as those for Matla, but modified to suit the different coal properties and other local conditions.

Diversification of power resources

The establishment and integrated operation of a national transmission system have permitted an increased degree of diversification of power resources.

At present, the only Escom power station not using coal as its source of primary energy, is the Hendrik Verwoerd hydro-electric power station with a capacity of 160 MW. This capacity is in the process of being doubled, work on the installation of two further 80 MW generating sets having been started during the year. Progress was also made with the construction of the Vanderkloof hydro-electric power station at the P. K. le Roux Dam, where 220 MW will be installed.

Escom's programme for the importation of electricity from the Cabora Bassa hydro-electric power station in Mozambique is proceeding according to plan. Following the closure of the diversion tunnels at the dam site in December 1974, there is expected to be sufficient water for testing of the first two hydro-electric generators by the middle of 1975. Commercial operation is planned to commence in October 1975. The two 533 kV monopolar direct-current transmission lines, extending from Pafuri in the north to Escom's Apollo distribution station at Irene, near Pretoria, and the first stage of the converter station at Apollo, were virtually completed by the end of the year. Within the Republic alone, the distance spanned by each transmission line is 514 km.

Pumped-storage schemes

Apart from the hydro-electric schemes of the Orange River and Cabora Bassa which are of the conventional storage type, two major pumped-storage hydro-electric schemes are also included in Escom's future generation plans. The first of these is the Drakensberg scheme, which is being undertaken jointly with the Department of Water Affairs and which, apart from providing Escom with valuable peak-load generating capacity, will be used to supplement the Vaal River resources by pumping water from the Tugela River. Towards the end of 1974, the first water was pumped by the Department of Water Affairs from the Jagersrust pumping station near Oliviershoek over the Drakensberg to the Sterkfontein Dam near Harrismith, and from there it will flow to the Vaal River. In the second phase of its scheme, the Department of Water Affairs will obtain augmentation of its pumping capacity at Jagersrust from the Drakensberg pumped-storage power station. An ultimate installed capacity of 1 000 MW is envisaged, made up of four 250 MW reversible pump-turbine sets.

To determine the impact of the Drakensberg scheme on the environment, and to recommend measures to minimise any possible adverse effects of this project, an Environmental Committee has been formed from representatives of the National Parks Board, Council for the Habitat, Department of Agricultural Technical Services, Natal Parks Board, Department of Planning and the Environment, Department of Forestry, Natal Town and Regional Planning Commission, Department of Water Affairs and Escom.

Another major pumped-storage scheme is being considered by Escom in the Western Cape. The site under consideration offers a potential pumped-storage generating capacity in excess of 1 000 MW. The first set of this scheme is expected to be commissioned by the middle of the eighties.

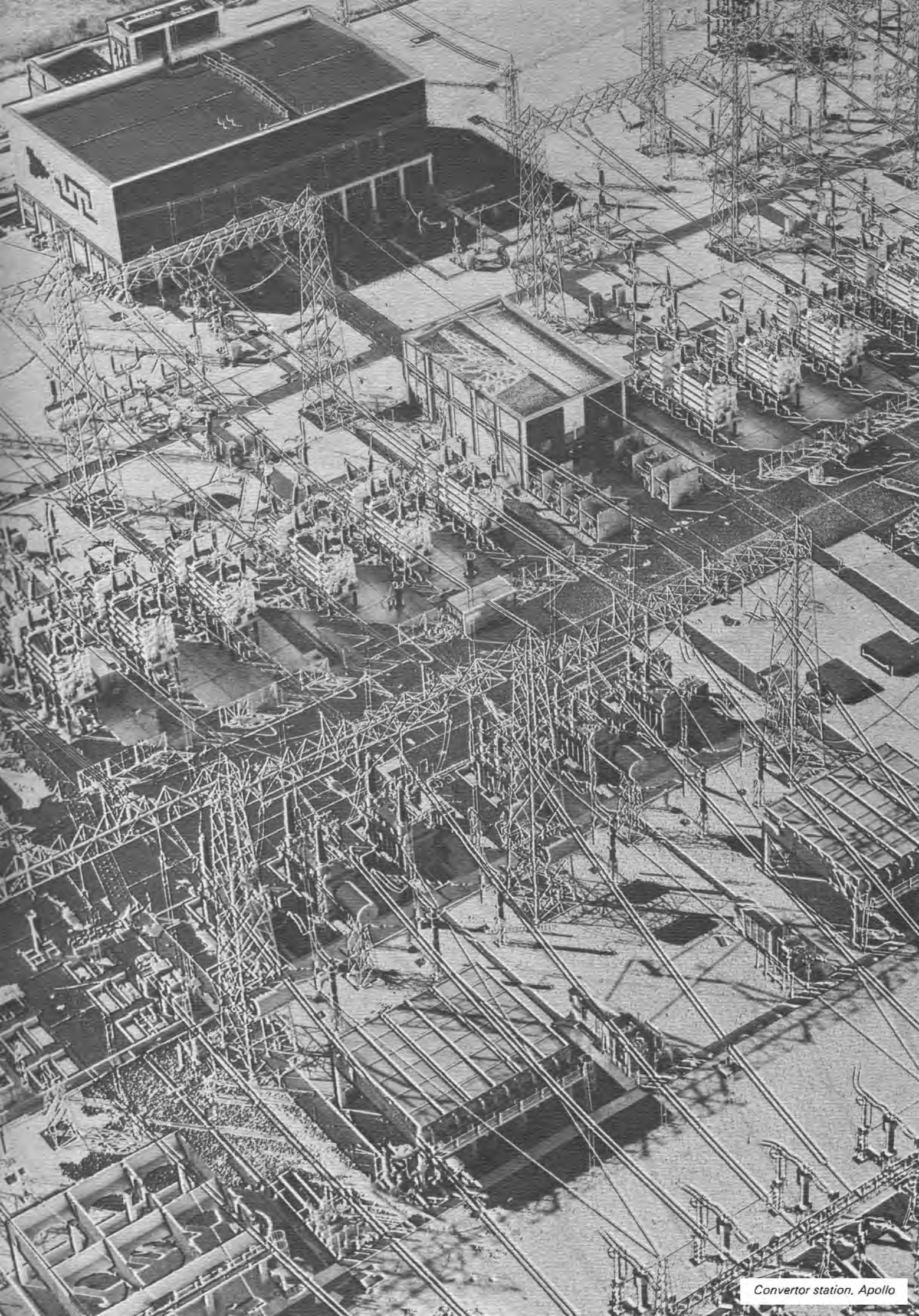
Gas turbines

The varying demand imposed on Escom's interconnected power stations can best be met with a "mix" of generating plant which includes not only large pithead coal and hydro-electric plant, but also gas turbine plant which can operate economically only if assigned to demands of extremely short duration. Gas turbine peak-load plant, developed from aircraft gas turbines, have in recent years been successfully used abroad in many countries. Among the features of gas turbine generating plant which provide an impetus for its installation in an interconnected power system are the short delivery period offered by manufacturers and the straight-forward site requirements which facilitate installation of this plant to relieve bottle-necks in the transmission network, wherever these may arise.

After careful consideration of its requirements, Escom has decided to order 360 MW of gas turbine generating plant for commissioning in 1976. This plant will be installed in the coastal areas of the Cape: 180 MW on a site near the West Bank power station at East London, and 180 MW at the Acacia distribution station in the Cape Town area.

Nuclear power

Escom's long-term plans for the generation of electricity include the erection of nuclear power stations. Such power stations have not yet been built by Escom because of their high electricity production costs compared with those of Escom's large pithead coal-fired power stations. However, the position has recently changed as a consequence of inflation: it has now been established that a large nuclear set installed in the Western Cape will be more economical than the combined costs of an inland coal-fired unit of equivalent capacity together with the associated transmission system to the Cape. For this reason, Escom invited provisional tenders during the year for its first nuclear generating set, in the range 800 to 1 000 MW, for commissioning in September 1982, followed by a second set of similar size, a year later. These generating sets will be installed in Koeberg power station, north of Cape Town. The tenders were received in October 1974 and three tenderers have been selected to submit final tenders.



Convertor station, Apollo

Commercial

Sales of electricity

Escom's total sales of electricity during the year 1974 amounted to 52 585 million units, which reflected an increase of 12,9 per cent over the corresponding figure for the year 1973. The average cost per unit sold in 1974 was 0,692 3 cents (0,657 3 cents in 1973). The average price per unit sold increased from 0,648 4 cents in 1973 to 0,682 2 cents in 1974. The growth of Escom's sales over the ten-year period 1965 to 1974 is shown in the diagram on page 13, together with the yearly average price per unit sold. The figures represented are the combined annual totals and averages for all undertakings. Similar figures for the individual undertakings are given in later sections of this report.

The yearly sales of electricity in the main categories of supply are given in Table 1 for the six-year period ending with the year 1974. In the upper portion of Table 1, the two columns on the right indicate the rate of increase during the year under review, and the average yearly rate of growth over the past five years. In the lower portion of the table, the percentage contribution of each category towards the total sales is shown for the year under review and for the five preceding years.

Bulk supplies to municipalities

Table 1 shows that bulk sales to municipalities during the year 1974 were 21,4 per cent more than in 1973. This rate of growth exceeded the rate of 19,0 per cent experienced in 1973, compared with the preceding year, and it is appreciably higher than the average yearly rate of 16,1 per cent recorded over the past five years. Table 1 also reveals the steadily increasing contribution of bulk sales towards Escom's total sales over the past five years, reaching the level of 29,0 per cent in 1974. The remarkable rate of growth during 1974 is due almost entirely to the rapid growth of the substantial partial bulk supplies to five major municipalities—Johannesburg, Pretoria, Cape Town, Port Elizabeth and Bloemfontein.

If the partial bulk supplies to these five municipalities are excluded, the rates of growth of bulk sales to the remaining municipalities are reduced to 9,9 per cent in 1974 and 13,4 per cent in 1973.

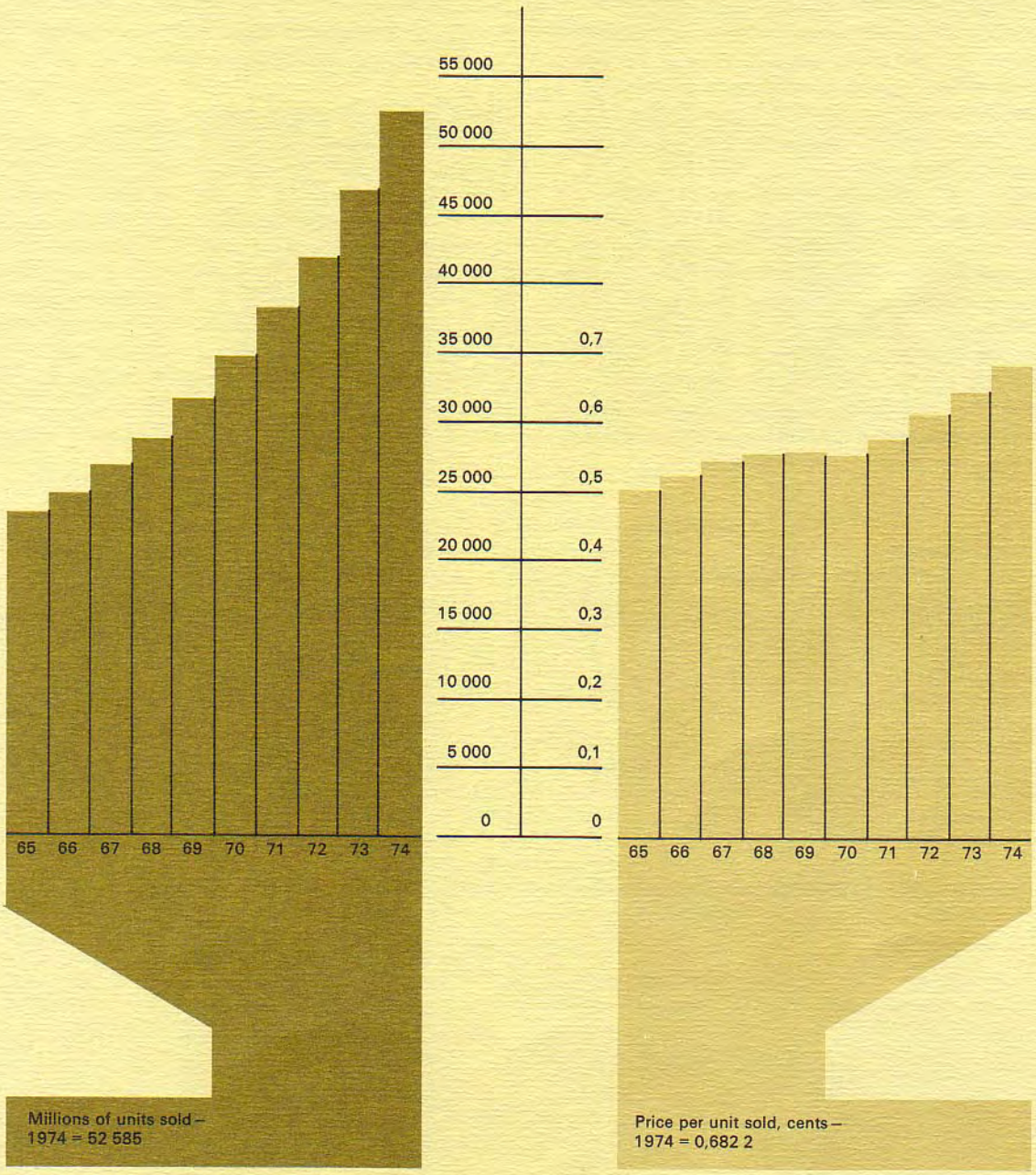
Bulk supplies to neighbouring territories

The total bulk supplies to neighbouring territories are given in Table 1. The rapid growth of these supplies since 1969 is evident from the figures tabulated. The allocation of these supplies among Lesotho, Mozambique and Swaziland is indicated in Table 2. Swaziland received its first bulk supplies during the year 1973.

Table 1
Sales of electricity to categories of consumers

Category of supply	Year 1969	1970	1971	1972	1973	1974	Percentage increase 1974/73	Average yearly increase over 5 years, per cent
			Millions of units (GWh)					
Bulk supplies								
To municipalities	7 257	8 099	9 252	10 684	12 572	**15 261**	21,4	16,1
To neighbouring territories	7	9	13	32	179	**261**	45,8	106,2
Direct supplies								
Traction	2 307	2 410	2 616	2 782	2 895	**3 108**	7,3	6,1
Mining	12 642	13 948	14 227	14 509	15 800	**16 941**	7,2	6,0
Industrial	8 574	9 608	11 014	12 641	14 026	**16 105**	14,8	13,4
Domestic and street lighting	719	817	918	1 001	1 106	**909**	−17,8	4,8
Total	31 506	34 891	38 040	41 649	46 578	**52 585**	12,9	10,8
			Per cent of total					
Bulk supplies								
To municipalities	23,1	23,2	24,3	25,6	27,0	**29,0**		
To neighbouring territories	0,0	0,0	0,0	0,1	0,4	**0,5**		
Direct supplies								
Traction	7,3	6,9	6,9	6,7	6,2	**5,9**		
Mining	40,1	40,0	37,4	34,8	33,9	**32,2**		
Industrial	27,2	27,6	29,0	30,4	30,1	**30,7**		
Domestic and street lighting	2,3	2,3	2,4	2,4	2,4	**1,7**		
Total	100,0	100,0	100,0	100,0	100,0	**100,0**		

Electricity sales



Sales to the mining sector

The mining industry was once again Escom's largest consumer, having purchased, as shown in the lower portion of Table 1, 32,2 per cent of all units sold in 1974. The table does show, however, a gradual decrease, over the past five years, of the contribution by this sector towards total sales.

During the year 1974, sales to the mining industry were 7,2 per cent more than in 1973, a rate of growth above the yearly average of 6,0 per cent recorded over the past five years. The rate of 7,2 per cent attained during the year under review reflects a return by the industry to a growth rate which can be sustained, following the revival of mining in 1973 when a rate of growth of 8,9 per cent was achieved.

Sales of electricity to the different sectors of the mining industry for the period 1969 to 1974 are given in Table 3.

During the year 1974, sales to the gold and uranium sector made up 75 per cent of the total sales to the mining industry. The renewed vigour of this sector since 1973 was maintained in 1974 as indicated in Table 3, with a rate of growth of 4,4 per cent—slightly more than the average yearly rate of 3,8 per cent experienced over the past five years. High rates of growth were also maintained in 1974 in the platinum and copper sectors.

As a result of the increased price of gold, sales of electricity to the older gold mines in the Witwatersrand area in 1974 were 4,3 per cent more than in the preceding year, contrasting sharply with the average decrease of 2,9 per cent a year experienced at these older mines over the past five years. Table 4 shows the Klerksdorp and Far West Rand areas to be the most rapidly developing gold mining areas over the past five years. During the year under review, sales in the Klerksdorp area were 8,8 per cent above the figure for the preceding year (8,2 per cent in 1973).

Sales to the industrial sector

Industrial consumers, as shown in the lower portion of Table 1, accounted for 30,7 per cent of Escom's total sales of electricity in 1974 (30,1 per cent in 1973). Sales to the industrial sector in 1974 were 14,8 per cent above the sales in the preceding year (11 per cent in 1973). The 1974 rate of growth of 14,8 per cent was also slightly above the yearly average of 13,4 per cent experienced over the past five years. In Table 5 it is shown that sales of electricity to the engineering, iron, steel and base-metals industries in 1974 were 14,9 per cent higher than in the preceding year (12,0 per cent in 1973), compared with an average yearly increase of 16 per cent over the past five years.

Table 2
Sales of electricity to neighbouring territories, millions of units

Neighbouring territories	1969	1970	1971	1972	1973	1974
Lesotho	7,3	8,8	12,2	16,6	19,7	26,2
Mozambique	0,1	0,6	0,8	15,5	151,2	215,5
Swaziland	*	*	*	*	8,4	19,1
Total	7,4	9,4	13,0	32,1	179,3	260,8

*Supply first taken in 1973

Table 3
Sales of electricity to sectors of the mining industry, millions of units

Sector of mining industry	1969	1970	1971	1972	1973	1974	Percentage increase 1974/73	Average yearly increase over 5 years, per cent
Gold and uranium	10 647	11 504	11 662	11 773	12 263	12 803	4,4	3,8
Diamonds	282	288	297	325	334	338	1,2	3,7
Coal	495	535	563	589	620	648	4,5	5,5
Platinum	653	941	962	990	1 581	1 978	25,1	24,8
Copper	282	343	374	422	565	653	15,6	18,3
Iron and manganese	80	88	92	101	113	134	18,6	10,9
Chrome	17	20	25	31	33	52	57,6	25,1
Asbestos	118	137	152	161	168	193	14,9	10,3
Other	68	91	100	117	123	142	15,4	15,9
Total	12 642	13 947	14 227	14 509	15 800	16 941	7,2	6,0

The breakdown in Table 5 of electricity sales to the various sectors of industry does not include supplies of electricity furnished to industrial consumers by municipalities. A further limitation of Table 5 is the fact that the method of classification into sectors has unavoidably suffered changes over the years.

Traction sales

Electricity sold to the South African Railways for traction increased by 7,3 per cent to 3 108 million units in 1974

(4,1 per cent in 1973). The overall rate of increase in 1974 is above the yearly average of 6,1 per cent experienced over the past five years. Details of the development which took place in 1974 in the field of railway electrification are given in a later section of this report dealing with development in each of the separate undertakings. The 1974 sales of electricity for railway traction in each of the undertakings concerned are given in Table 6, together with the corresponding figures for the five years prior to 1974. It will be noted in Table 6 that

Table 4
Sales of electricity to the various gold mining areas, millions of units

Gold mining area	1969	1970	1971	1972	1973	1974	Percentage increase 1974/73	Average yearly increase over 5 years, per cent
Witwatersrand	2 186	2 144	1 974	1 801	1 813	1 891	4,3	−2,9
Klerksdorp	2 178	2 283	2 355	2 561	2 771	3 014	8,8	6,7
Far West Rand	2 759	3 439	3 602	3 622	3 790	3 921	3,5	7,3
Orange Free State	2 913	3 002	3 095	3 144	3 222	3 296	2,3	4,8
Eastern Transvaal	611	636	636	645	667	681	2,1	2,2
Total	10 647	11 504	11 662	11 773	12 263	12 803	4,4	3,8

Table 5
Sales of electricity to sectors of industry, millions of units

Sector of industry	1969	1970	1971	1972	1973	1974	Percentage increase 1974/73	Average yearly increase over 5 years, per cent
Building, cement and quarrying	716	782	824	878	1 096	1 148	4,7	9,9
Chemical	1 272	1 376	1 444	1 639	1 921	2 160	12,4	11,2
Engineering, iron, steel and base metals	4 207	4 683	5 652	6 863	7 687	8 835	14,9	16,0
Paper and paper products	542	485	494	520	575	603	4,9	2,2
Foodstuffs, consumer goods, commercial, and other	1 837	2 282	2 600	2 741	2 747	3 359	22,3	12,8
Total	8 574	9 608	11 014	12 641	14 026	16 105	14,8	13,4

Table 6
Sales of electricity for S.A.R. traction, millions of units

Undertaking	1969	1970	1971	1972	1973	1974	Percentage increase 1974/73	Average yearly increase over 5 years, per cent
Cape Northern	179,5	178,3	203,6	203,0	231,7	261,2	12,7	7,8
Cape Western	397,0	412,6	420,2	424,3	450,8	491,2	9,0	4,4
Eastern Transvaal	270,2	270,3	299,2	327,1	351,3	353,6	9,6	5,5
Natal	667,9	751,5	819,7	893,5	896,0	981,6	9,9	8,0
Rand and O.F.S.	792,4	796,9	873,7	934,4	965,8	1 020,3	5,6	5,2
Total	2 307,0	2 409,6	2 616,4	2 782,3	2 895,6	3 107,9	7,3	6,1

the rate of growth of sales in every undertaking was higher during 1974 than the average yearly rate experienced over the past five years.

Sales by distribution undertakings

In Table 7, the total sales of electricity in each of Escom's distribution undertakings are given for the six years 1969 to 1974. The table shows that Escom's high rate of overall growth in 1974 can be attributed largely to the 11,5 per cent increase (10,8 per cent in 1973) in electricity sales in its major distribution undertaking, the Rand and O.F.S. Undertaking. The 11,5 per cent increase in sales in this large undertaking during 1974 is well above the yearly average rate of 9 per cent over the past five years. This is mainly due to the sustained growth of sales to the mining industry, and to the increased bulk supplies to municipalities. Electricity sales in the Natal Undertaking increased in 1974 by 12,1 per cent (9,3 per cent in 1973). This rate of growth—only slightly below the average yearly rate of

12,9 per cent experienced over the past five years in this undertaking—is seen as signalling a return to the vigorous rate of growth in Natal prior to 1973. Sales of electricity in the Eastern Transvaal Undertaking in 1974 were 7,0 per cent above the sales in the preceding year (16,5 per cent in 1973). The rate of growth of electricity sales in this undertaking is determined largely by the expansion programmes of a relatively small number of large industrial concerns. These expansion programmes of large consumers have in recent years been responsible for sudden surges in the demand for electricity. The exceptionally high rate of growth achieved in 1973 may be attributed to one of these surges. Sales in the Cape Western Undertaking in 1974 were 22,3 per cent higher than in the preceding year (13,6 per cent in 1973)—a rate of growth appreciably above the yearly average of 16,1 per cent for the past five years. The remarkable increase during 1974 was mainly due to a substantial increase in Escom's bulk sales to the City of Cape Town.

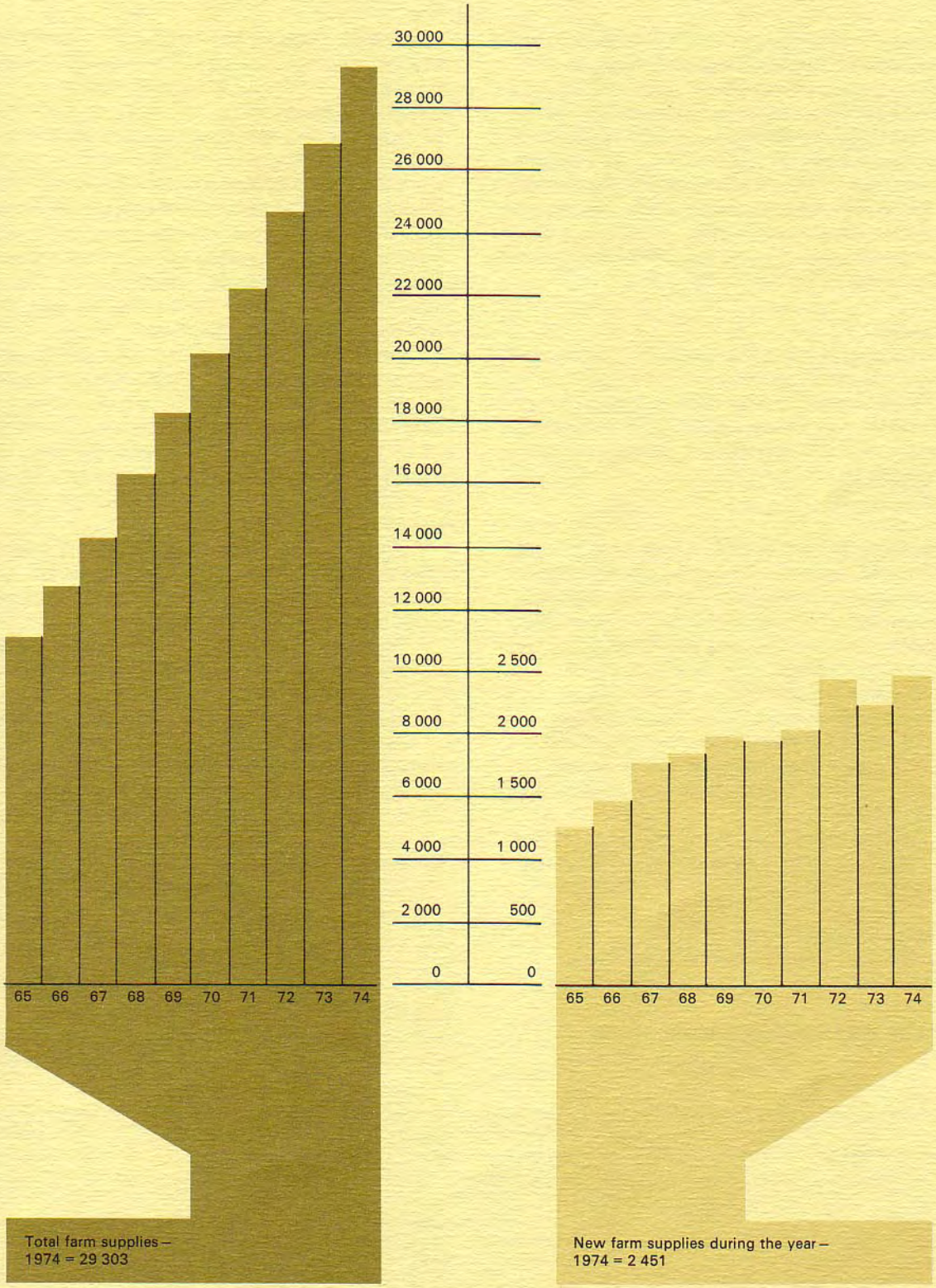
Table 7
Total sales of electricity in Escom distribution undertakings, millions of units

Undertaking	1969	1970	1971	1972	1973	1974	Percentage increase 1974/73	Average yearly increase over 5 years, per cent
Rand and O.F.S.	20 218	22 294	23 620	25 209	27 938	**31 147**	11,5	9,0
Natal	4 637	5 074	6 072	6 938	7 581	**8 500**	12,1	12,9
Eastern Transvaal	3 824	4 294	4 562	5 235	6 098	**6 527**	7,0	11,3
Cape Western	1 824	2 101	2 494	2 771	3 149	**3 852**	22,3	16,1
Cape Northern	658	715	790	896	1 060	**1 211**	14,2	13,0
Border	331	360	400	448	504	**551**	9,3	10,7
Orange River	8	47	95	144	239	**786**	228,9	150,3
Cape Eastern	6	6	7	8	9	**11**	22,2	12,9
Total	31 506	34 891	38 040	41 649	46 578	**52 585**	12,9	10,8

Table 8
Total number of farm supplies at the year end

Undertaking	1969	1970	1971	1972	1973	1974	Percentage increase 1974/73	Average yearly increase over 5 years, per cent
Rand and O.F.S.	5 147	5 862	6 719	7 570	8 398	**9 248**	10,1	12,4
Cape Western	5 269	5 527	5 805	6 071	6 389	**6 772**	6,0	5,2
Natal	3 347	3 787	4 140	4 652	5 080	**5 578**	9,8	10,8
Eastern Transvaal	2 057	2 411	2 717	3 187	3 634	**4 080**	12,3	14,7
Cape Northern	1 531	1 653	1 777	2 033	2 130	**2 240**	5,2	7,9
Border	501	571	642	688	716	**773**	8,0	9,1
Cape Eastern	368	378	387	388	432	**475**	10,0	5,2
Orange River	*	*	4	25	73	**137**	87,7	**
Total	18 220	20 189	22 191	24 614	26 852	**29 303**	9,1	10,0

*Before existence of Orange River Undertaking
**Growth rates not meaningful


30 000
28 000
26 000
24 000
22 000
20 000
18 000
16 000
14 000
12 000
10 000
8 000
6 000
4 000
2 000
0
2 500
2 000
1 500
1 000
500
0
65 66 67 68 69 70 71 72 73 74
65 66 67 68 69 70 71 72 73 74
Total farm supplies –
1974 = 29 303
New farm supplies during the year –
1974 = 2 451

Electricity sales in the Cape Northern Undertaking increased during 1974 by 14,2 per cent compared with the preceding year—a rate of growth above the yearly average of 13 per cent for the past five years. In the Border Undertaking, on the other hand, the 1974 rate of growth of 9,3 per cent was slightly below the yearly average rate of 10,7 per cent achieved over the past five years. In the Orange River Undertaking, the sales in 1974 were more than three times the sales in 1973, as a result of the new partial bulk supply to the City of Port Elizabeth which commenced at the end of 1973.

Rural supplies

Continued progress is being made with the expansion of Escom's rural networks, and a total of 2 451 new farm supplies were connected during 1974 (2 238 in 1973). Table 8 illustrates how Escom's distribution undertakings have contributed to this development over the six-year period ending in 1974.

Tariffs

Escom's tariffs for the supply of electricity have in recent years been forced upwards, not only by the high current rates of interest on capital investment, but by escalating generation costs. The cost of machinery and equipment increased appreciably in 1973 and also in 1974 as a result of the rising costs of basic materials and of wages. Although the interconnection of its power stations enables Escom to contain the rising cost of coal by reducing the burning at coastal coal-fired power stations, this is partly offset on the other hand by the capital-related costs associated with the extension of the transmission system.

As a result of rising costs, the surcharge applicable to Escom's standard tariffs was increased in four of the eight distribution undertakings, from April 1974, as follows:

Eastern Transvaal Undertaking:

The surcharge was increased from 12,5 per cent to 20 per cent.

Natal Undertaking:

The surcharge was increased from 12,5 per cent to 15 per cent.

Orange River Undertaking:
The surcharge was increased from 12,5 per cent to 20 per cent.
Cape Eastern Undertaking:
The surcharge was increased from 17,5 per cent to 20 per cent.

These increases in tariffs were aimed at producing an increase of 5 per cent in the average revenue per unit sold during 1974. Furthermore, to correct the balance between the demand-related and unit-related charges, new tariffs were introduced in the Rand and Orange Free State Undertaking in April 1974 and in the Eastern Transvaal Undertaking in July 1974.

The operating results for the year have shown, however, that these increased tariffs did not adequately provide for the severe escalation of costs during 1974. Continued escalation of costs is expected also in 1975, and for this reason further increases in the tariffs to be charged by the various distribution undertakings, were announced at the end of 1974 to take effect from April 1975.

These tariff increases are in the form of adjustments to the discounts or surcharges applicable in the various distribution undertakings. The effect of the increases is shown in summarised form below.

These increases do not include the effect of the automatic coal adjustment to the unit rates. This is included in the next table.

The increases will apply to all types of consumers, but affect only the standard tariff charges and not extension charges and other fixed contractual payments.

The overall effect on the total Escom revenue per unit of electricity sold is illustrated in the following table:

Year	Escom sales revenue in cents per unit sold	Percentage increase over previous year
1971	0,577 2	4,1
1972	0,610 8	5,8
1973	0,648 4	6,2
1974	**0,682 2**	**5,2**
1975	0,76 (Estimated)	12,0

Distribution undertaking	Discount or surcharge applicable at present	Discount or surcharge applicable from April 1975	Effective increase in standard tariff, per cent
Rand and O.F.S.	Discount 13%	Surcharge 2%	17,2
Eastern Transvaal	Discount 15%	Discount 7½%	8,8
Cape Northern	Discount 7½%	Surcharge 7½%	16,2
Cape Western	Surcharge 17½%	Surcharge 22½%	4,3
Natal	Surcharge 15%	Surcharge 25%	8,7
Border	Surcharge 17½%	Surcharge 30%	10,6
Orange River	Surcharge 20%	Surcharge 40%	16,7
Cape Eastern*	Surcharge 20%	Surcharge 40%	16,7

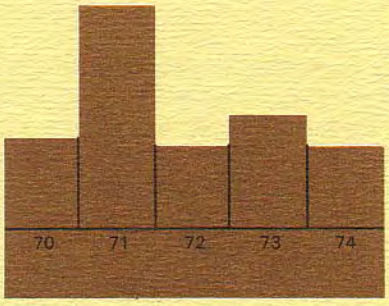
*Unless incorporated with Orange River Undertaking before April 1975

The average 1975 increase of 12 per cent in the price of electricity supplied by Escom is roughly double the yearly percentage increase in Escom prices in the years from 1971 to 1974. During these years, Escom was able to limit the increase in its average prices to approximately 5 per cent per year. The increased tariffs with effect from April 1975 are designed not only to cope with the expected 1975 cost levels, but also to make good the shortfall at the end of 1974.

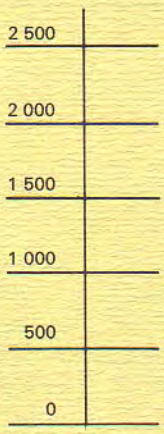
The apparently severe increases, as from April 1975, for the Rand and Orange Free State and for the Cape Northern Undertakings as compared with the Eastern Transvaal Undertaking are explained by the fact that part of the tariff increase necessary for the Eastern Transvaal Undertaking had already been incorporated in the general tariff revision introduced in July 1974.

Capacity of Republic's power stations

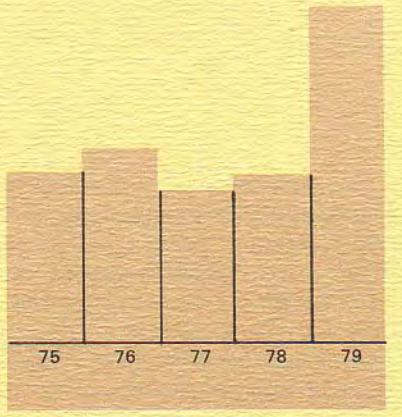
Expansion over the last five years, thousands of MW



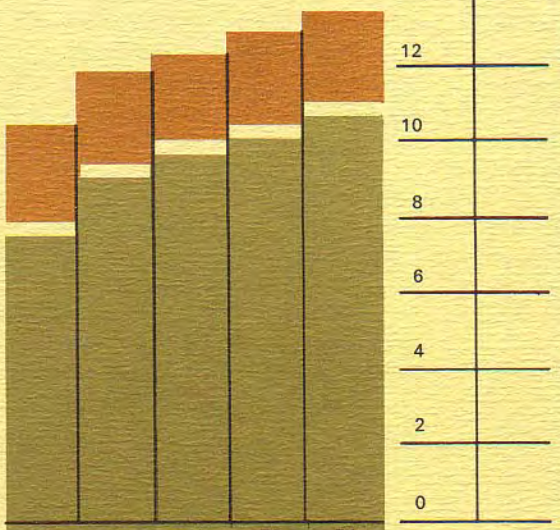
Installed by Escom during the year, MW



Planned expansion over the next five years, thousands of MW

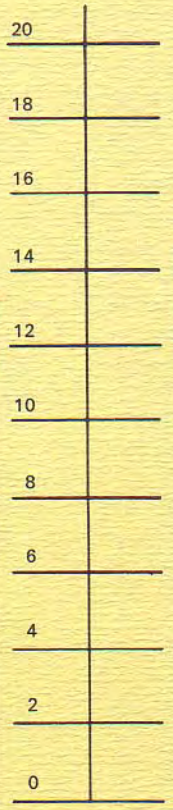


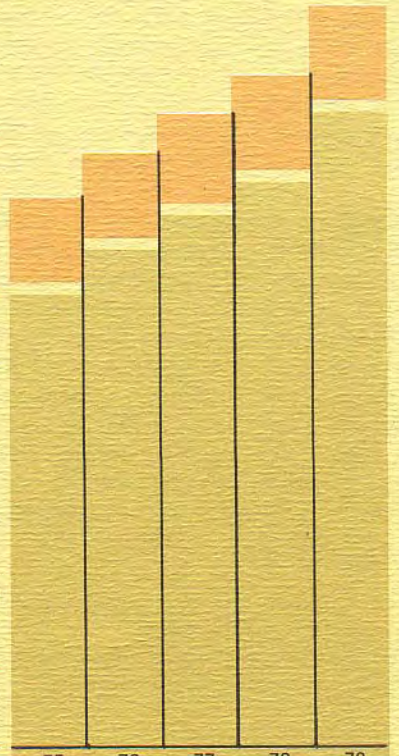
Planned installation by Escom during the year, MW



Total generating capacity installed by Escom*, MW

Total generating capacity installed in Republic, MW





Total generating capacity planned by Escom*, MW

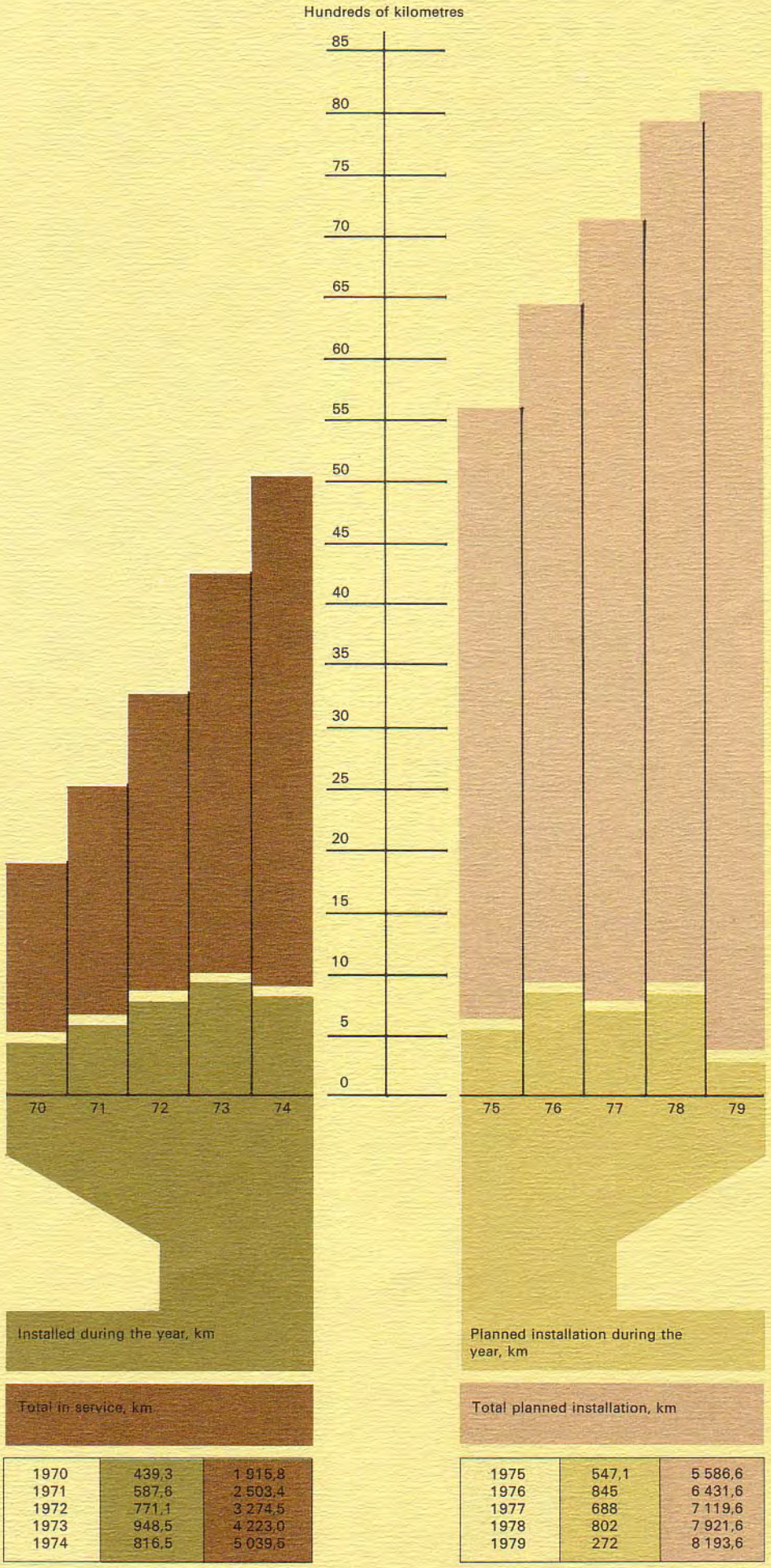
Total generating capacity planned in Republic, MW

1970	600	7 583	10 511
1971	1 460	9 013	11 868
1972	550	9 551	12 391
1973	750	10 142	12 930
1974	550	10 692	13 435

1975	1 130	11 822	14 525
1976	1 270	13 010	15 668
1977	990	14 000	16 658
1978	1 100	14 993	17 789
1979	2 200	16 769	19 547

*After allowing for expected de-commissioning of obsolete plant

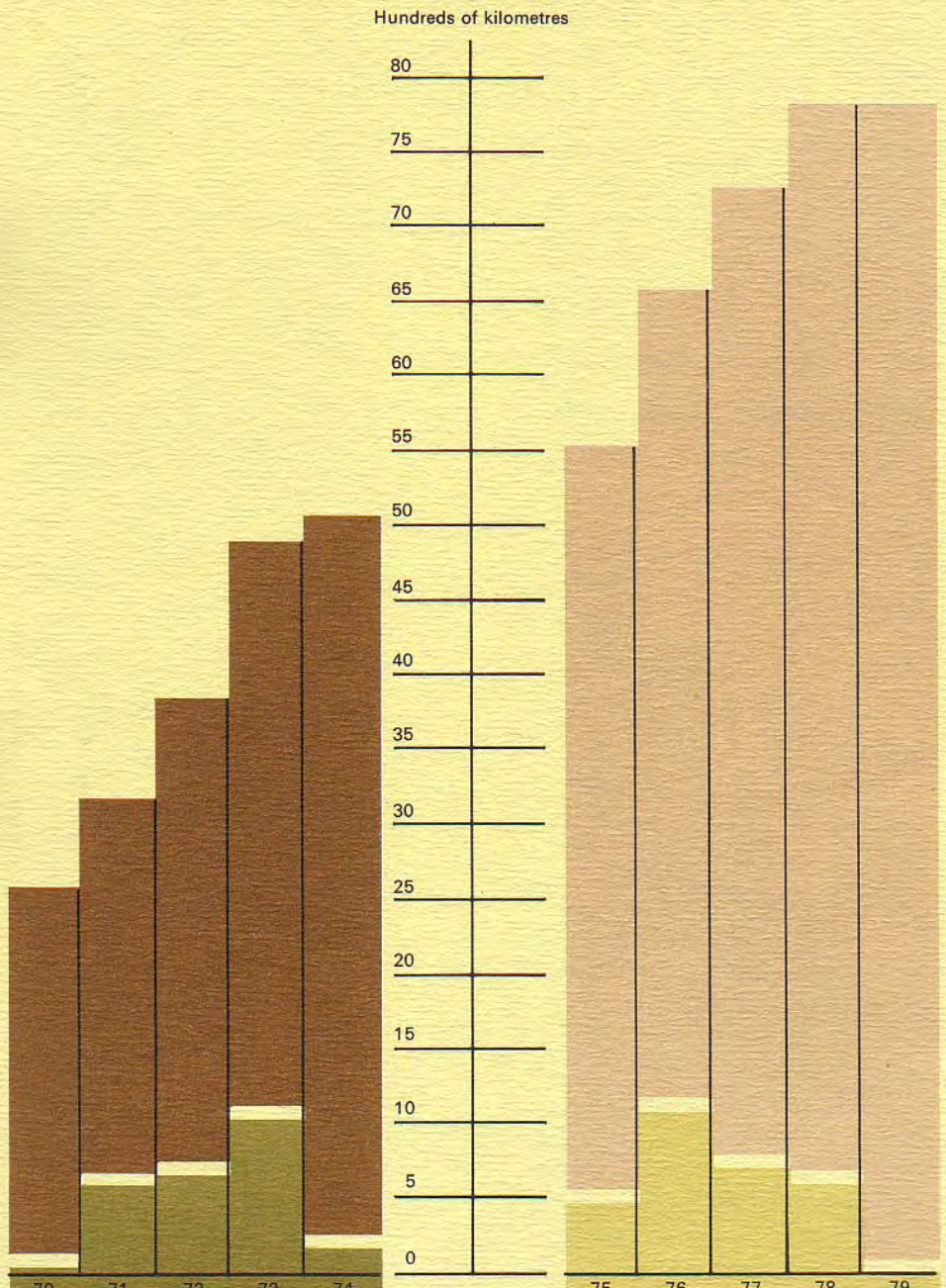
Expansion of Escom's transmission system
400 kV lines



1970	439,3	1 915,8
1971	587,6	2 503,4
1972	771,1	3 274,5
1973	948,5	4 223,0
1974	816,5	5 039,5

1975	547,1	5 586,6
1976	845	6 431,6
1977	688	7 119,6
1978	802	7 921,6
1979	272	8 193,6

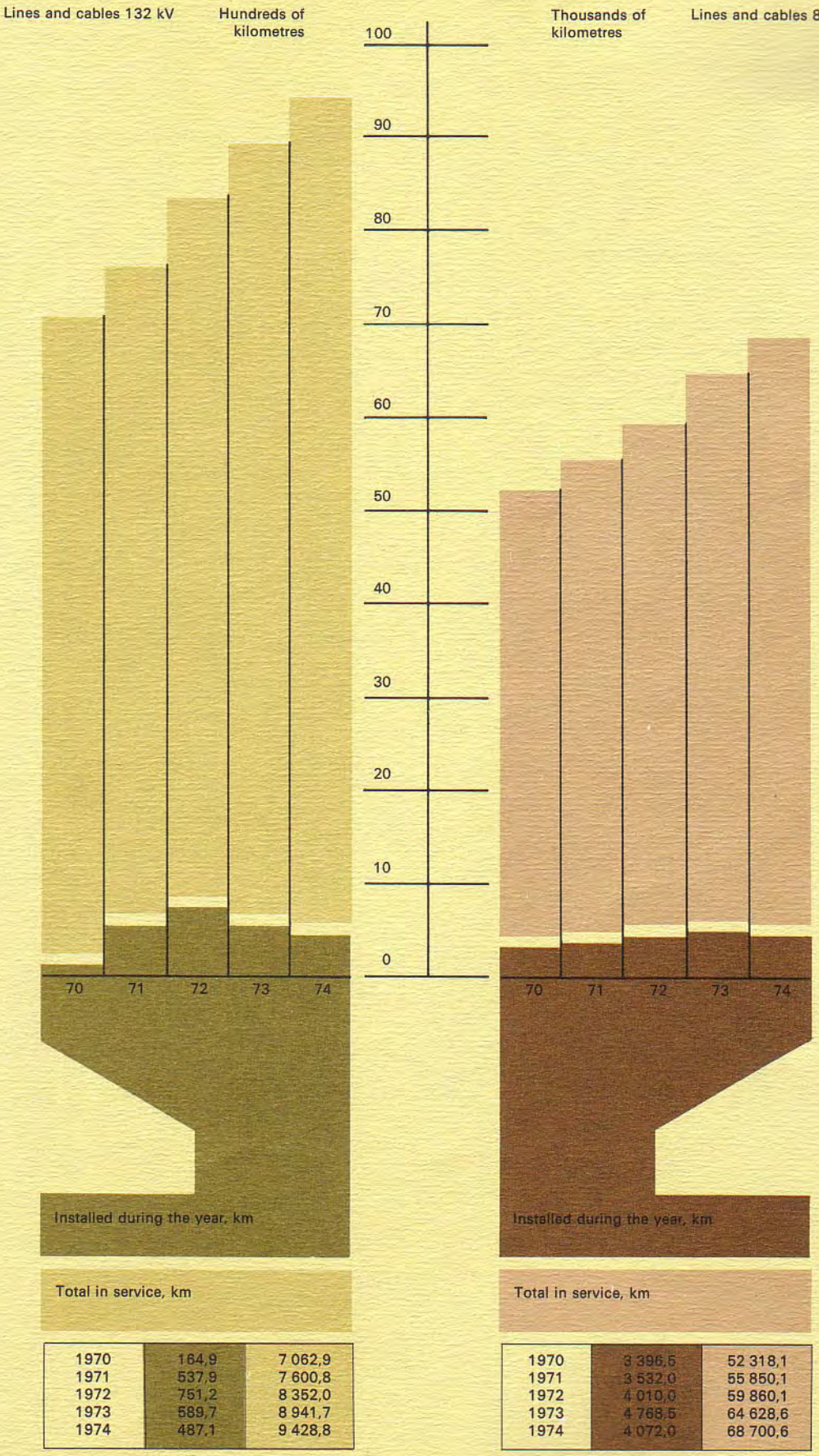
Expansion of Escom's transmission system
275 kV and 220 kV lines



1970	46,8	2 598,5
1971	577,0	3 175,5
1972	650,2	3 825,7
1973	1 068,5	4 894,2
1974	161,6	5 055,8

1975	450	5 505,8
1976	1 073	6 578,8
1977	682	7 260,8
1978	560	7 820,8
1979	000	7 820,8

Expansion of Escom's transmission system



1970	164,9	7 062,9
1971	537,9	7 600,8
1972	751,2	8 352,0
1973	589,7	8 941,7
1974	487,1	9 428,8

1970	3 396,5	52 318,1
1971	3 532,0	55 850,1
1972	4 010,0	59 860,1
1973	4 768,5	64 628,6
1974	4 072,0	68 700,6

Technical

Plant installed for generation and transmission

Major power station plant and equipment taken into service during 1974 and under construction or on order at 31 December 1974 is shown in Table 9.

At 31 December 1974, the installed generating plant comprised 186 boilers with a total steam raising capacity of 12 196 kg/s and 137 turbo-generator sets with a total capacity of 10 691,5 MW. Included in the 137 turbo-generator sets are 7 steam-electric house sets with a total capacity of 49 MW and 2 hydro-electric sets with a total capacity of 160 MW.

Statement No. 1 on pages 70 and 71 of this report gives full details of power station plant installed at 31 December 1974. Due allowance has been made for all plant de-commissioned, and the "assigned sent-out rating in MW" has been indicated. This is the maximum power which can be fed into the grid from the power stations listed. Statement No. 1 continues on pages 72 to 73 with an indication of the transmission lines, cables and transformers in service at 31 December 1974.

The interconnected system was extended in 1974 by the completion of an additional 629 km of 400 kV transmission lines, including a second 400 kV line from Chivelston distribution station near Newcastle to Mersey distribution station near Pietermaritzburg, a distance of 193 km. During the year, the power transfer capability of the 400 kV lines connecting the distribution undertakings of the Cape with the power stations in the Eastern Transvaal was also increased by installing the first group of series capacitors in these lines.

Preparations are at present being made to ensure a smooth connection in 1975 of Escom's national transmission network with the Cabora Bassa hydro-electric power station in Mozambique. Two direct-current transmission lines from Pafuri in the north on the Mozambique border to Escom's Apollo distribution station at Irene, near Pretoria, were completed during 1974. The first stage of the direct-current converter station with all

ancilliary equipment at Apollo was 98 per cent complete by the end of the year. The South African portion of the Cabora Bassa project is thus virtually completed.

Power stations and projects under construction or in the planning stage

Particulars of Escom power stations under construction, or in the planning and design stages are as follows:

Grootvlei

This coal-fired power station, situated in the Southern Transvaal between Balfour and Villiers, has been planned for an ultimate capacity of six coal-fired sets of 200 MW, with steam conditions 10,3 MPa (abs.) and 538°C.

Of the five sets now in commercial service, one uses a dry cooling tower, which enables its condenser to be cooled without loss of water by evaporation. The sixth set, planned for commercial service in June 1977, will also be of the dry-cooled type.

Contracts have been awarded for all the major plant of the sixth set, with the exception of the contract for the dry cooling system, which is expected to be placed early in 1975. Site work for the sixth set has commenced.

With the sixth set in operation, Escom will thus have two large turbo-generator sets employing dry cooling towers. The experience gained with these two sets will enable Escom to formulate a long-term policy in regard to the adoption of the dry cooling process on a larger scale.

Hendrina

This coal-fired power station, situated near Hendrina in the Eastern Transvaal, is planned for an ultimate capacity of ten 200 MW sets with steam conditions 10,3 MPa (abs.) and 538°C.

The seventh set in this power station was commissioned in June 1974—three months ahead of the originally planned commissioning date. Unfortunately, the low-pressure turbine rotor was damaged by the ingress of

Table 9
Power station plant taken into service during 1974 and on order at 31 December 1974

Name of power station	Plant taken into service in 1974		Plant under construction or on order	
	Boilers kg/s	Generators MW	Boilers kg/s	Generators MW
Coal-fired steam				
Arnot	333	350	333	350
Hendrina	214	200	642	600
Grootvlei	—	—	215	200
Kriel	—	—	2 640	3 000
Matla	—	—	1 524	1 800
Gas turbines	—	—	—	180
Hydro				
Hendrik Verwoerd	—	—	—	160
Vanderkloof	—	—	—	220

Cabora Bassa line

water, and it became necessary to install an identical rotor intended for the eighth set. Operation of the seventh set could thus be resumed in September.

Arrangements have been made to advance the commissioning date of the eighth set by six months and of the ninth and tenth sets by twelve and eighteen months respectively. The power station is thus expected to be completed before the winter of 1977.

Arnot

This coal-fired power station, situated near Middelburg in the Eastern Transvaal, is planned for an ultimate capacity of six 350 MW sets with steam conditions 15,9 MPa (abs.) and 510°C with reheat to 510°C. The fifth set was commissioned in September 1974 and the sixth and last set will follow in June 1975.

Arnot is Escom's first station using reheat of the steam, and with no interconnection of the boilers on the steam side.

Kriel

The design and construction of this coal-fired power station, situated between Bethal and Ogies in the Eastern Transvaal, is proceeding according to plan. The ultimate installed capacity will be 3 000 MW, comprised of six 500 MW boiler/turbine sets employing steam conditions of 16,1 MPa (abs.) and 510°C with reheat to 510°C.

The main civil works completed during the year include the first cooling tower and its associated ducts and circulating water pumphouse, the first concrete chimney, the high-voltage yard, the boiler-house and turbine-house foundations for the second and third sets, the turbine foundation block for the second set, and buildings for stores and workshops. The boiler supporting steelwork for the first two sets and the turbine house steelwork for the second set were all completed during the year.

Erection of both the boiler and the turbo-generator for the first set commenced at the beginning of the year and progress has been satisfactory, in spite of delays with the delivery of materials.

Matla

This coal-fired power station is planned for an ultimate installed capacity of 3 600 MW, made up of six 600 MW boiler/turbine sets, having steam conditions of 16,1 MPa (abs.) and 535°C with reheat to 535°C.

The contract for the supply of coal to this power station, and the contracts for the first three boiler/turbo-generator sets were awarded during the year.

The first set is planned for commissioning before the winter of 1979, the second a year later, and the third a year after that.

Duvha

The technical specifications, size of set, and ultimate installed capacity of this power station are identical to those of Matla but modified to suit the different coal properties and other particular site conditions.

Tenders for the first three boiler/turbo-generator sets have been adjudicated, and contracts were placed in April 1975. The first set is planned for commissioning before the winter of 1980, and the second and third sets at yearly intervals thereafter.

Usutu water scheme

In 1973, Escom was appointed by the Department of Water Affairs to undertake, on its behalf, the complete engineering of the Usutu River Government Water Scheme (excluding dam works), which will serve partly to supply the Kriel and Camden power stations with water. During the year under review, Escom engineered and supervised the construction of the reservoir and pump-house at Camden power station, and the pipeline between the Camden and Kriel power stations. Apart from certain minor finishing works, the pipeline between the Camden and Rietspruit reservoirs has been completed.

Hendrik Verwoerd

Two further 80 MW turbo-generator sets are being installed in this conventional storage hydro-electric power station to bring the total number up to four. The associated civil work, which commenced in 1973, progressed well during 1974, and the roof on the power station extensions is now completed.

The construction programme suffered a short delay due to flooding of the works at the time of the Orange River floods in February 1974. This power station is planned for completion to its ultimate installed capacity of 320 MW before the winter of 1976.

Vanderkloof

This hydro-electric power station, situated at the P. K. le Roux Dam, is planned for an ultimate capacity of 220 MW consisting of two turbo-generator sets of 110 MW each. The station is scheduled for completion before the winter of 1977.

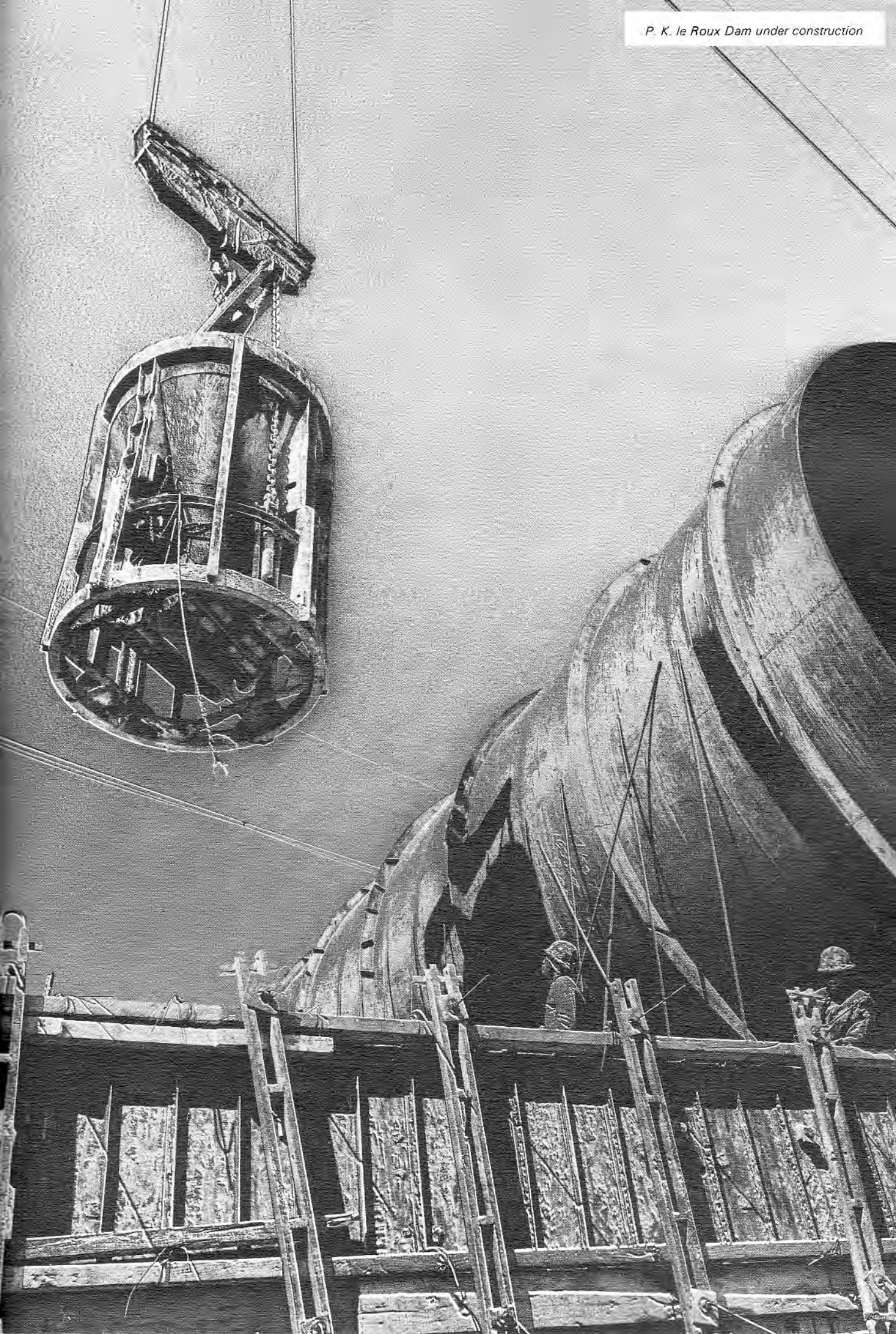
Construction progress continued to be satisfactory during 1974. Excavations for the underground power-house and associated shafts and tunnels were completed by the middle of the year—approximately two months ahead of schedule.

The powerhouse crane was installed and erection of the turbines commenced in December.

Drakensberg pumped-storage scheme

A large hydro-electric power station of the pumped-storage type is planned as a joint venture with the Department of Water Affairs in their scheme for supplementing the resources of the Vaal River by pumping water from the upper reaches of the Tugela River.

A study of the joint venture showed it to be feasible. Escom's part of the scheme involves using an "arm" or



P. K. le Roux Dam under construction

"fiord" of the Sterkfontein Dam as an upper reservoir and a dam on the Mnjaneni River on the farm Kilburn as a lower reservoir. A low-lift pumping station is required to lift water 40 metres from the Jagersrust forebay to Escom's lower reservoir. As a result of the feasibility study, it has been agreed that the State will make a contribution of some R35 000 000 to the capital cost of the scheme.

The power station will house four 250 MW reversible/pump-turbine sets, the first of which is planned for commissioning in September 1980 to satisfy the pumping requirements for the second phase of the Department of Water Affairs' Tugela-Vaal scheme. The average nett head in the generating mode is 433 metres.

Research and development

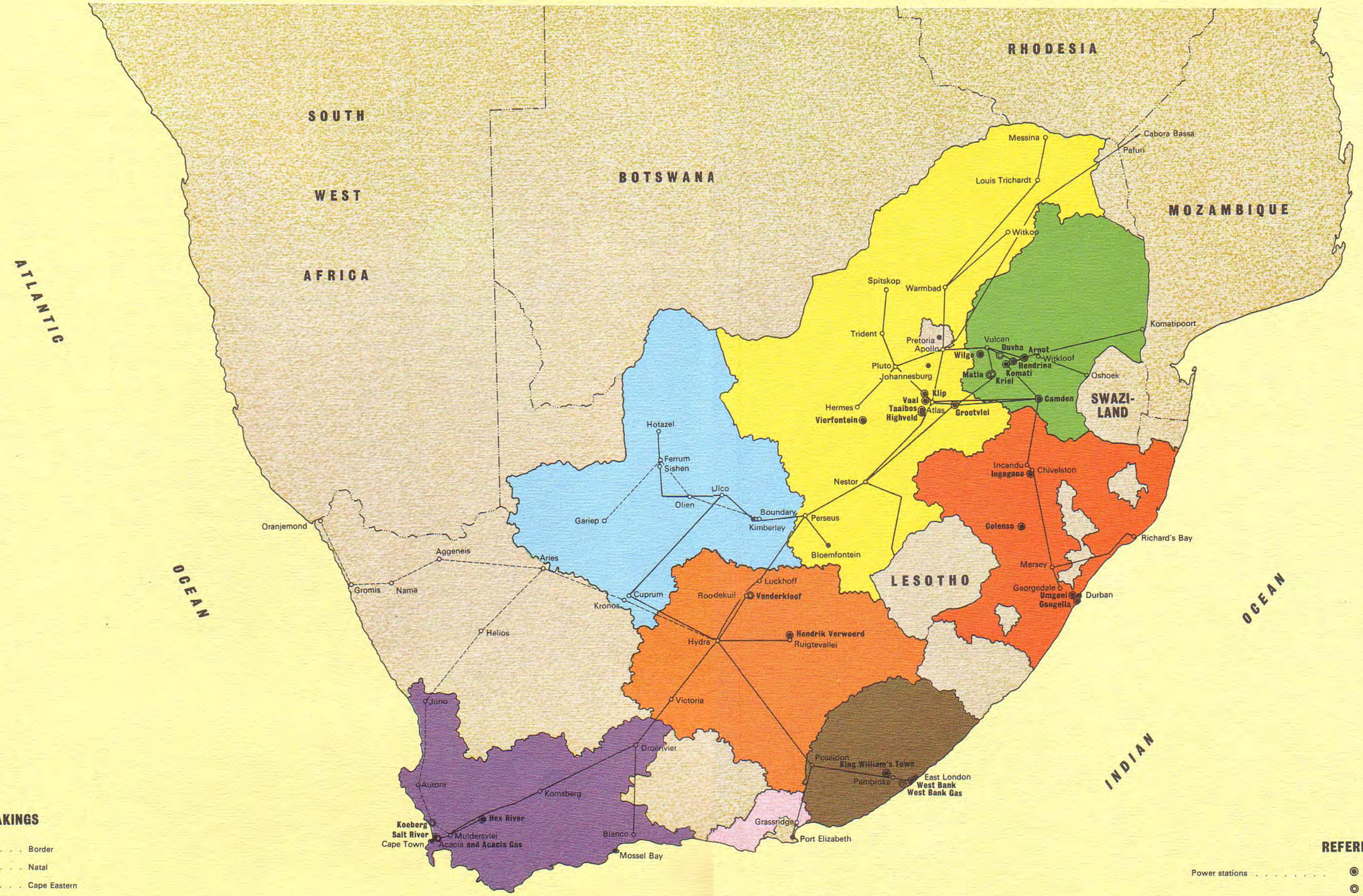
The investigation of problems associated with power generation and transmission continued during the past year. Among these are many long-term projects, such as measures required to reduce pollution, the determination of the general properties of coal, paint and protective coverings, surveys of radio and television interference from transmission lines, finding the solution to problems associated with power line carriers, establishing the performance of contaminated insulators, and earth resistivity surveys.

Among the many new projects which were started during 1974 were an investigation into lightning arrestor failures, impulse tests on the Cabora Bassa direct current transmission line and the 400 kV alternating current lines at Apollo, and the development and testing of a new range of steel pylons for 132 kV transmission lines. On the power generation side the work included the determination of thermal stresses in steam pipes, surge measurements in pipelines, and the investigation of a number of plant vibration problems.

Co-operation with the Council for Scientific and Industrial Research, South African Bureau of Standards and the universities has been maintained through joint research projects and through national committees on which Escom is represented, such as the National Advisory Committee on Electrical Engineering and the Co-ordinating Committee for High Voltage Research and Testing Facilities. Escom also serves on numerous committees convened by the South African Bureau of Standards to draw up standards and codes of practice, and also on various committees convened by the Atomic Energy Board. Contact with overseas research activities is ensured through membership of the Electrical Research Association of the United Kingdom, Conférence Internationale des Grandes Réseaux Electriques, where Escom representatives serve on the Administrative Council and on two of the study committees, the World Energy Conference, and through contact with similar electric utilities in other countries such as the Central Electricity Generating Board in the United Kingdom, and the Electricité de France.

As an aid to planning the construction of the large new coal-fired power stations which will be sited on the Transvaal coalfields in future years, Escom is continuing to accumulate operating experience with the experimental 200 MW turbo-generator employing the non-evaporative cooling process at Grootvlei power station. Some of the test results and operating experience obtained so far with this experimental plant at Grootvlei were described in a paper presented by Escom engineers at the ninth World Energy Conference in Detroit in September 1974. The paper aroused a great deal of interest at the Conference.

ESCOM MAP SHOWING UNDERTAKINGS AND NATIONAL GRID



UNDERTAKINGS

- Border
- Natal
- Cape Eastern
- Cape Western
- Cape Northern
- Orange River
- Eastern Transvaal
- Rand and Orange Free State

REFERENCE

Power stations . . . . . Arnot
Matla . . . . . Under construction

Power lines . . . . . ———

- - - - - - - - . . . . . To be constructed

100 50 0 100 200 300 400 Kilometres

Operating – The Central Generating Undertaking

The Central Generating Undertaking entered the third year of its existence by formally taking over the control of West Bank power station from Escom's Border Undertaking on 1 January 1974. With this step, all of Escom's power stations have now come under the control of the Central Generating Undertaking. Consequently, a further improvement in the co-ordinated operation of power stations and the distribution of their output to consumers throughout the country, was achieved.

Generation of electricity

As indicated in Statement No. 4 on page 78 a total of 59 797 million units of electricity were generated in Escom's power stations during 1974, and this exceeds the corresponding figure for 1973 by 12,7 per cent. During 1973 the corresponding increase was 11,9 per cent. Table 10 shows the units of electricity distributed for consumption each year in all Escom's undertakings for the five-year period 1970 to 1974 inclusive. In this table, the units supplied to the Orange River Undertaking and to the small Cape Eastern Undertaking are shown separately. The electricity purchased from Port Elizabeth Municipality and from the Department of Water Affairs (hydro electric power station at the Paul Sauer Dam) by the Cape Eastern Undertaking is tabulated in Statement No. 2 on page 75.

The one-hour non-simultaneous maximum demands experienced each year over the past ten years by the

distribution undertakings are indicated in Table 11. Table 12 shows in a similar manner the demands experienced each year by the different distribution undertakings during the hour of occurrence of the yearly peak demand on the national interconnected system, the time and date of occurrence of the national peak demand being stated. There is diversity between the demands of the individual distribution undertakings: the yearly peak demand on the national interconnected system is lower than the aggregate of the non-simultaneous demands of the individual undertakings. This is one of the advantages that accrue to the combined systems as a result of the interconnection of Escom's undertakings.

It can be seen from Table 12 that the maximum simultaneous demand on the national interconnected system in 1974 was 1 202 MW higher than in 1973. In 1973 the corresponding increase over the preceding year was some 720 MW.

The extraordinary growth in the demand for electricity during the year 1974 placed Escom under severe pressure in its task of meeting the requirements of all its consumers. The hourly maximum demand of 8 552 MW on Escom's interconnected system in 1974 represents an increase of 16,4 per cent over the maximum of 7 350 MW experienced in 1973. Escom's installed generating capacity, on the other hand, increased during 1974 by only 11,6 per cent over the total capacity which was installed by the end of 1973.

Table 10
Electricity supplied to Escom's undertakings, millions of units
(Electricity consumed by power station auxiliaries is excluded)

	1970	1971		1972	1973	1974
Pooled power station supplies to undertakings			**(1) Central Generating Undertaking supplies to distribution undertakings**			
Rand and O.F.S.*	24 038,3	25 499,1	Rand and O.F.S.	26 959,4	30 036,2	**33 459,3**
Natal	5 339,9	6 407,6	Natal	7 370,2	8 041,1	**9 087,1**
Eastern Transvaal*	4 408,5	4 687,2	Eastern Transvaal	5 438,8	6 205,4	**6 679,0**
Cape Western	2 321,5	2 755,7	Cape Western	3 078,8	3 495,8	**4 241,3**
Cape Northern	796,7	879,9	Cape Northern	999,8	1 182,6	**1 345,9**
Orange River	52,9	101,8	Orange River	156,8	257,8	**822,3*** **
			Border	**	4,2	**594,3**
			Cape Eastern	—	—	**5,2**
			(2) Central Generating Undertaking own consumption	9,2	20,0	**16,8**
			(3) Sub-total: supplied by Central Generating Undertaking	44 013,0	49 243,1	**56 251,2**
Border	363,2	408,0	**(4) Border Undertaking**	462,1	516,0	—
Cape Eastern (purchased)	7,1	8,3	**(5) Cape Eastern Undertaking (purchased)**	9,7	11,3	**7,9**
Total, all Escom	37 328,1	40 747,6	**Total, all Escom**	44 484,8	49 770,4	**56 259,1**

*Includes electricity purchased from municipalities and other sources
**Before interconnection with Central Generating Undertaking
***Excludes units supplied to Cape Eastern Undertaking

Plant performance and maintenance

The computerisation of the plant performance system was completed at all power stations during the year. The generation of plant operating statistics at power stations, as an extension of performance monitoring, was undertaken on a trial basis at several power stations. The system proved to be acceptable, and it is planned to introduce it at all power stations in 1975.

A variety of tests were carried out during the year in connection with plant performance. Acceptance tests were conducted on newly commissioned major mechanical plant and cooling towers at several power stations. Tests were also conducted at some of the older power stations for various specific purposes.

The facilities of the Central Maintenance Services at Rosherville were augmented by the installation of a large dynamic balancing machine capable of handling turbo-generator rotors with a mass of up to 65 metric tons. A replacement flame-cutting profile machine of larger capacity has also been installed. Several additional lathes and boring mills and a new 75 metric ton crane for the mechanical workshop have been ordered.

Of the total capacity of turbo-generating plant installed in Escom power stations by the end of 1974, amounting to 10 691,5 MW, the Central Plant Maintenance specialists carried out guarantee inspections on 1 100 MW, overhauls on 1 256 MW, and major maintenance on a further 2 591 MW. This amounts to 4 947 MW of turbo-generator plant, and represents almost half the installed generating capacity. In addition, planned routine, preventive, and breakdown maintenance was carried out on many other turbo-generators throughout the system.

During the year, 57 boilers were overhauled to meet

Table 11
Hourly maximum demand of Escom's undertakings over the last ten years, megawatts

Undertaking	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Rand and O.F.S.	2 573,7	2 644,4	2 863,0	3 114,7	3 277,1	3 624,4	3 878,4	4 054,9	4 467,8	5 147,0
Natal	564,5	613,3	660,0	712,0	794,0	867,0	1 060,0	1 177,0	1 263,0	1 438,0
Eastern Transvaal	290,5	368,4	424,7	485,2	575,5	615,3	680,4	786,1	867,8	924,6
Cape Western	245,0	260,6	276,6	298,6	326,8	389,8	442,8	491,7	554,1	707,1
Cape Northern	69,4	79,2	102,2	117,5	127,3	139,8	157,1	170,1	201,9	231,0
Orange River	—	—	—	—	7,6	12,4	20,5	30,3	88,2	117,5**
Border	51,5	54,6	58,9	64,9	67,7	70,2	80,3	88,3	100,8	114,0
Cape Eastern	—	1,1	1,5	1,7	2,0	2,0	2,3	2,5	2,3	5,1*
Aggregate of non-simultaneous maximum demands	3 794,6	4 021,6	4 386,9	4 794,6	5 178,0	5 720,9	6 321,8	6 800,9	7 545,9	8 684,3

*Includes 2 MW supplied by Orange River Undertaking
**The power supplied to Cape Eastern Undertaking by Orange River Undertaking is not included in this figure

Table 12
Demand in each undertaking at the time of maximum demand on total Escom system, megawatts

Undertaking	Year / Time / Date	1965 10h00 20/7/65	1966 11h00 22/7/66	1967 11h00 14/7/67	1968 12h00 13/6/68	1969 09h00 25/7/69	1970 12h00 16/7/70	1971 09h00 17/6/71	1972 10h00 1/8/72	1973 09h00 13/7/73	1974 19h00 4/9/74
Rand and O.F.S.		2 572,7	2 649,2	2 868,6	3 119,4	3 277,1	3 624,4	3 885,9	4 026,8	4 440,0	5 083,0
Natal		493,0	574,0	545,7	635,7	747,4	825,3	994,0	1 088,0	1 222,0	1 438,0
Eastern Transvaal		267,1	320,4	409,0	456,1	541,2	598,2	565,8	772,0	827,0	946,0
Cape Western		225,0	239,0	255,5	273,0	315,5	357,5	432,4	470,4	542,0	647,0
Cape Northern		67,2	75,4	95,8	110,3	114,5	136,8	144,8	163,0	197,0	218,0
Orange River		—	—	—	—	—	10,3	18,3	23,0	31,0	114,0
Border		43,7	47,5	52,6	63,1	59,0	69,0	74,0	87,0	91,0	106,0
Maximum simultaneous demand on total Escom system		3 668,7	3 905,5	4 227,2	4 657,6	5 054,7	5 621,5	6 115,2	6 630,2	7 350,0	8 552,0

statutory requirements. Three boilers were given guarantee inspections and several received major maintenance. General maintenance was carried out on 37 pumps. On the electrical side, 101 transformers and 22 generators received attention.

There were further developments during the year in the Central Maintenance Workshops with the computerised capacity loading and scheduling system. The system was improved by installing a teleprocessing link connecting the local IBM system 3/10 computer with the large IBM system 370 computer at head office. A major achievement was the introduction of a weekly report on the status of works orders.

A computer-assisted system for scheduling of planned maintenance was proposed during the year, and accepted in principle. Further development of this system is in progress with a view to incorporating all the major constraints affecting planned maintenance. To improve detailed scheduling of maintenance at individual power stations, courses were given in computerised critical path analysis to power station maintenance superintendents.

Coal supplies

The metric tonnages of coal burnt each year in Escom power stations situated in different areas of the country are indicated in Table 13 for the years 1969 to 1974

inclusive. In Table 14, Escom's costs per metric ton of coal delivered to its power stations in these areas are shown as yearly averages over the same period.

During the year under review, the ultimate stage in the co-ordinated operation of all Escom's generating plant was reached, following the transfer on 1 January 1974 of West Bank power station from the Border Undertaking to the Central Generating Undertaking. As a result, the coal burnt in the Eastern Cape area in 1974 was 49,2 per cent less than in the preceding year, as shown in Table 13. The yearly decrease of 1,2 per cent shown in the table as an average figure for the Eastern Cape over the past five years is to some extent misleading, being dominated by the drastic reduction achieved during the year under review. In the Natal and Western Cape areas, on the other hand, the metric tonnages of coal burnt during the year 1974 were above the tonnages burnt in the preceding year, and Table 13 reveals that this represents a reversal of the tonnage reduction achieved in both these areas, when expressed as a yearly average over the past five years. Such a reversal was inevitable in a year of unprecedented demand on Escom's aggregate generating capability. The endeavour to continue allocating load among the various power stations in an economical manner is demonstrated by the fact that of their total electricity requirements during the year 1974,

Table 13
Coal burnt per year in different areas, millions of metric tons

Geographic area	1969	1970	1971	1972	1973	1974	Percentage increase 1974/73	Average yearly increase over 5 years, per cent
Transvaal and O.F.S.	16,097	17,755	19,515	21,618	25,009	**27,998**	12,0	11,7
Natal	2,734	2,871	3,067	2,450	2,013	**2,117**	5,2	−4,2
Western Cape	0,956	0,797	0,604	0,622	0,591	**0,627**	6,1	−7,4
Eastern Cape*	0,196	0,208	0,230	0,263	0,295	**0,150**	−49,2	−1,2
Total	19,983	21,631	23,416	24,953	27,908	**30,892**	10,7	9,1

*Incorporated in Central Generating Undertaking as from 1974

Table 14
Yearly average cost of coal burnt in different areas, Rand per metric ton

Geographic area	1969	1970	1971	1972	1973	1974	Percentage increase 1974/73	Average yearly increase over 5 years, per cent
Transvaal and O.F.S.	1,82	1,76	1,76	1,83	2,03	**2,58**	27,1	7,7
Natal	3,91	3,82	4,08	4,10	4,13	**4,96**	20,1	5,2
Western Cape	6,58	6,58	7,06	7,44	9,06	**10,04**	10,8	9,1
Eastern Cape*	6,04	6,13	6,31	6,83	8,17	**8,87**	8,6	8,2
Overall average	2,38	2,26	2,25	2,25	2,39	**2,92**	22,2	4,6

*Incorporated in Central Generating Undertaking as from 1974

only 26 per cent in the case of the Cape Western Undertaking, 40 per cent in the case of Border Undertaking, and 42 per cent in the case of Natal Undertaking was supplied from power stations situated within their territories, the remainder having been imported via the 400 kV transmission lines from the power stations in the Transvaal and Orange Free State.

A conspicuous feature of Table 14 is the steep rise of Escom's coal cost during the year under review at the power stations situated in the Transvaal, Orange Free State and Natal. The cost of coal burnt in the Transvaal and Orange Free State power stations in 1974 was 27,1 per cent higher than in the preceding year. In Natal the corresponding increase was 20,1 per cent. These percentage increases during 1974 were dramatically higher than the yearly averages of 7,7 per cent and 5,2 per cent respectively experienced in these two areas over the past five years. This steep increase in Escom's coal cost during 1974 was due to various factors. The coal mining industry has not only suffered normal inflation, but has also made substantial adjustments to wages. Considerable costs have been incurred in the mechanisation and rehabilitation of production facilities at the older collieries. An example of the kind of difficulty which has arisen during the year was the need to rail additional coal from the Witbank area to Klip power station to meet generating requirements there in the face of a shortfall in output from local collieries. In the case of the newer collieries the policy of Escom's coal suppliers has consequently favoured the adoption of more mechanisation. The more capital-intensive ventures have of course also suffered the consequences of inflation; the cost of stores and mining equipment have recently been rising at a higher rate than the average inflation rate resulting from the energy crisis.

It should perhaps be pointed out that the cost figures in Table 14 do not at this stage reflect the influence of an increase in the controlled price of coal, amounting to some 91 cents per metric ton depending on grade and calorific value, which took effect in the Transvaal as from 6 September 1974. In the case of the power stations in the Western and Eastern Cape, this increase is coupled with a 15 per cent increase in the rail tariff. Similar circumstances apply at the Natal power stations, as a result of the increase in the controlled price of coal, which varies from one colliery to another in this area.

Present indications are that the rates of increase of Escom's coal costs experienced in 1974 can be expected to continue in 1975.

During the year, problems were experienced with the supply of coal to some of Escom's power stations, particularly those situated at some distance from coalfields. The suppliers were under great pressure in providing the increased quantity of coal required, and serious disruption of Escom's supplies of electricity to its consumers could be avoided only by drawing upon the stockpiles of coal which had been built up at most of its

power stations. By the end of the year, some 1,5 million metric tons of coal were stockpiled at the power stations of the Transvaal and Orange Free State, and stockpiling was under way at the power stations in the Western Cape. The maximum stockpiling capacity is estimated at 2,0 million metric tons. Escom is at present making extensive arrangements to ensure that sufficient coal will be available in 1975. The expected flow of supplies to Escom from Cabora Bassa in October 1975 will augment Escom's resources of coal-fired generating capacity.

Escom is actively pursuing the application of open-cast mining at the collieries serving its Hendrina and Arnot power stations. Further investigations by coal suppliers, in collaboration with Escom, are being carried out to extend the scope of these mining operations which seek to increase the percentage extraction of in situ coal reserves. Recent visits overseas were undertaken by mining experts from this country, including two Escom representatives, with the object of studying the merits of longwall mining as an alternative to the bord and pillar technique for the extraction of deep coal seams. Definite advantages were found in favour of the longwall method. The feasibility of longwall mining has been investigated at one of the smaller collieries and the necessary capital expenditure has been approved by Escom. Should this highly mechanised method of mining with its improved percentage extraction be found to yield the benefits expected, a door will be opened to its application on a larger scale at the colliery for Matla power station, and at the other large collieries serving future Escom power stations.

Where conditions are favourable, the ash discharged from power stations can be returned to the colliery for disposal underground. Apart from eliminating unsightly ash-heaps in the vicinity of power stations, the procedure may lead to increases in the percentage coal recovery underground. A system for pumping ash from Grootvlei power station to the underground areas of its colliery has been in operation since October 1973, and is still progressing favourably. A full report is awaited on the merit of this venture, which seeks to reduce the cost of producing coal by achieving a greater percentage extraction of the in situ reserves.

Water supplies

Quantities and sources of water used in Escom's power stations during the past two years are shown in Table 15.

The total water consumption of Escom's major coal-fired power stations, namely Arnot, Hendrina, Camden, Grootvlei, and Komati, averaged 280 megalitres per day in 1974. If the demand for electricity increases at the expected rate, Escom will have to install in the years to come a substantial amount of additional generating plant. As mentioned in an earlier section of this report, much of the additional plant will be conventional coal-

fired plant, situated on the coalfields of the Eastern Transvaal.

Wet cooling towers will be used at Kriel. As far as the Matla and Duvha power stations are concerned, Escom is committed to the evaporative cooling process only for the first three sets to be installed in each station. On the basis of these commitments, Escom's water requirements in the Eastern Transvaal area are estimated to be 550 megalitres per day by the year 1980. By 1985 this figure may have increased to the region of 800 megalitres per day, depending upon Escom's further decisions in regard to the adoption of non-evaporative cooling using dry cooling towers.

Although these estimated future water consumption figures may appear rather high, it should be pointed out that they comprise only about 2,5 per cent of the total volume of water continuously in circulation in the power stations concerned. However, Escom continues with the promotion of its aim to reduce its water consumption as far as practical. For some years, as recorded in previous annual reports, several possible avenues of water conservation have been investigated. These include the use of chemicals in the circulating water to reduce blow-down water loss, the re-use of waste water and sewage effluent, the improvement of the efficiency of evaporative towers, and the use of non-evaporative instead of evaporative towers. The result of the measures adopted so far has been that between 1970 and 1974 the average

Table 15
Water used in Escom coal-fired power stations, megalitres
(Includes colliery and construction usage)

Area and source of water	Potable water		Crude river water		Water from other sources including boreholes, dams and sewage		Sea water circulated (estimated)	
	1973	**1974**	1973	**1974**	1973	**1974**	1973	**1974**
Western Cape								
Cape Town Municipality	240	**280**						
Worcester Municipality	535	**484**						
Hex River			35	**27**				
Sea water (estimated)							296 000	**296 400**
Total Western Cape	775	**764**	35	**27**			296 000	**296 400**
Eastern Cape								
East London Municipality	95	**104**						
Sea water (estimated)							121 000	**73 312**
Total Eastern Cape	95	**104**					121 000	**73 312**
Natal								
Durban Municipality	2 000	**2 083**						
Sea water (estimated)							90 980	**102 913**
Tugela River			1 587	**1 575**				
Ngagane River			11 051	**10 709**				
Total Natal	2 000	**2 083**	12 638	**12 284**			90 980	**102 913**
Transvaal and O.F.S.								
Vaal River	1 439	**1 790***	49 589	**50 456**				
Bronkhorstspruit			7 244	**7 570**				
Komati River			49 885	**69 718**				
Usutu complex			20 661	**23 346**				
Other	71	**61**			179	**312**		
Total Transvaal and O.F.S.	1 510	**1 851**	127 379	**151 090**	179	**312**		
Total all Escom	4 380	**4 802**	140 052	**163 401**	179	**312**	507 980	**472 625**

*During 1974, 663 Ml were supplied by the Rand Water Board for construction purposes at the new Kriel power station and colliery. This water requirement will cease in June 1975.

specific water consumption of the above-named power stations has dropped from 3,05 litres to 2,60 litres per electrical unit of energy sent out.

The excellent liaison between Escom and the Department of Water Affairs has facilitated planning the best means of providing water requirements of future power stations. The main development towards the goal of optimum usage of the limited water resources in the Eastern Transvaal, has been the decision to combine the Komati and the Usutu River Systems into the Usutu-Komati Link System. By this means the water resources will be pooled, resulting in an improved assurance of supply, and possibly a uniform water tariff, which is an important consideration when evaluations have to be made between wet-tower and dry-tower cooling for a given power station.

Escom's first nuclear power station, Koeberg, will be sited at Melkbosstrand on the coast, north of Cape Town. Sea water will be used for cooling in this power station. Any additional nuclear power stations which may be built following Koeberg will in all probability also be at coastal sites and will consequently not be large consumers of fresh water.

Kriel power station

Personnel

The personnel employed on 31 December 1974 were as follows:

Table 16
Personnel

	Number	% increase during 1974
White salaried staff	6 166	12,3
White monthly-paid employees	4 851	2,8
Non-white employees	18 874	6,3
Total	29 891	6,9

The overall percentage increase in Escom's employees during the year under review was 6,9 per cent, and is attributed largely to the commissioning of additional plant at the Hendrina and Arnot power stations, and to growth in the Cape Northern and Orange River Undertakings. To a considerable extent, the increase was also due to the stepping up of Escom's education programme. This necessitated expansion of the Education Department, resulting in additional training staff at power stations, in the distribution undertakings, and in the Information Department, particularly the Data Processing Section, where considerable effort was devoted to the further development of Escom's Information and Decision System and the Management Accounting System. Further reasons for the increase in staff are the creation of new posts due to the reorganisation of Escom and the tightening up of security measures during 1974.

The recruitment of personnel, particularly technical staff, required for the rapid expansion and for replacing staff leaving Escom's service, remained a serious problem in a labour market reflecting conditions approaching full employment.

With regard to specialised staff, particularly for the new power stations, Escom once again had to rely on overseas recruitment on the Continent and in the United Kingdom where 75 technically-trained immigrants were engaged. A further 17 immigrants were engaged through the Department of Immigration, compared with 58 and 13 respectively for 1973.

Excellent co-operation and assistance were obtained from the Departments of Immigration and Foreign Affairs in promoting Escom's recruiting campaigns, both in the Republic and overseas.

To improve channels of communication with non-White employees seven liaison committees were established on a trial basis. It is planned to establish these at various centres in all undertakings during 1975.

The development of job evaluation and aptitude testing systems for non-White employees continues to receive attention.

Non-White employees were granted increases of wages on 1 January 1974 and on 1 July 1974.

Sport and recreation among non-White employees continue to be actively promoted, with boxing and athletics having been successfully added to sports previously enjoyed.

An integrated computer payroll system has been designed, and is at present being implemented at pay centres throughout the organisation. This system will supply the majority of basic data necessary for the Management Accounting System. A job evaluation system is being developed for implementation during 1975.

Salary and wage structures were maintained following comprehensive market surveys. Every endeavour was made to keep salaries and wages at competitive levels, while at the same time guarding against an undue contribution towards general inflation.

Industrial relations

Negotiations with the trade unions, representing Escom's monthly-paid employees, on Escom's proposals for the more productive use of non-White employees are continuing.

Good relations have been maintained with the trade unions and staff associations throughout the year.

Education and training

The year under review was the second in the existence of Escom's Education Department. During the year the department was actively engaged in forecasting requirements and planning of courses for the education and training of staff.

The introduction of new courses at the Klip Training Centre for employees in the generation and distribution undertakings, and the lack of space for building extensions led to the acquisition of premises at Henley on Klip on some 11,7 hectares of ground with river frontage. After renovation the premises will be available by June 1975 for the first 60 trainees. It is anticipated that these facilities will be further extended at a later date to accommodate a maximum of about 200 at any one time.

All generation training will ultimately be centred at Henley, and arrangements are being made to install a simulator to enable boiler and turbine operators to be trained on equipment which electronically simulates a power station generating unit.

A completely new technique to Escom, for the maintenance and repair of transmission lines without taking them out of service, was introduced during 1974, necessitating the training of staff in Escom in this specialised field. Courses were developed and presented initially for supervisors, and finally, for a complete team. It is hoped to train more staff in this live-line working technique in the future.

During 1974 training was provided at the Klip Training Centre for 544 employees (618 in 1973) in power line construction and maintenance, power plant operation, material handling and control of stores.

Live-line working

At the Rosherville Training Centre a total of 292 apprentices were each trained for 4 months in workshop practice. This is less than the figure of 426 trained during 1973 but the period of training has been increased from 3 to 4 months. This has been found necessary to enable the workshop training period to fit in with the trimester system adopted by the Colleges for Advanced Technical Education. Further planning of courses to modernise apprentice training was undertaken, and it is hoped to reap the benefit from this revised training in the near future. Of a total of 99 apprentices prepared for the Government trade test, 73 were successful. Of the apprentices who completed training with Escom during 1974, 69 per cent have remained in Escom's service.

Additional workshops for engineers-in-training and pupil technicians are nearing completion. Courses are being designed for the level of training required by the engineers and technicians.

To improve the efficiency of Escom's Security Services a training centre was established at Arnot. Courses of instruction were provided for 61 White security officers and 80 Bantu security guards in protection of persons and property, maintenance of law and order, security, and physical training.

A total of 617 Escom employees (262 in 1973) attended courses and seminars offered by external organisations during 1974, to improve individual knowledge and performance. A computerised bulletin detailing all training courses available was issued weekly and distributed to departments and undertakings throughout Escom.

In addition to the courses provided at Klip, Rosherville and Arnot Training Centres, in-company training was given by Education Department staff to 819 employees, with detailed instruction in various aspects of computer operation, draughting, and the specific skills required for the implementation of Escom's reorganisation.

During 1974, 106 students (117 in 1973) studied at the various universities in the Republic with the aid of Escom bursary loans, following electrical, mechanical and civil engineering, land surveying, commerce, architecture, quantity surveying, computer science, chemistry and law courses. The number of new bursaries granted was 38 (37 in 1973), the total cost being R92 177 for 1974 (R108 600 in 1973).

Scholarships were granted to 55 dependants of employees, under the Dr. H. J. van der Bijl Scholarship Scheme at a cost of R50 300 (52 at a cost of R49 020 during 1973).

The role played by technicians in the various disciplines applicable to Escom increases annually. Under the Pupil Technicians Scheme during 1974 the number of students doing full-time formal training, which includes attendance at technical colleges, increased from 189 to 221.

During 1974 Bantu training was considerably increased and decentralised to a large extent. This meant

that undertakings were responsible for much of their own training while the Education Department trained instructors for the undertakings. During the year 168 Bantu supervisors, clerks, indunas, drivers, security guards, and dog handlers attended courses held by this department. In addition, 183 instructors were trained.

The problem of the illiteracy of Bantu staff was investigated, and it was decided to adopt the Arnold-Varty method of language instruction. This method is at present available for teaching English only, and has enabled students to learn basic English in about 9 months, spending approximately 40 minutes per working day in classes. Of the instructors trained, 107 were trained in this technique and the response of the Bantu staff has been heartening.

Further methods of training Bantu persons were actively planned, with the emphasis on training for semi-skilled types of work.

To keep abreast of the latest technological developments 32 senior Escom employees proceeded overseas for discussion, negotiation, and training during the year.

Escom's Education Department firmly established itself during the year under review, with a clear definition of the role it is intended to play, not only within Escom, but in a wider sense, fostering the industrial development of the Republic as a whole.

Prevention of accidents

The injury frequency rate in respect of all Escom employees has decreased substantially over the past few years and the rate experienced during 1974 was the lowest ever. The rate of lost time injuries per million man-hours worked over the past seven years is as follows: 1968 – 15,8; 1969 – 11,9; 1970 – 10,4; 1971 – 8,5; 1972 – 9,1; 1973 – 7,6; 1974 – 6,2.

Unfortunately the fatality rate for 1974 was slightly higher than the 1973 rate. This increase is attributed to road accidents.

The injury frequency rate of Escom is now 50% lower than the average for all industry.

Because of Escom's improved record of injury experience, the workmen's compensation rate of Escom for 1974 has been reduced to 40 per cent of the figure applicable in 1964.

In addition to this substantial saving the Accident Prevention Programme has contributed further to Escom's operating efficiency through better house-keeping, reduction of accidental damage to plant and equipment, reduction of man-hours lost by employees as a result of accidental injuries, and reduction of man-hours lost by managers and supervisors attending to the consequences of accidents.

The major safety achievement of the year is the fact that Escom produced five of the eleven finalists in the section applicable to small firms ("B" competition) of the main national safety competition organised by the National Occupational Safety Association.

Fringe benefits, sport and recreation

The method of calculating the annual increases in the amounts paid to pensioners was amended and approved by the Trustees of the Pension Fund and the Commission. This amendment resulted in an increase of 10% in the pensions from 1 March 1974, for all pensions granted before 1 March 1972. For pensions granted between 1 March 1972 and 28 February 1974, the increase was calculated on a pro rata basis for each completed month between the date of granting the pension and 1 March 1974. The increase was designed to give relief to pensioners who were particularly affected by the increase in the cost of living.

The financial reserves of the Escom Medical Aid Society have been satisfactorily maintained despite increased medical costs. In anticipation of an increase in the tariff of fees, and further escalating medical costs, the Society has reluctantly been forced to increase membership fees by 25% from 1 January 1975.

Twenty-two Escom clubs representing some 11 000 members throughout the Republic, are affiliated to the Federation of Escom Clubs. The clubs play an important part in the lives of employees, particularly at power stations distant from public sporting facilities. The inter-club competitions are contributing successfully towards developing an esprit de corps among Escom employees.

Financial

Capital expenditure

During 1974 expenditure on construction works amounted to R229 million (R180 million in 1973) made up of:

Table 17
Capital expenditure

Power station development	R138 million
Transmission, distribution and reticulation systems	R88 million
Head office building	R3 million
Total	R229 million

A variety of assets were either sold or written off, amounting to a value of R2 million, thus bringing the nett capital expenditure for the year to R227 million (R168 million in 1973).

The total value of fixed assets earning revenue was increased by R148 million (R173 million in 1973) and at the year-end stood at R1 847 million. The additional items include the continued commissioning of generating sets at the Hendrina (R18 million) and Arnot (R35 million) power stations.

Expenditure on contract works under construction and still to be completed at 31 December 1974 amounted to R323 million (R244 million in 1973), the main concentration of work in progress being at the Hendrina, Arnot and Kriel power stations.

The expansion in capital works has led to an increase in the amount of working capital required. The value of stores, materials, movable plant, and equipment at the end of 1974 increased by R20 million to R102 million.

Loans and the capital market

Long-term loans totalling R184 million (R118 million in 1973) were raised during the year, as follows:

Table 18
Long-term loans, millions of Rand

	1974	1973
Local market—public issues	89	55
Local market—private placements . . .	85	30
Foreign market—public issues	10	33
Foreign market—private placements . .	—	—
Total	184	118

Four long-term local loans amounting to R34 million were repaid during 1974 while foreign long-term loan repayments amounted to R11 million.

Local market

Conditions on the market for fixed-interest long-term securities tightened progressively during the first three quarters of the year causing interest rates to rise to record levels before easing in the last quarter.

The inadequate supply of funds due to a general scarcity of funds as well as the withholding of funds by investors in expectation of higher future interest rates made market operations difficult. The two Escom public issues in March and November did, however, receive firm investor support.

Escom was unable to finance all its capital requirements from long-term local fund sources; therefore use was made of overseas sources especially the revolving credit facilities which Escom has available there.

Foreign market

Except for the first quarter, foreign capital markets for long-term funds were virtually closed; only a minimum number of long-term fixed interest rate loans were floated. This could be ascribed to the uncertain foreign exchange markets, the high inflation rates presently ruling and the oil price situation. Yields on the secondary market for Escom bonds increased to 14% p.a. while a very low trade was maintained. Most of the new issues were the floating rate type and the margin above the interbank interest rate increased from $\frac{3}{4}$% to 1$\frac{1}{4}$%. Indications are that new issues would bear an interest rate of 1$\frac{5}{8}$% above the interbank rate.

Escom did raise one bond issue of $15 million at 9,25% for 15 years. Two note issues were undertaken: SF 20 million at 8,5% for 5 years and $35 million for 8 years at a floating rate of 1$\frac{1}{4}$% above the London interbank rate.

The equivalent of R79,5 million was raised by way of utilisation of the revolving credit facilities which Escom has available overseas.

The balance of money outstanding for import finance facilities increased by R1,1 million (a decrease of R6,1 million in 1973), and refinancing turnover amounted to R5,8 million (R3 million in 1973).

Capital Development Fund

Contributions amounting to R28,1 million (R15,4 million in 1973) were made to the Capital Development Fund during 1974.

The amount standing to the credit of the Fund on 31 December 1974 was R63,7 million (R31,4 million in 1973).

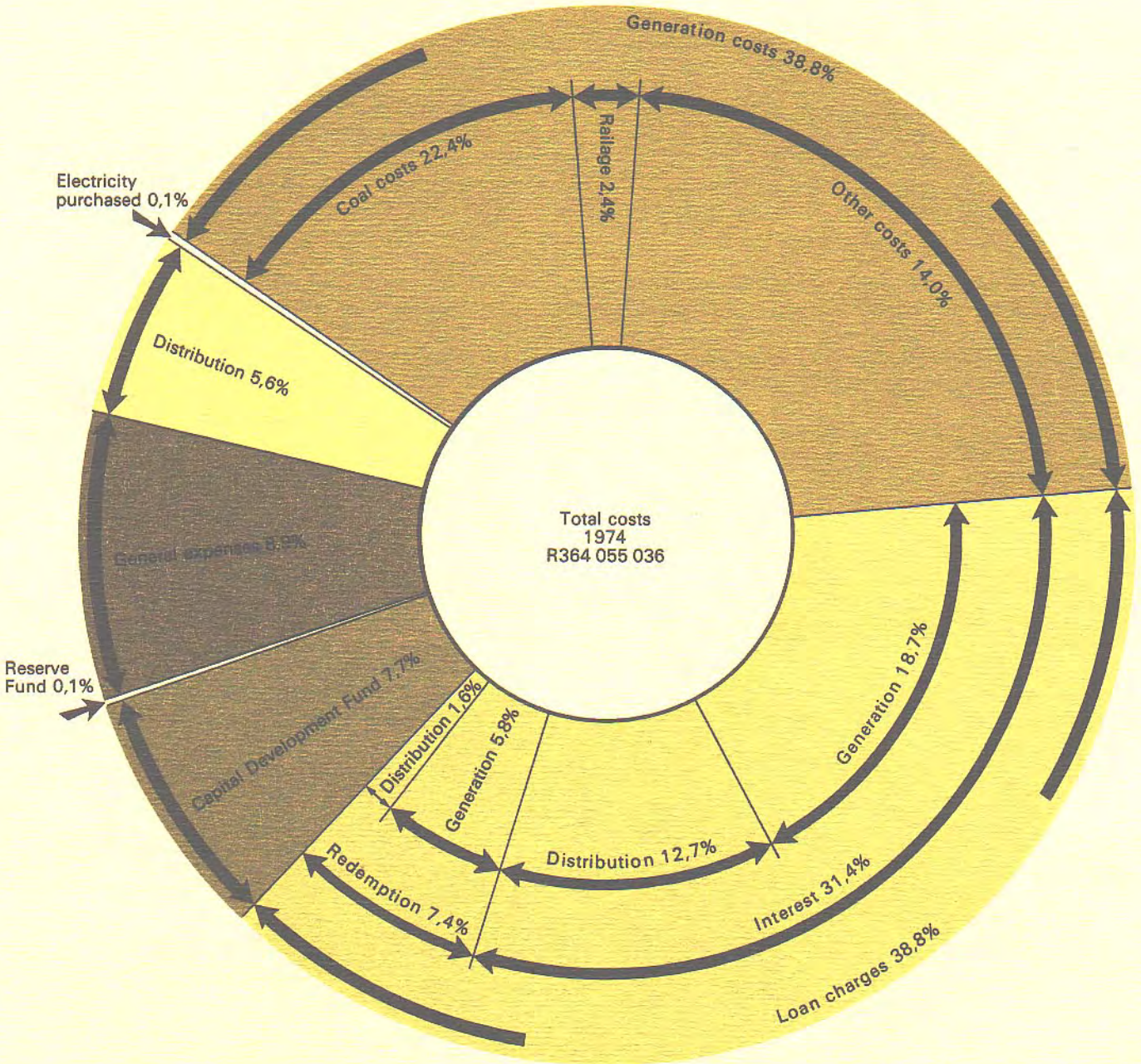
Reserve Fund

The Reserve Fund received contributions of R66 000 (R3,8 million in 1973) during the year.

Replacement and betterment expenditure amounted to R3,2 million (R2,0 million in 1973) leaving the Fund with a balance of R171,5 million, an increase of R8,5 million over 1973 derived primarily from interest earned.

Revenue account

The total revenue from sales of electricity in 1974 was R359 million, which represented an increase of R57 million or 18,9 per cent above the corresponding figure for 1973.


Generation costs 38,8%
Coal costs 22,4%
Railage 2,4%
Other costs 14,0%
Electricity purchased 0,1%
Distribution 5,6%
General expenses 0,9%
Reserve Fund 0,1%
Capital Development Fund 7,7%
Total costs
1974
R364 055 036
Distribution 1,6%
Generation 5,8%
Generation 18,7%
Distribution 12,7%
Redemption 7,4%
Interest 31,4%
Loan charges 38,8%

Auditors' report and accounts

The report of the auditors

The Chairman and Members
Electricity Supply Commission
Johannesburg

Gentlemen

We have completed the audit of the books and accounts of the Commission for the year ended 31 December 1974.

Redemption Fund

In the course of our audit we have examined the position of the Redemption Fund established by the Commission in terms of the Schedule to the Electricity Act, 1958, to provide for the redemption of the loans issued by the Commission.

The State President in terms of Section 10(2) of the Act, directed that the provisions relating to the establishment of the Redemption Fund should not apply to each of the loans listed under the heading "Foreign Bond Issues" and "Direct Placings" on Schedule No. 5.

The Redemption Fund provisions have not been applied to short-term loans included under the heading "Other Borrowings", as these loans were raised under the provisions of paragraph 1(3) of the Schedule to the Electricity Act, which relates to borrowings in anticipation of the raising of loans.

The Commission has fixed redemption periods not exceeding 25 years from the dates of issue of the respective loans.

In the records of the Commission, the Fund is divided into sections corresponding to its undertakings but investments are held in a common pool. Accruals to the Fund are invested by the Commission as prescribed in the Schedule to the Act.

In the valuing the Fund at 31 December 1974, we have taken into account the market value of the investments at that date. The value of the Fund at 31 December 1974 was in excess of the sum required, in terms of the Schedule to the Act, for the redemption of the respective loans.

Foreign Loans

The loan periods of the Foreign Bond Issues and Direct Placings are not less than 10 years or more than 15 years.

Provision is being made for repayment by setting aside amounts over periods of 15 years, except in the cases of Loans 562 and 574, where the period is 19 years. The differences, if any, between the amounts set aside and instalments payable are being met from temporary borrowings.

A further exception is Loan 559 listed under "Direct Placings" which is repayable by half-yearly instalments over a period of nine years from 1 June 1968. Contributions in respect of this loan are being charged to revenue accounts of undertakings on a 25 year sinking fund basis, the shortfall being met from local loans raised partly for this purpose.

Reserve Fund and Capital Development Fund

Amounts determined by the Commission, and approved by the State President, have been set aside to the Reserve Fund and the Capital Development Fund. The amounts set aside have been invested in the securities prescribed by the Electricity Act, 1958.

Verification of landed properties, rights and investments

We have verified the existence of the titles of the landed properties and of the rights and investments as shown in the records of the Commission.

Head office administration, engineering and general expenses

The nett expenditure under this heading, after crediting fees for reporting on power schemes of local authorities and amounts chargeable to revenue accounts under other headings, has been allocated to:

(a) Capital and Reserve Fund expenditure.
(b) revenue accounts of undertakings.

The amount allocated to revenue accounts of undertakings has been apportioned by the Commission. We have no reason to disagree with the apportionment so made.

Revenue accounts

The following is a summary of the operations of the Commission's undertakings for 1973 and 1974:

	Surplus (deficit)		Accumulated surplus (deficit)	Amounts set aside to Reserve and Capital Development Funds	
	1973	1974	at 31.12.74	1973	1974
Cape Western	(399 000)	(56 000)	(1 505 000)	670 000	670 000
Cape Northern	(198 000)	(320 000)	(214 000)	175 000	366 000
Cape Eastern	(65 000)	(58 000)	(307 000)	16 000	26 000
Border	437 000	(255 000)	13 000	126 000	136 000
Orange River	(8 000)	128 000	(157 000)	100 000	172 000
Natal	(1 134 000)	(216 000)	(1 445 000)	1 327 000	1 016 000
Eastern Transvaal	(2 819 000)	95 000	(1 780 000)	908 000	1 036 000
Rand and O.F.S.	58 000	(4 603 000)	(6 742 000)	1 304 000	2 768 000
Central Generating	—	—	—	14 500 000	22 000 000
	R(4 128 000)	R(5 287 000)	R(12 137 000)	R19 126 000	R28 180 000

Operations during the year resulted in deficits at all the undertakings other than Orange River and Eastern Transvaal Undertakings.

Charges for electricity being supplied have been increased with effect from 1 April 1975 at all undertakings.

General

As a result of our audit of the books and accounts of the Commission for the year 1974 and subject to the foregoing remarks, in terms of Section 18(8) of the Electricity Act, 1958, we report as follows:

(a) We have found the accounts of the Commission to be in order.
(b) The accounts issued present a true and correct view of the financial position of the Commission and its transactions and of the results of trading.
(c) Due provision, in terms of the Act, has been made for the redemption and repayment of moneys borrowed by or advanced to the Commission.
(d) As formerly, the land and rights, buildings and civil works, and machinery and plant are set out in the balance sheet on a cost basis.
(e) Sums fixed by the Commission have been set aside to the Reserve Fund and Capital Development Fund under Section 13 as prescribed.
(f) All our requirements as auditors have been complied with and carried out.

Yours faithfully
Alex. Aiken & Carter
Halsey, Button & Perry
Chartered Accountants (S.A.) Auditors

Johannesburg
6 June 1975

Balance sheet

at 31 December 1974

	R000	R000
		1973
Borrowings	1 977 811	1 751 663
Loans outstanding (Schedule No. 5)	1 753 762	1 611 113
Other borrowings	224 049	140 550
Import financing facilities taken up	28 802	27 726
Other short term advances	195 247	112 824
Capital reserve		
Loans repaid	319 938	256 958
Machinery and plant financed out of Reserve Fund	10 360	10 360
	330 298	267 318
Less: cost of land and rights, buildings and civil works and machinery and plant sold and scrapped	59 647	57 868
	270 651	209 450
Exchange adjustment of foreign liabilities (Note 2)	(12 654)	(3 417)
	257 997	206 033
Balance on revenue account (Account Nos. 4 to 12)	(12 137)	(6 850)
	245 860	199 183
Capital Development Fund (Account No. 1)	63 696	31 367
Redemption Fund (Account No. 2)	296 578	312 369
Amount set aside for repayment of foreign loans	12 270	10 807
Reserve Fund (Account No. 3)	171 503	163 016
Creditors and provisions	100 780	80 429
Creditors	63 479	49 683
Interest accrued on loans	32 417	26 828
Sundry provisions	4 884	3 918
	2 868 498	2 548 834

	R000	R000
		1973
Capital expenditure at cost (Schedule No. 1)	2 170 639	1 942 949
Land and rights	26 078	20 131
Buildings and civil works	396 791	377 180
Machinery and plant	1 424 615	1 301 968
Total in commission	1 847 484	1 699 279
Works under construction	323 155	243 670
Stores and movable plant	102 049	81 845
Stores and materials at cost	83 888	66 860
Movable plant and equipment at cost less depreciation	18 161	14 985
Investments of Capital Development Fund (Schedule No. 2)	63 073	18 151
Nominal value R63 220 000 (1973: R18 400 000)		
Market value R58 159 000 (1973: R17 733 000)		
Investments of Redemption Fund (Schedule No. 3)	294 190	280 492
Nominal value R303 645 000 (1973: R294 805 000)		
Market value R239 152 000 (1973: R257 471 000)		
Investments of Reserve Fund (Schedule No. 4)	166 812	160 021
Nominal value R174 170 000 (1973: R166 222 000)		
Market value R134 318 000 (1973: R144 678 000)		
Other investments	22 819	16 568
Electricity Supply Commission foreign loan bonds including interest accrued	6 219	3 706
Nominal value R7 095 000 (1973: R4 043 000)		
Market value R6 055 000 (1973: R3 511 000)		
Entire share capital of the Rand Mines Power Supply Company Limited	1	1
Housing loans to employees secured by first mortgage	16 599	12 861
Debtors and payments in advance	44 731	47 627
Debtors	35 373	31 325
Payments in advance	9 358	16 302
Cash	4 186	1 181
On deposit, on current account, on hand and at call	12 505	7 079
Less: amounts due to bankers	8 320	5 898
	2 868 498	2 548 834

Notes to the balance sheet

at 31 December 1974

Note 1

(a) Commitments in respect of that portion of contracts and orders placed for fixed assets which has not yet been completed or executed amount to approximately R610 000 000 (R324 000 000 in 1973).

(b) The Commission is committed to:

(1) The payment of approximately R1 821 000 (R1 833 000 in 1973) in respect of loans granted under the Commission's Home Ownership Scheme and not yet paid out.

(2) The payment to the Electricity Supply Commission Pension and Provident Fund, in addition to the normal contributions, of R191 000 per annum for the period ending 31 December 1985.

(3) The purchase from certain stockholders of Electricity Supply Commission Local Registered Stock as follows:

R 4 500 000 – 6,75 per cent 1991 not later than September 1976 at R97 per cent
R 2 000 000 – 6,75 per cent 1991 at the option of the stockholders at R97 per cent
R10 000 000 – 8,5 per cent 1997 on 31 January 1975 at par
R20 000 000 – 9,5 per cent 1999 on 15 January 1975 at par
R10 000 000 – 9,25 per cent 1996 on 15 January 1975 at par

Note 2

Foreign currency liabilities of the Commission which are covered by forward exchange contracts are converted to South African currency at the protected rates of exchange. Other foreign assets and liabilities have been converted to South African currency at the rates of exchange ruling at the year end. The currencies most favourable to the bondholders at 31 December 1974 were used to convert loans raised in European Units of Account and payable in the currency of the bondholders' choice.

Nett losses arising from the conversion of foreign long term loan balances at the year end are written off over the period of the loans.

Note 3

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.

Note 4

The investments of the Capital Development Fund, the Redemption Fund and the Reserve Fund include investments with a nominal value of R532 125 000 (R466 466 000 in 1973) in Electricity Supply Commission Stocks.

Capital expenditure

at 31 December 1974

Schedule No. 1

R000

	Total	Cape Western	Cape Northern	Cape Eastern	Border	Orange River	Natal	Eastern Transvaal	Rand & O.F.S.	Central Generating	Head office
Totals at 31 December 1973	1 942 949	79 233	32 122	1 473	30 694	16 278	104 125	99 828	311 445	1 256 491	11 260
Transfers between undertakings	—	—	—	—	(16 143)	—	—	—	(408)	16 183	368
	1 942 949	79 233	32 122	1 473	14 551	16 278	104 125	99 828	311 037	1 272 674	11 628
Expenditure during 1974	229 468	10 161	4 291	155	2 048	2 298	15 156	9 858	34 063	147 948	3 490
	2 172 417	89 394	36 413	1 628	16 599	18 576	119 281	109 686	345 100	1 420 622	15 118
Less: Assets decommissioned	1 778	419	4	—	34	—	339	224	698	60	—
Totals at 31 December 1974	2 170 639	88 975	36 409	1 628	16 565	18 576	118 942	109 462	344 402	1 420 562	15 118
Consisting of:											
Land and rights	26 078	2 933	582	12	206	138	3 033	2 112	10 759	5 255	1 048
Buildings and civil works	396 791	5 848	1 939	75	650	506	11 776	10 475	20 183	340 269	5 070
Machinery and plant	1 424 615	68 303	32 015	1 405	10 113	13 635	95 001	82 415	278 903	842 561	264
In commission	1 847 484	77 084	34 536	1 492	10 969	14 279	109 810	95 002	309 845	1 188 085	6 382
Works under construction	323 155	11 891	1 873	136	5 596	4 297	9 132	14 460	34 557	232 477	8 736

Investments of the Capital Development Fund

at 31 December 1974

Schedule No. 2

R000

Description			Nominal value	Book value
Escom internal registered stock				
8,500 per cent	1997	Loan No. 95	7 000	6 747
8,250 per cent	1997	Loan No. 98	7 400	7 314
8,375 per cent	1998	Loan No. 100	2 000	1 991
8,000 per cent	1998	Loan No. 103	2 000	2 000
8,000 per cent	1998	Loan No. 106	13 000	13 000
9,000 per cent	1999	Loan No. 110	3 000	2 978
10,750 per cent	2000	Loan No. 112	8 820	8 634
10,750 per cent	2000	Loan No. 113	20 000	19 579
			63 220	62 243
Interest accrued				830
				63 073
Market value			58 159	

Investments of the Redemption Fund

at 31 December 1974

Schedule No. 3

R000

Description	Loan No.	Nominal value	Book value
Escom internal registered stock			
5,000 per cent 1971/75	32	746	725
4,625 per cent 1975/80	33	1 165	1 055
4,875 per cent 1975/80	34	5 747	5 242
5,125 per cent 1976/81	35	3 647	3 301
5,125 per cent 1977/82	36	1 176	1 048
5,125 per cent 1976/82	37	3 726	3 339
5,125 per cent 1977/83	38	9 147	8 151
5,375 per cent 1978/83	39	163	146
5,625 per cent 1979/84	40	2 334	2 121
5,375 per cent 1979/84	42	7 058	6 301
5,375 per cent 1979/85	43	6 143	5 447
5,375 per cent 1980/85	44	7 423	6 538
5,500 per cent 1980/86	45	4 853	4 315
5,875 per cent 1981/86	46	7 575	6 929
6,250 per cent 1981/86	47	4 532	4 253
6,125 per cent 1982/87	49	6 346	5 909
5,250 per cent 1982/87	50	6 550	5 582
5,000 per cent 1983/88	51	10 198	8 359
5,000 per cent 1980/83	52	1 076	920
5,000 per cent 1982/84	53	3 375	2 886
5,500 per cent 1982/84	54	3 528	3 151
5,875 per cent 1983/85	55	10 225	9 514
6,500 per cent 1983/85	56	3 842	3 666
6,500 per cent 1989/91	58	9 389	8 893
6,750 per cent 1991	60	4 182	4 022
6,875 per cent 1992	61	6 179	6 024
6,500 per cent 1992	64	2 068	1 960
6,875 per cent 1992	65	3 925	3 784
6,500 per cent 1993	70	2 274	2 097
6,875 per cent 1993	71	5 495	5 249
6,500 per cent 1993	75	1 790	1 558
6,875 per cent 1993	76	144	120
6,500 per cent 1994	78	3 618	3 398
6,875 per cent 1994	79	10 967	10 735
6,500 per cent 1994	81	3 555	3 255
6,875 per cent 1994	82	9 218	8 846
7,500 per cent 1995	83	466	403
7,000 per cent 1995	84	114	88
8,750 per cent 1995	85	8 459	8 441
8,500 per cent 1995	86	1 360	1 316
9,250 per cent 1996	87	3 318	3 275
8,750 per cent 1996	88	109	106
9,250 per cent 1996	89	4 551	4 550
9,250 per cent 1996	90	682	680
8,750 per cent 1996	91	7 692	7 320
9,250 per cent 1997	92	2 235	2 224
Carried forward		202 365	187 242

R000

Description	Loan No.	Nominal value	Book value
Brought forward		202 365	187 242
9,125 per cent 1997	93	798	784
8,750 per cent 1997	94	933	899
8,500 per cent 1997	95	6 131	5 907
8,250 per cent 1997	96	6 862	6 781
8,000 per cent 1997	97	190	183
8,250 per cent 1997	98	10 713	10 589
8,250 per cent 1998	99	7 500	7 268
8,375 per cent 1998	100	2 344	2 326
8,000 per cent 1998	101	2 103	2 013
6,250 per cent 1976	102	3 000	2 992
8,000 per cent 1998	103	571	561
7,625 per cent 1998	104	2 080	1 998
7,250 per cent 1979	105	7 583	7 525
8,000 per cent 1998	106	30 000	30 000
9,000 per cent 1999	107	228	226
8,500 per cent 1999	108	652	615
8,000 per cent 1976	109	960	959
10,750 per cent 2000	113	20 000	19 579
		305 013	288 447
Republic of South Africa			
5,250 per cent 1979		300	290
6,000 per cent 1985		500	487
Municipal stock			
Bloemfontein			
5,375 per cent 1975/80		80	72
Cape Town			
3,000 per cent 1976	167	200	186
5,375 per cent 1980/85	203	300	261
Durban			
3,250 per cent 1965/75	48	90	86
3,250 per cent 1966/76	49	100	94
3,000 per cent 1967/77	50	668	600
5,375 per cent 1974/79	68	120	111
Germiston			
5,375 per cent 1985	16	20	17
Johannesburg			
3,000 per cent 1967/77	21	60	54
5,375 per cent 1974/79	36	194	179
		307 645	290 884
Interest accrued			3 306
			294 190
Market value	239 152		

Investments of the Reserve Fund

at 31 December 1974

Schedule No. 4

R000

Description	Loan No.	Nominal value	Book value
Escom internal registered stock			
5,000 per cent 1971/75	32	1 704	1 678
4,625 per cent 1975/80	33	1 176	982
4,875 per cent 1975/80	34	1 952	1 701
5,125 per cent 1976/81	35	1 630	1 477
5,125 per cent 1977/82	36	907	785
5,125 per cent 1976/82	37	1 612	1 442
5,125 per cent 1977/83	38	2 333	2 078
5,375 per cent 1978/83	39	112	90
5,625 per cent 1979/84	40	2 015	1 726
5,375 per cent 1979/84	42	1 418	1 267
5,375 per cent 1979/85	43	329	278
5,375 per cent 1980/85	44	1 002	886
5,500 per cent 1980/86	45	1 852	1 637
5,875 per cent 1981/86	46	2 583	2 369
6,250 per cent 1981/86	47	3 334	2 992
6,125 per cent 1982/87	49	2 005	1 873
5,250 per cent 1982/87	50	3 506	3 000
5,000 per cent 1983/88	51	5 080	4 197
5,000 per cent 1980/83	52	3 850	3 392
5,000 per cent 1982/84	53	2 422	2 104
5,500 per cent 1982/84	54	2 186	1 973
5,875 per cent 1983/85	55	4 258	3 851
6,500 per cent 1983/85	56	4 944	4 313
6,500 per cent 1989/91	58	3 987	3 795
6,750 per cent 1991	60	4 494	4 388
6,875 per cent 1992	61	5 000	4 934
6,875 per cent 1992	65	8 995	8 844
6,875 per cent 1993	71	7 234	6 869
6,500 per cent 1993	75	1 665	1 543
6,875 per cent 1993	76	8 746	8 447
6,500 per cent 1994	78	2 001	1 883
6,875 per cent 1994	79	6 978	6 844
6,500 per cent 1994	81	2 000	1 841
6,875 per cent 1994	82	3 490	3 351
7,500 per cent 1995	83	1 828	1 828
7,000 per cent 1995	84	1 664	1 577
8,750 per cent 1995	85	9 024	9 024
8,500 per cent 1995	86	1 855	1 811
9,250 per cent 1996	87	2 006	2 006
9,250 per cent 1996	89	1	1
9,250 per cent 1996	90	309	308
8,750 per cent 1996	91	237	236
9,125 per cent 1997	93	659	659
8,750 per cent 1997	94	98	98
8,500 per cent 1997	95	1 013	977
8,250 per cent 1997	96	361	351
8,250 per cent 1997	98	6 481	6 406
8,250 per cent 1998	99	7 482	7 256
8,375 per cent 1998	100	2 836	2 823
6,250 per cent 1976	102	9 649	9 623
7,250 per cent 1979	105	5 000	4 962
8,000 per cent 1998	106	1 870	1 870
8,000 per cent 1976	109	4 040	4 033
10,750 per cent 2000	111	680	680
Carried forward		163 893	155 359

R000

Description	Loan No.	Nominal value	Book value
Brought forward		163 893	155 359
Republic of South Africa			
5,250 per cent 1979		700	677
Municipal stock			
Bloemfontein			
5,375 per cent 1975/80		100	90
Cape Town			
5,000 per cent 1975	185	94	92
5,375 per cent 1980/85	203	600	522
5,500 per cent 1981/86	208	850	732
5,500 per cent 1983/88	219	610	515
5,500 per cent 1980	227	100	92
6,500 per cent 1981	240	210	202
Durban			
3,000 per cent 1967/77	50	1	1
5,375 per cent 1974/79	68	600	555
5,375 per cent 1976/80	70	800	729
6,000 per cent 1972/77	74	334	324
5,000 per cent 1984	84	500	420
5,500 per cent 1982	87	450	403
6,000 per cent 1980	88	500	470
6,000 per cent 1981	91	1 000	932
6,500 per cent 1981	93	1 000	958
Germiston			
5,375 per cent 1985	16	150	127
Johannesburg			
5,375 per cent 1974/79	36	120	111
5,500 per cent 1975	38	10	10
Pretoria			
5,000 per cent 1961/81	7	246	218
5,125 per cent 1972/75	37	52	52
5,375 per cent 1975/78	44	100	95
5,375 per cent 1975/78	47	100	94
6,250 per cent 1977/82	49	200	188
5,500 per cent 1980/83	56	200	177
6,500 per cent 1981/84	59	200	189
Rand Water Board			
6,500 per cent 1984	33	250	236
7,000 per cent 1987	35	200	195
		174 170	164 765
Interest accrued			2 047
			166 812
Market value	134 318		

Loans outstanding

at 31 December 1974

Schedule No. 5

R000

Internal registered stock

Loan No.		Per cent		Outstanding
32	20 000	5,000	1971/75	20 000
33	16 000	4,625	1975/80	16 000
34	16 000	4,875	1975/80	16 000
35	16 500	5,125	1976/81	16 500
36	20 000	5,125	1977/82	20 000
37	22 000	5,125	1976/82	22 000
38	24 000	5,125	1977/83	24 000
39	24 000	5,375	1978/83	24 000
40	22 000	5,625	1979/84	22 000
42	20 000	5,375	1979/84	20 000
43	16 000	5,375	1979/85	16 000
44	16 000	5,375	1980/85	16 000
45	17 000	5,500	1980/86	17 000
46	16 000	5,875	1981/86	16 000
47	18 000	6,250	1981/86	18 000
49	18 000	6,125	1982/87	18 000
50	22 000	5,250	1982/87	22 000
51	29 000	5,000	1983/88	29 000
52	40 000	5,000	1980/83	40 000
53	20 000	5,000	1982/84	20 000
54	20 000	5,500	1982/84	20 000
55	32 000	5,875	1983/85	32 000
56	38 000	6,500	1983/85	38 000
58	30 000	6,500	1989/91	30 000
60	35 000	6,750	1991	35 000
61	35 000	6,875	1992	35 000
64	12 000	6,500	1992	12 000
65	37 000	6,875	1992	37 000
70	10 000	6,500	1993	10 000
71	70 000	6,875	1993	70 000
75	22 000	6,500	1993	22 000
76	48 000	6,875	1993	48 000
78	20 000	6,500	1994	20 000
79	30 000	6,875	1994	30 000
81	10 000	6,500	1994	10 000
82	25 000	6,875	1994	25 000
83	18 000	7,500	1995	18 000
84	3 000	7,000	1995	3 000
85	35 000	8,750	1995	35 000
86	10 000	8,500	1995	10 000
87	45 000	9,250	1996	45 000
88	10 000	8,750	1996	10 000
89	20 000	9,250	1996	20 000
90	30 000	9,250	1996	30 000
91	10 000	8,750	1996	10 000
92	20 000	9,250	1997	20 000
93	22 000	9,125	1997	22 000
94	5 000	8,750	1997	5 000
95	25 000	8,500	1997	25 000
96	28 000	8,250	1997	28 000
97	7 000	8,000	1997	7 000
98	45 000	8,250	1997	45 000
99	30 000	8,250	1998	30 000
Carried forward				1 249 500

R000

Internal registered stock

Loan no.		Per cent		Outstanding
Brought forward				1 249 500
100	20 000	8,375	1998	20 000
101	5 000	8,000	1998	5 000
102	30 000	6,250	1976	30 000
103	24 000	8,000	1998	24 000
104	6 000	7,625	1998	6 000
105	30 000	7,250	1979	30 000
106	45 000	8,000	1998	45 000
107	27 000	9,000	1999	27 000
108	3 000	8,500	1999	3 000
109	12 000	8,000	1976	12 000
110	30 000	9,500	1999	30 000
111	11 000	10,750	2000	(a) 11 000
112	29 000	10,750	2000	(b) 29 000
113	40 000	10,750	2000	40 000
				1 561 500

Foreign bond issues

557	DM	50 000	(8 921)	6,50	1965/80	5 353
562	U.S.$	15 000	(10 776)	7,00	1967/77	3 233
574	Units of account	15 000	(10 906)	7,00	1968/78	8 562
577	DM	100 000	(18 034)	6,50	1968/83	16 452
578	DM	100 000	(19 582)	8,50	1970/85	19 583
580	Units of account	12 000	(8 627)	9,25	1970/80	8 219
584	DM	100 000	(19 556)	8,00	1971/86	19 556
592	Units of account	20 000	(14 210)	8,25	1971/86	18 276
598	U.S.$	20 000	(14 304)	8,50	1971/86	13 231
604	DM	100 000	(25 131)	6,25	1972/87	25 132
607	SF	50 000	(8 293)	6,50	1973/88	8 293
610	DM	100 000	(24 975)	7,00	1973/88	24 975
614	U.S.$	15 000	(10 080)	9,25	1974/89	10 080

Direct placings

559	U.S.$	20 000	(14 357)	6,25	1966/76	3 513
589	DM	10 000	(2 054)	8,00	1971/86	2 054
593	DM	20 000	(3 644)	8,50	1971/86	3 644
596	DM	20 000	(4 016)	8,50	1971/86	4 016
597	DM	40 000	(9 437)	8,50	1971/83	9 437
						1 765 109
Less: payable by stockholders in respect of local stock						11 347
111	Not later than 27 March 1975				(a) 3 780	
112	Not later than 27 March 1975				(b) 7 567	
						1 753 762

Accounts

Accounts

Capital Development Fund account

for the year ended 31 December 1974

Account No. 1

	R000		R000	
			1973	
Amounts set aside		28 114		15 366
Cape Western Undertaking	670		335	
Cape Northern Undertaking	356		175	
Cape Eastern Undertaking	17		8	
Border Undertaking	136		63	
Orange River Undertaking	115		50	
Natal Undertaking	1 016		477	
Eastern Transvaal Undertaking	1 036		454	
Rand and Orange Free State Undertaking	2 768		1 304	
Central Generating Undertaking	22 000		12 500	
Income from investments		4 215		1 853
Interest earned	4 206		1 849	
Adjustment of investment values	9		4	
Accumulated balance brought forward		31 367		14 148
Balance as shown in balance sheet		63 696		31 367

Redemption Fund account

for the year ended 31 December 1974

Account No. 2

	R000	R000
		1973
Repayment of internal registered stock	54 000	36 000
3 per cent 1967/73 (Loan No. 13)	—	6 000
3,125 per cent 1968/73 (Loan No. 15)		30 000
3 per cent 1968/74 (Loan No. 14)	6 000	—
3,5 per cent 1969/74 (Loan No. 16)	6 000	—
3,75 per cent 1969/74 (Loan No. 17)	6 000	—
5 per cent 1971/74 (Loan No. 31)	16 000	—
6 per cent 1974 (Loan No. 80)	20 000	—
Balance as shown in balance sheet	296 578	312 369
Cape Western Undertaking	14 850	18 875
Cape Northern Undertaking	9 113	8 171
Cape Eastern Undertaking	226	198
Border Undertaking	2 446	2 586
Orange River Undertaking	685	453
Natal Undertaking	18 327	19 414
Eastern Transvaal Undertaking	21 080	19 904
Rand and Orange Free State Undertaking	58 521	61 518
Central Generating Undertaking	161 018	171 284
Head Office	4 145	3 920
Undertaking which has been sold	6 167	6 046
	350 578	348 369

	R000	R000
		1973
Balance at beginning of year	312 369	302 220
Cape Western Undertaking	18 875	16 714
Cape Northern Undertaking	8 171	7 090
Cape Eastern Undertaking	198	160
Border Undertaking	2 586	6 839
Orange River Undertaking	453	275
Natal Undertaking	19 414	16 463
Eastern Transvaal Undertaking	19 904	17 471
Rand and Orange Free State Undertaking	61 518	79 207
Central Generating Undertaking	171 284	148 445
Head Office	3 920	3 628
Undertaking which has been sold	6 046	5 928
Amounts contributed during the year	16 252	23 760
Cape Western Undertaking	681	1 284
Cape Northern Undertaking	349	543
Cape Eastern Undertaking	14	22
Border Undertaking	87	442
Orange River Undertaking	191	142
Natal Undertaking	1 001	1 562
Eastern Transvaal Undertaking	765	1 313
Rand and Orange Free State Undertaking	2 863	3 369
Central Generating Undertaking	10 301	15 083
Other contributions	42	58
Proceeds of sales of fixed property	718	1 382
Income from investments	21 197	20 949
Interest earned	22 387	20 833
Adjustment of investment values	(1 190)	116
	350 578	348 369

We hereby certify that we are satisfied as to the correctness of the accounts and books of the Redemption Fund and as to the maintenance of the Fund at the amount required by the schedule to the Electricity Act, 1958, subject to the remarks contained in our report dated 6 June 1975.

Alex. Aiken & Carter
Halsey, Button & Perry

Chartered Accountants (S.A.)
Auditors

Reserve Fund account

for the year ended 31 December 1974 — Account No. 3

	R000		R000	
			1973	
Amounts set aside		66		3 760
Cape Western Undertaking	—		335	
Cape Northern Undertaking	—		—	
Cape Eastern Undertaking	9		8	
Border Undertaking	—		63	
Orange River Undertaking	57		50	
Natal Undertaking	—		850	
Eastern Transvaal Undertaking	—		454	
Rand and Orange Free State Undertaking	—		—	
Central Generating Undertaking	—		2 000	
Income from investments		11 637		11 178
Interest earned	11 581		10 788	
Adjustment of investment values	46		390	
		11 703		14 938
Less: Expenditure during the year		3 216		1 992
Cape Western Undertaking	244		22	
Cape Northern Undertaking	29		—	
Cape Eastern Undertaking	—		—	
Border Undertaking	5		10	
Orange River Undertaking	29		—	
Natal Undertaking	385		372	
Eastern Transvaal Undertaking	157		15	
Rand and Orange Free State Undertaking	130		310	
Central Generating Undertaking	2 237		1 263	
		8 487		12 946
Accumulated balance brought forward		163 016		150 070
Balance as shown in balance sheet		171 503		163 016

Consolidated revenue account

for the year ended 31 December 1974

	R000		R000	
			1973	
Sales of electricity				
Traction		27 436		24 391
Bulk		109 218		85 959
Mining		94 390		85 605
Industrial		113 651		94 006
Domestic and lighting		14 073		12 073
		358 768		302 034
Cost of electricity		141 188		107 436
Generation and transmission				
Operation				
Fuel	92 530		68 634	
Water and stores	4 928		3 782	
Salaries and wages	17 689		13 957	
Other expenses	1 259		836	
Maintenance				
Stores	6 248		5 696	
Salaries and wages	16 403		12 937	
Other expenses	2 045		1 477	
	141 102		107 319	
Electricity purchased	86		117	
Distribution		20 617		17 082
Operation and maintenance				
Stores	2 919		2 512	
Salaries and wages	14 880		12 317	
Other expenses	2 818		2 253	
General expenses		32 611		26 460
Local administration and technical management	10 703		8 139	
Head office administration and engineering (including research of R1 366 000–1973: R1 075 000)	9 749		8 357	
Other expenses	12 159		9 964	
Loan charges		141 459		136 058
Interest and finance charges	114 308		101 858	
Redemption of local loans	16 253		23 760	
Repayment of foreign loans	10 898		10 440	
Amounts set aside to		28 180		19 126
Capital Development Fund	28 114		15 366	
Reserve Fund	66		3 760	
		364 055		306 162
Deficit for the year		5 287		4 128
		368 788		302 034
Deficit for the year		5 287		4 128
Accumulated deficit brought forward		6 850		2 722
Accumulated deficit as shown in balance sheet		12 137		6 850

Cape Western Undertaking revenue account

for the year ended 31 December 1974

Account No. 4

	R000	R000	
		1973	
Sales of electricity			
Traction	6 013		5 490
Bulk	15 329		10 820
Industrial	16 186		14 736
Domestic and lighting	6 904		6 104
	44 432		37 150
Cost of electricity	30 593		25 059
Supplied by Central Generating Undertaking			
Distribution	3 544		2 549
Operation and maintenance			
Stores	404	243	
Salaries and wages	2 562	1 881	
Other expenses	578	425	
General expenses	3 138		2 634
Local administration and technical management	1 416	1 173	
Head office administration and engineering	411	360	
Other expenses	1 311	1 101	
Loan charges	6 543		6 637
Interest and finance charges	5 861	5 353	
Redemption of local loans	682	1 284	
Amounts set aside to	670		670
Capital Development Fund	670	335	
Reserve Fund	—	335	
	44 488		37 549
Deficit for the year	56		399
	44 432		37 150
Deficit for the year	56		399
Accumulated deficit brought forward	1 449		1 050
Accumulated deficit at 31 December 1974	1 505		1 449

Cape Northern Undertaking revenue account

for the year ended 31 December 1974

Account No. 5

	R000		R000	
			1973	
Sales of electricity				
Traction		2 492		2 183
Bulk		2 503		2 011
Mining		5 161		4 202
Industrial		1 345		1 281
Domestic and lighting		446		436
		11 947		10 113
Cost of electricity Supplied by Central Generating Undertaking		6 854		5 702
Distribution		926		844
Operation and maintenance				
Stores	72		87	
Salaries and wages	454		431	
Other expenses	220		130	
Debited from other undertakings	180		196	
General expenses		1 133		810
Local administration and technical management	646		446	
Head office administration and engineering	175		147	
Other expenses	312		217	
Loan charges		2 998		2 780
Interest and finance charges	2 649		2 237	
Redemption of local loans	349		543	
Amounts set aside to				
Capital Development Fund		356		175
		12 267		10 311
Deficit for the year		320		198
		11 947		10 113
Surplus/(deficit) for the year		(320)		(198)
Accumulated surplus brought forward		106		304
Accumulated surplus/(deficit) at 31 December 1974		(214)		106

Cape Eastern Undertaking revenue account

for the year ended 31 December 1974

Account No. 6

	R000		R000	
			1973	
Sales of electricity				
Bulk		48		39
Industrial		220		167
Domestic and lighting		123		120
		391		326
Cost of electricity		128		117
Supplied by Central Generating Undertaking	42		—	
Electricity purchased	86		117	
Distribution		92		68
Operation and maintenance				
Stores	3		4	
Salaries and wages	65		52	
Other expenses	19		12	
Debited from other undertakings	5		—	
General expenses		46		36
Local administration and technical management	6		9	
Head office administration and engineering	9		7	
Other expenses	31		20	
Loan charges		157		154
Interest and finance charges	143		132	
Redemption of local loans	14		22	
Amounts set aside to		26		16
Capital Development Fund	17		8	
Reserve Fund	9		8	
		449		391
Deficit for the year		58		65
		391		326
Deficit for the year		58		65
Accumulated deficit brought forward		249		184
Accumulated deficit at 31 December 1974		307		249

Border Undertaking revenue account

for the year ended 31 December 1974

Account No. 7

	R000	R000	
		1973	
Sales of electricity			
Bulk	6 541		5 698
Industrial	873		825
Domestic and lighting	661		562
	8 075		7 085
Cost of electricity	5 703		3 374
Supplied by Central Generating Undertaking	5 703	24	
Local Generation			
Operation	—	3 350	
Fuel	—	2 410	
Water and stores	—	38	
Salaries and wages	—	453	
Other expenses	—	36	
Maintenance			
Stores	—	85	
Salaries and wages	—	323	
Other expenses	—	5	
Distribution	702		493
Operation and maintenance			
Stores	73	62	
Salaries and wages	463	362	
Other expenses	116	69	
Debited from other undertakings	50	—	
General expenses	751		752
Local administration and technical management	516	396	
Head office administration and engineering	65	116	
Other expenses	170	240	
Loan charges	1 038		1 903
Interest and finance charges	950	1 461	
Redemption of local loans	88	442	
Amounts set aside to	136		126
Capital Development Fund	136	63	
Reserve Fund	—	63	
	8 330		6 648
Surplus/(deficit) for the year	(255)		437
	8 075		7 085
Surplus/(deficit) for the year	(255)		437
Accumulated surplus/(deficit) brought forward	268		(169)
Accumulated surplus at 31 December 1974	13		268

Orange River Undertaking revenue account

for the year ended 31 December 1974 — Account No. 8

	R000	R000	
		1973	
Sales of electricity			
Bulk	4 220		1 175
Industrial	1 235		1 122
Domestic and lighting	21		7
	5 476		2 304
Cost of electricity	3 695		1 321
Supplied by Central Generating Undertaking			
Distribution	97		39
Operation and maintenance			
Stores	2	3	
Salaries and wages	105	52	
Other expenses	25	30	
	132	85	
Less: debited to other undertakings	35	46	
General expenses	299		264
Local administration and technical management	221	167	
Head office administration and engineering	63	48	
Other expenses	89	89	
	373	304	
Less: debited to other undertakings	74	40	
Loan charges	1 087		588
Interest and finance charges	1 298	807	
Redemption of local loans	191	142	
	1 489	949	
Less: debited to other undertakings	402	361	
Amounts set aside to	172		100
Capital Development Fund	115	50	
Reserve Fund	57	50	
	5 350		2 312
Surplus/(deficit) for the year	126		(8)
	5 476		2 304
Surplus/(deficit) for the year	126		(8)
Accumulated surplus/(deficit) brought forward	(283)		(275)
Accumulated surplus/(deficit) at 31 December 1974	(157)		(283)

Natal Undertaking revenue account

for the year ended 31 December 1974

Account No. 9

	R000		R000	
			1973	
Sales of electricity				
Traction		8 840		7 822
Bulk		34 542		30 575
Mining		1 620		1 507
Industrial		19 888		15 063
Domestic and lighting		2 607		2 317
		67 497		57 284
Cost of electricity		51 238		43 410
Supplied by Central Generating Undertaking				
Distribution		3 443		3 160
Operation and maintenance				
Stores	246		440	
Salaries and wages	2 490		2 042	
Other expenses	707		678	
General expenses		3 069		2 236
Local administration and technical management	1 886		1 070	
Head office administration and engineering	586		447	
Other expenses	797		719	
Loan charges		8 947		8 285
Interest and finance charges	7 796		6 573	
Redemption of local loans	1 001		1 562	
Repayment of foreign loans	150		150	
Amounts set aside to		1 016		1 327
Capital Development Fund	1 016		477	
Reserve Fund	—		850	
		67 713		58 418
Deficit for the year		216		1 134
		67 497		57 284
Deficit for the year		216		1 134
Accumulated deficit brought forward		1 229		95
Accumulated deficit at 31 December 1974		1 445		1 229

Eastern Transvaal Undertaking revenue account

for the year ended 31 December 1974

Account No. 10

	R000		R000	
			1973	
Sales of electricity				
Traction		2 931		2 557
Bulk		4 869		3 505
Mining		10 550		8 676
Industrial		23 882		19 144
Domestic and lighting		380		340
		42 612		34 222
Cost of electricity		28 390		24 780
Supplied by Central Generating Undertaking	27 795		24 212	
Electricity supplied by other undertakings	595		568	
Distribution		3 017		2 041
Operation and maintenance				
Stores	349		235	
Salaries and wages	2 170		1 532	
Other expenses	498		274	
General expenses		2 288		1 788
Local administration and technical management	818		671	
Head office administration and engineering	503		433	
Other expenses	967		684	
Loan charges		7 786		7 524
Interest and finance charges	7 195		6 405	
Redemption of local loans	765		1 312	
	7 960		7 717	
Less: debited to other undertakings	174		193	
Amounts set aside to		1 036		908
Capital Development Fund	1 036		454	
Reserve Fund			454	
		42 517		37 041
Surplus/(deficit) for the year		95		(2 819)
		42 612		34 222
Surplus/(deficit) for the year		95		(2 819)
Accumulated surplus/(deficit) brought forward		(1 875)		944
Accumulated surplus/(deficit) at 31 December 1974		(1 780)		(1 875)

Rand and O.F.S. Undertaking revenue account

for the year ended 31 December 1974

Account No. 11

	R000	R000	1973
Sales of electricity			
Traction	7 160		6 339
Bulk	41 166		32 136
Mining	77 059		71 220
Industrial	50 022		41 668
Domestic and lighting	2 931		2 187
	178 338		153 550
Cost of electricity	143 903		120 019
Supplied by Central Generating Undertaking	144 498	120 587	
Less: electricity supplied to other undertakings	595	568	
Distribution	8 862		7 846
Operation and maintenance			
Stores	1 770	1 439	
Salaries and wages	6 606	5 964	
Other expenses	655	635	
	9 031	8 038	
Less: debited to other undertakings	169	192	
General expenses	4 884		4 053
Local administration and technical management	1 444	1 305	
Head office administration and engineering	1 652	1 343	
Other expenses	1 788	1 405	
Loan charges	22 524		20 270
Interest and finance charges	20 361	17 469	
Redemption of local loans	2 863	3 369	
	23 224	20 838	
Less: debited to other undertakings	700	568	
Amount set aside to			
Capital Development Fund	2 768		1 304
	182 941		153 492
Surplus/(deficit) for the year	(4 603)		58
	178 338		153 550
Surplus/(deficit) for the year	(4 603)		58
Accumulated surplus/(deficit) brought forward	(2 139)		(2 197)
Accumulated surplus/(deficit) at 31 December 1974	(6 742)		(2 139)

Central Generating Undertaking schedule of costs and allocation

for the year ended 31 December 1974 — Account No. 12

	R000		R000	
			1973	
Electricity supplied to undertakings				
Cape Western		30 593		25 059
Cape Northern		6 854		5 702
Cape Eastern		42		—
Border		5 703		24
Orange River		3 695		1 321
Natal		51 238		43 410
Eastern Transvaal		27 795		24 212
Rand and Orange Free State		144 498		120 587
		270 418		220 315
Generation and transmission		141 206		104 051
Operation				
Fuel	92 530		66 224	
Water and stores	4 928		3 744	
Salaries and wages	17 689		13 504	
Other expenses	1 259		800	
Maintenance				
Stores	6 248		5 611	
Salaries and wages	16 403		12 614	
Other expenses	2 045		1 472	
Debited from other undertakings	104		82	
Interconnectors		1 106		1 122
General expenses		17 003		13 847
Local administration and technical management	4 024		2 902	
Head office administration and engineering	6 285		5 456	
Other expenses	6 694		5 489	
Loan charges		89 103		86 795
Interest and finance charges	68 055		61 421	
Redemption of local loans	10 300		15 084	
Repayment of foreign loans	10 748		10 290	
Amounts set aside to		22 000		14 500
Capital Development Fund	22 000		12 500	
Reserve Fund	—		2 000	
		270 418		220 315

Statistical and other statements

Power stations: principal equipment installed

at 31 December 1974

Statement No. 1

Central Generating Undertaking power stations	Type	Station capacity: Boilers kg/s	Station capacity: Generators MW	Station capacity: Assigned sent out rating MW	Boilers: No.	Boilers: Continuous maximum rating each kg/s	Main generators: No.	Main generators: Normal rating each MW	House sets: No.	House sets: Normal rating each MW
Stations under construction										
Arnot	Steam	1 665,5	1 750,0	1 650	5	333,1	5	350,0		
Grootvlei	Steam	856,8	1 000,0		4	214,2	5	200,0		
		230,6			1	230,6				
		1 087,4	1 000,0		5		5			
Hendrina	Steam	1 499,4	1 400,0	1 330	7	214,2	7	200,0		
Sub-total, steam stations		4 252,3	4 150,0		17		17			
Hendrik Verwoerd	Hydro		160,0	160			2	80,0		
Group total		4 252,3	4 310,0	4 090	17		19			
Completed stations in Transvaal and Orange Free State										
Camden	Steam	1 814,4	1 600,0	1 520	8	226,8	8	200,0		
Highveld	Steam	554,4	480,0	440	8	69,3	8	60,0		
Klip	Steam	567,5	396,0		25	22,7	12	33,0		
			28,0						4	7,0
		567,5	424,0	380	25		12		4	
Komati	Steam	567,0	500,0		5	113,4	5	100,0		
		566,8	500,0		4	141,7	4	125,0		
		1 133,8	1 000,0	925	9		9			
Taaibos	Steam	584,8	480,0	440	8	73,1	8	60,0		
Vaal	Steam		297,0				9	33,0		
		430,2	21,0		18	23,9			3	7,0
		430,2	318,0	280	18		9		3	
Vierfontein	Steam	503,5	360,0	335	19	26,5	12	30,0		
Wilge	Steam	62,8			4	15,7				
		201,6	60,0		4	50,4	2	30,0		
		73,1	180,0		1	73,1	3	60,0		
		337,5	240,0	220	9		5			
Group total		5 926,1	4 902,0	4 540	104		71		7	

Central Generating Undertaking power stations	Type	Station capacity: Boilers kg/s	Station capacity: Generators MW	Station capacity: Assigned sent out rating MW	Boilers: No.	Boilers: Continuous maximum rating each kg/s	Main generators: No.	Main generators: Normal rating each MW	House sets: No.	House sets: Normal rating each MW
Completed stations in Western Cape										
Salt River No. 1	Steam	75,6	60,0		6	12,6	3	20,0		
Salt River No. 2	Steam	328,0	120,0		10	32,8	4	30,0		
			120,0				2	60,0		
		328,0	240,0		10		6			
Total Salt River		403,6	300,0	285	16		9			
Hex River	Steam	100,8	60,0		4	25,2	3	20,0		
		69,2	60,0		2	34,6	2	30,0		
		170,0	120,0	110	6		5			
Group total		573,6	420,0	395	22		14			
Completed stations in Natal										
Colenso	Steam	113,5	75,0		5	22,7	3	25,0		
		50,4	30,0		2	25,2	1	30,0		
		163,9	105,0	89	7		4			
Ingagane	Steam	567,0	500,0	465	5	113,4	5	100,0		
Congella	Steam	201,6	70,0		8	25,2	2	35,0		
			37,0				1	37,0		
		201,6	107,0	97	8		3			
Umgeni	Steam	181,6	120,0		8	22,7	4	30,0		
		164,0	120,0		5	32,8	2	60,0		
		345,6	240,0	225	13		6			
Group total		1 278,1	952,0	876	33		18			
Completed stations in Eastern Cape										
West Bank No. 1	Steam	27,6	22,5		4	6,9	3	7,5		
West Bank No. 2	Steam	85,6	45,0		4	21,4	3	15,0		
		53,0	40,0		2	26,5	2	20,0		
		138,6	85,0		6		5			
Total West Bank		166,2	107,5	101	10		8			
Group total		166,2	107,5	101	10		8			
Total all Escom		12 196,3	10 691,5	10 002	186		130		7	

Transmission lines and cables:

Circuit kilometres (excluding service connections on reticulation systems)

at 31 December 1974

Statement No. 1
(continued)

(a) Transmission lines

Undertaking	400 kV	275 kV	220 kV	132 kV	88 kV	66 kV	42 kV	33 kV	22 kV 21 kV	11 kV	6,6 kV	3,3 kV	2,0 kV 2,1 kV 2,2 kV	380/220 V	Total
Border			159,85			427,66		57,47	455,21	1 341,87		5,78		165,41	2 613,25
Cape Eastern									235,68	222,45				16,47	474,60
Cape Northern		206,60		2 220,66		609,36			1 197,78	1 714,75				110,45	6 059,60
Cape Western				1 107,19		1 815,71		163,66	1 046,97	5 442,29	541,43			2 256,90	12 374,15
Eastern Transvaal		807,63		1 464,86	978,08	271,24			4 033,92	4 186,25	97,98	13,52	79,96	333,74	12 267,18
Natal		1 162,99		1 259,17	2 163,77			869,65	567,19	7 178,52	8,15		1,53	796,49	14 007,46
Orange River			478,94	100,83		677,93			1 017,24	106,24				2,81	2 383,99
Rand and O.F.S.	430,49	2 239,81		3 255,70	5 856,30	101,90	2 366,70	14,80	1 768,73	10 716,64	554,54		1,62	1 276,36	28 583,59
Central Generating	4 609,05			4,80											4 613,85
Totals A	5 039,54	4 417,03	638,79	9 413,21	8 998,15	3 903,80	2 366,70	1 105,58	10 322,72	30 909,01	1 202,10	19,30	83,11	4 958,63	
	5 039,54	4 417,03	638,79	9 413,21	16 374,23				47 494,87						83 377,67
(b) Underground cables															
Border									0,02	28,59		2,55		37,63	68,79
Cape Eastern														2,31	2,31
Cape Northern						0,32				2,00	0,75			29,59	32,66
Cape Western				15,54		38,68		60,47	5,66	892,84	15,46	4,51		1 209,27	2 242,43
Eastern Transvaal									40,77	61,45	2,85	1,67	4,78	137,29	248,81
Natal					1,89			4,45	4 04	341,59	6,84	0,47	0,02	202,43	561,73
Orange River															
Rand and O.F.S.					38,51		141,18	0,33	175,39	306,60	640,14	0,21		387,98	1 690,34
Totals B				15,54	40,40	39,00	141,18	65,25	225,88	1 633,07	666,04	9,41	4,80	2 006,50	
				15,54	285,83				4 545,70						4 847,07
(c) Total lines and cables	5 039,54	4 417,03	638,79	9 428,75	9 038,55	3 942,80	2 507,88	1 170,83	10 548,60	32 542,08	1 868,14	28,71	87,91	6 965,13	
1974 = A + B = C	5 039,54	5 055,82		9 428,75	16 660,06				52 040,57						88 224,74
Year 1973 = D	4 223,05	4 894,17		8 941,70	16 171,54				48 457,08						82 687,54
Additions in 1974 = C – D = E	816,49	161,65		487,05	488,52				3 583,49						5 537,20

Capacity of transformers in service

at 31 December 1974

Statement No. 1
(continued)

Undertaking	Number		MVA	
	1973	**1974**	1973	**1974**
Border	1 082	**1 137**	604,880	**656,880**
Cape Eastern	511	**558**	14,750	**15,610**
Cape Northern	2 677	**2 818**	1 208,895	**1 298,906**
Cape Western	8 462	**9 328**	2 252,393	**4 043,442**
Eastern Transvaal	4 995	**5 536**	4 947,195	**5 296,924**
Natal	7 235	**7 620**	7 174,087	**8 596,393**
Orange River	177	**255**	2 359,545	**2 366,950**
Rand and Orange Free State	14 193	**16 015**	25 529,216	**28 602,502**
Central Generating	1 099	**1 100**	16 344,897	**15 022,602**
Totals	40 431	**44 367**	60 435,858	**65 900,209**

Power purchased from outside sources in 1974

Statement No. 2

Undertaking	Purchased from	Maximum demands kVA	Units kWh
Cape Eastern	Water Affairs Department (Paul Sauer Dam)	1 200	4 518 726
	Port Elizabeth Municipality (Aloes)	1 566	1 375 020
	Port Elizabeth Municipality (Summit)	2 400	1 977 465
Total units purchased			7 871 211
Total units sold			52 585 098 245
Purchased as percentage of sales			0,015

Units sold and number of consumers, 1974

Statement No. 3

In licensed areas of undertakings:

Undertakings	Traction			Bulk			Mining		Industrial				Domestic and street lighting			Total units sold			Total number of consumers
	Units	Per cent	Number consumers	Units	Per cent	Number consumers	Units	Per cent	Number consumers	Units	Per cent	Number consumers	Units	Per cent	Number consumers	Units	Per cent		
Border				483 292 430	3,11	16				40 406 463	0,25	432	27 785 537	2,58	3 746	551 484 430	1,05		4 194
Cape Eastern				2 272 200	0,01	1				5 794 065	0,04	216	3 410 304	0,32	615	11 476 569	0,02		832
Cape Northern	261 213 972	8,41	3	265 288 500	1,71	21	549 276 640	3,24	77	108 275 836	0,68	746	26 417 955	2,45	2 884	1 210 472 903	2,30		3 731
Cape Western	491 153 481	15,80	6	1 736 216 600	11,19	54				1 215 159 909	7,62	9 636	409 041 684	37,94	60 177	3 851 571 674	7,32		69 873
Eastern Transvaal	353 629 355	11,38	7	704 100 723	4,54	32	1 652 869 944	9,76	105	3 792 090 245	23,76	5 296	24 677 194	2,85	2 776	6 527 367 461	12,41		8 216
Natal	981 604 416	31,58	14	4 696 638 860	30,26	35	175 921 806	1,04	33	2 490 822 182	15,63	5 485	154 969 993	14,38	20 778	8 499 957 257	16,17		26 345
Orange River				686 761 881	4,42	31				98 969 806	0,62	91	510 225	0,04	103	786 241 912	1,50		225
Rand and O.F.S.	1 020 294 460	32,83	2	6 947 333 723	44,76	142	14 562 473 119	85,96	99	8 354 120 962	51,40	19 745	262 303 775	39,44	15 778	31 146 526 039	59,23		35 766
Total electricity	3 107 895 684	100,00	32	15 521 904 917	100,00	332	16 940 541 509	100,00	314	16 105 639 468	100,00	41 647	909 116 667	100,00	106 857	52 585 098 245	100,00		149 182
Per cent of total	5,91			29,51			32,22			30,63			1,73			100,00			

In provinces of South Africa and neighbouring territories:

Cape	666 865 981	21,60	8	3 206 735 720	20,66	112	507 409 900	2,99	68	1 465 996 904	9,20	11 163	464 791 432	43,11	67 157	6 311 799 937	12,00		78 508
Lesotho				26 164 658	0,17	2										26 164 658	0,05		2
Swaziland				19 119 376	0,12	1										19 119 376	0,04		1
Natal	845 956 216	27,22	12	4 573 657 060	29,47	23	175 921 806	1,04	33	2 464 093 133	15,46	4 791	143 187 808	13,28	18 915	8 202 816 023	15,60		23 774
O.F.S.	213 599 646	6,87	2	861 683 368	5,55	68	3 431 660 554	20,26	23	681 557 963	4,28	456	28 975 210	2,69	1 632	5 217 476 741	9,92		2 181
Mozambique				215 542 800	1,39	2										215 542 800	0,41		2
Transvaal	1 381 473 841	44,45	10	6 614 237 189	42,61	123	12 825 549 249	75,71	190	11 325 071 538	71,06	25 237	441 082 147	40,92	19 153	32 587 413 964	61,97		44 713
Rhodesia				4 764 746	0,03	1										4 764 746	0,01		1
Total electricity	3 107 895 684	100,00	32	15 521 904 917	100,00	332	16 940 541 509	100,00	314	16 105 639 468	100,00	41 647	909 116 667	100,00	106 857	52 585 098 245	100,00		149 182

Power station operating statistics, 1974

Statement No. 4

Central Generating Undertaking power stations	Units generated GWh	Units sent out GWh	Maximum demands 1 hour sent out kW	Station load factors per cent		Overall thermal efficiency per cent	
				A	B	Generated	Sent out
Stations under construction							
Arnot	8 914,8	8 290,2	1 595,2	66,5	59,3	36,8	34,1
Grootvlei	5 509,3	5 248,8	966,1	63,1	62,0	33,7	32,0
Hendrina	9 308,2	8 871,9	1 344,8	81,9	75,3	34,3	32,7
Sub-total, steam stations	23 732,3	22 410,9	—	70,9	—	35,1	33,1
Hendrik Verwoerd Hydro	1 111,9	1 110,3	202,5	79,2	62,6	—	—
Group total	24 844,2	23 521,2	—	—	—	—	—
Completed stations:							
Transvaal and O.F.S.							
Camden	10 016,3	9 569,9	1 333,3	71,9	81,9	32,1	30,7
Highveld	2 457,6	2 285,7	466,8	59,3	55,9	29,5	27,4
Klip	1 581,6	1 445,6	387,6	43,4	42,6	20,2	18,4
Komati	7 118,9	6 615,5	952,1	81,6	79,3	30,1	27,9
Taaibos	2 474,0	2 283,3	443,7	59,2	58,7	27,0	25,0
Vaal	2 080,8	1 938,3	292,2	79,0	75,7	21,4	19,9
Vierfontein	1 826,4	1 695,4	287,0	57,8	67,4	24,9	23,1
Wilge	1 822,5	1 684,1	231,6	87,4	83,0	25,9	23,9
Group total	29 378,1	27 517,8	—	69,2	—	28,2	26,4
Western Cape							
Hex River	144,0	133,2	113,0	13,8	13,5	23,2	21,4
Salt River Nos. 1 and 2	1 036,2	979,0	293,4	39,2	39,8	26,0	24,5
Group total	1 180,2	1 112,2	—	32,1	—	25,0	24,1
Natal							
Colenso	166,3	150,4	97,1	19,3	17,7	19,7	17,6
Congella	290,3	261,7	111,9	30,8	26,7	20,9	18,7
Ingagane	3 234,8	3 037,8	483,2	74,6	71,8	31,1	29,2
Umgeni	448,4	409,7	216,8	20,8	21,6	21,9	20,0
Group total	4 139,8	3 859,6	—	50,3	—	28,2	26,3
Eastern Cape							
West Bank Nos. 1 and 2	225,2	240,3	104,0	27,2	26,4	22,9	21,6
Group total	225,2	240,3	104,0	27,2	26,4	22,9	21,6
Total all Escom	59 797,5	56 251,1	8 552,0	66,3	75,1	30,5*	28,7*

Availability %	Water used Litre/USO (excludes colliery and construction usage)	Coal burnt metric ton	Kg of coal per unit sent out	Calorific value of coal MJ per kg as received (weighted average)	Station heat rate, MJ per unit sent out	Coal cost		
						Total rand	Per metric ton rand	Per unit sent out cent
73,3	3,15	3 919 348	0,473	22,23	10,51	10 228 578	2,61	0,123 4
81,7	2,05	2 832 007	0,540	20,80	11,23	11 606 006	4,10	0,221 1
85,9	2,66	4 099 897	0,462	23,83	11,01	8 782 654	2,14	0,099 0
79,8	2,70	10 851 252	0,484	22,46	10,87	—	—	—
88,0	—	—	—	—	—	—	—	—
—	—	10 851 252	—	—	—	30 617 238	2,82	0,136 6
75,1	2,40	4 943 984	0,517	22,69	11,73	10 618 953	2,15	0,111 0
90,2	2,93	1 468 481	0,642	20,41	13,10	4 169 875	2,84	0,182 4
92,0	4,63	1 322 407	0,915	21,35	19,54	5 100 760	3,86	0,352 8
88,5	2,86	3 491 552	0,528	24,42	12,89	6 700 242	1,92	0,101 3
86,2	3,77	1 583 149	0,693	20,80	14,41	4 373 014	2,76	0,191 5
92,0	4,72	1 862 968	0,961	18,83	18,10	4 354 512	2,34	0,224 7
76,8	4,51	1 302 525	0,768	20,26	15,56	3 634 470	2,79	0,214 4
97,1	4,47	1 171 305	0,696	21,62	15,05	2 574 664	2,20	0,152 9
84,0	3,21	17 146 371	0,623	21,89	13,64	41 526 490	2,42	0,150 9
89,3	3,81	83 608	0,628	26,76	16,81	795 113	9,51	0,596 9
97,0	0,30	542 896	0,554	26,46	14,66	5 496 319	10,12	0,561 4
94,9	0,72	626 504	0,563	26,50	14,92	6 291 432	10,04	0,565 7
77,0	6,55	120 312	0,800	25,28	20,22	736 677	6,12	0,489 8
92,1	1,00	206 312	0,788	24,21	19,08	1 514 991	7,34	0,578 9
93,0	3,39	1 503 054	0,495	24,88	12,32	6 013 069	4,00	0,197 9
91,6	4,45	287 788	0,702	25,64	18,00	2 240 339	7,78	0,546 8
90,9	3,46	2 117 466	0,549	24,94	13,69	10 505 076	4,96	0,272 2
95,7	0,38	149 788	0,623	26,73	16,65	1 328 553	8,87	0,552 9
95,7	0,38	149 788	0,623	26,73	16,65	1 328 553	8,87	0,552 9
83,7	2,91*	30 891 381*	0,560*	22,42*	12,56*	90 268 789	2,92	0,163 7

$$\text{Station load factors A} = \frac{\text{U.S.O.} \times 100}{\text{(Assigned S.O. rating)} \times \text{hours in year}}$$

$$\text{Station load factors B} = \frac{\text{U.S.O.} \times 100}{\text{(Station M.D. S.O.)} \times \text{hours in year}}$$

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

*Coal-fired stations only

Statement showing the 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 1974

Statement No. 5

Rand and O.F.S. Undertaking	
Immovable property acquired for considerations amounting to	R389 205,00
Servitudes and other interest in or over land or other property acquired or hired	R622 501,84
Eastern Transvaal Undertaking	
Immovable property acquired for considerations amounting to	R54 697,58
Servitudes and other interest in or over land or other property acquired or hired	R77 961,91
Cape Northern Undertaking	
Immovable property acquired for considerations amounting to	R46 953,56
Servitudes and other interest in or over land or other property acquired or hired	R78 482,64
Cape Western Undertaking	
Immovable property acquired for considerations amounting to	R1 183 327,00
Servitudes and other interest in or over land or other property acquired or hired	R101 486,75
Cape Eastern Undertaking	
Immovable property acquired for considerations amounting to	R3 382,28
Servitudes and other interest in or over land or other property acquired or hired	R2 627,04
Border Undertaking	
Immovable property acquired for considerations amounting to	R54 015,00
Servitudes and other interest in or over land or other property acquired or hired	R83 378,92
Natal Undertaking	
Immovable property acquired for considerations amounting to	R66 776,50
Servitudes and other interest in or over land or other property acquired or hired	R236 656,00
Orange River Undertaking	
Immovable property acquired for considerations amounting to	R32 257,00
Servitudes and other interest in or over land or other property acquired or hired	R71 315,74
Central Generating Undertaking	
Immovable property acquired for considerations amounting to	R1 081 353,05
Servitudes and other interest in or over land or other property acquired or hired	R660 452,06

Average cost of coal burnt at Escom power stations

Rand per metric ton

Statement No. 6

Power station	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
	R	R	R	R	R	R	R	R	R	R	R	R
1 Brakpan	2,03	—	—	—	—	—	—	—	—	—	—	—
2 Colenso	3,84	3,71	4,16	4,31	4,30	4,20	4,39	4,39	4,51	4,68	5,26	6,12
3 Congella	3,96	3,58	3,77	3,92	4,01	4,19	5,24	5,26	5,44	5,82	6,41	7,34
4 Hex River	5,74	5,70	5,88	6,14	6,38	6,22	6,36	6,43	7,35	7,30	8,60	9,51
5 Highveld	1,71	1,83	1,79	1,81	1,95	2,07	2,23	2,23	2,19	2,15	2,20	2,84
6 Ingagane	2,50	2,49	2,71	2,78	2,78	2,77	2,53	2,51	2,75	3,02	3,34	4,00
7 Kimberley Central	4,54	4,52	4,49	4,67	—	—	—	—	—	—	—	—
8 Klip	2,25	2,23	2,39	2,74	2,91	3,12	2,93	2,74	2,86	2,89	3,23	3,86
9 King William's Town	5,05	—	—	5,02	—	—	—	—	—	—	—	—
10 Komati	1,69	1,48	1,29	1,37	1,27	1,40	1,41	1,33	1,37	1,50	1,60	1,92
11 Rosherville	2,35	2,37	2,41	2,74	—	—	—	—	—	—	—	—
12 Salt River	5,91	5,86	5,97	6,23	6,56	6,48	6,64	6,61	7,01	7,46	9,13	10,12
13 Taaibos	1,87	1,74	1,72	1,82	1,96	2,05	2,11	2,04	1,92	2,06	2,14	2,76
14 Umgeni	4,82	4,76	5,00	5,31	5,61	5,58	5,45	5,57	5,84	6,08	6,82	7,78
15 Vaal	1,14	1,15	1,15	1,20	1,28	1,27	1,22	1,17	1,32	1,25	1,64	2,34
16 Vereeniging	1,18	1,16	1,17	1,46	1,42	1,45	1,01	—	—	—	—	—
17 Vierfontein	1,58	1,57	1,70	1,85	1,82	1,87	1,72	1,76	1,85	1,85	2,34	2,79
18 West Bank	5,53	5,52	5,62	5,75	5,85	5,84	6,04	6,13	6,31	6,83	8,17	8,87
19 Wilge	1,05	1,06	1,09	1,20	1,44	1,47	1,36	1,38	1,58	1,66	1,79	2,20
20 Witbank	1,27	1,28	1,40	1,51	1,50	1,55	1,76	1,57	—	—	—	—
21 Camden	—	—	—	—	2,00	1,55	1,79	1,82	1,69	1,69	1,84	2,15
22 Grootvlei	—	—	—	—	—	—	1,84	1,67	1,83	2,09	2,16	4,10
23 Hendrina	—	—	—	—	—	—	—	1,95	1,72	1,89	2,13	2,14
24 Arnot	—	—	—	—	—	—	—	—	1,67	1,97	2,12	2,61

Units sold by undertakings to all consumers during the past twenty-five years

(million units)

Statement No. 7

	Border	Cape Eastern	Cape Northern	Cape Western	Eastern Transvaal	Natal (2) Central	Natal (2) Southern	Natal	Orange River	Rand and O.F.S.	Sabie (1)	Total
1950	79,9	—	53,9	271,9	378,5	406,5	561,8	—	—	5 151,8	6,3	6 910,6
1951	88,1	—	58,5	303,5	386,8	433,4	617,0	—	—	5 563,2	6,1	7 456,5
1952	97,7	—	61,3	341,2	425,0	454,0	655,6	—	—	6 039,6	6,1	8 080,6
1953	107,8	—	67,1	375,5	409,9	492,3	713,2	—	—	6 559,9	6,4	8 732,2
1954	118,2	—	70,7	436,2	270,5	532,5	777,7	—	—	7 465,2	5,6	9 676,6
1955	130,8	—	73,2	527,1	394,6	546,4	870,8	—	—	8 416,3	5,7	10 964,0
1956	139,1	—	78,7	585,1	505,9	595,4	957,7	—	—	9 151,6	6,0	12 019,5
1957	143,1	—	86,1	698,6	536,6	621,7	1 018,7	—	—	9 652,5	5,9	12 763,1
1958	152,9	—	115,2	826,0	584,1	616,1	1 104,1	—	—	10 200,6	3,0	13 602,2
1959	165,0	—	171,4	861,8	633,3	629,4	1 228,6	—	—	11 034,8	—	14 724,5
1960	172,3	—	185,2	871,6	762,0	649,3	1 409,0	—	—	12 044,8	—	16 094,1
1961	178,8	—	191,3	860,0	901,5	684,0	1 497,5	—	—	12 700,0	—	17 013,2
1962	188,6	—	224,9	945,0	1 012,2	731,0	1 589,5	—	—	13 429,8	—	18 121,0
1963	204,9	—	264,9	1 051,4	1 212,1	779,0	1 764,6	—	—	14 223,1	—	19 500,0
1964	228,8	0,4	311,4	1 163,9	1 553,6	—	—	2 922,1	—	15 067,3	—	21 247,5
1965	250,5	1,6	393,2	1 267,4	1 936,8	—	—	3 182,5	—	16 111,3	—	23 143,3
1966	272,4	2,5	442,4	1 367,0	2 408,2	—	—	3 498,5	—	16 563,4	—	24 554,3
1967	294,2	3,2	519,9	1 533,1	2 829,6	—	—	3 720,6	1,1	17 755,4	—	26 657,1
1968	310,5	4,1	609,6	1 666,2	3 191,4	—	—	4 121,5	2,4	18 979,3	—	28 885,0
1969	330,5	5,7	657,9	1 824,3	3 824,4	—	—	4 636,7	8,0	20 218,1	—	31 505,6
1970	360,4	6,1	714,9	2 101,0	4 294,1	—	—	5 073,5	47,3	22 293,4	—	34 890,6
1971	399,9	7,1	789,7	2 494,5	4 561,5	—	—	6 072,3	95,0	23 620,0	—	38 040,0
1972	448,1	8,4	895,8	2 771,3	5 234,6	—	—	6 938,0	144,5	25 208,2	—	41 648,9
1973	504,6	9,6	1 060,1	3 148,8	6 097,5	—	—	7 581,3	238,8	27 937,7	—	46 578,4
1974	551,5	11,5	1 210,5	3 851,6	6 527,4	—	—	8 499,9	786,2	31 146,5	—	52 585,1

Notes

(1) Sabie Undertaking incorporated in Eastern Transvaal Undertaking since 1 July 1958, in terms of the Amended Licence. De-commissioned November 1964.

(2) Natal Central and Southern one undertaking as from 1 April 1964.

Escom – Total units sold

Statement No. 8

Year	Units sold – millions								Overall average seling price cents/unit	Escom employees		Capital expenditure at cost		Units sent out*	Ratio: Units sold / Units sent out
	Traction	Bulk S.A. municipalities	Bulk neighbouring territories	Mining	Air and steam	Industrial and commercial	Domestic and street lighting	Total sold		Total number as at 31 December	Number/GWh of units sold	R000 Total as at 31 December	R000 per GWh sold		
1950	524,0	1 106,5	—	3 898,6	276,9	990,7	113,9	6 910,6	0,274 1	9 352	1,353	115 129	16,66	7 417,8	0,932
1951	539,4	1 260,7	—	4 104,6	267,5	1 149,9	134,4	7 456,5	0,292 2	10 336	1,386	137 283	18,41	8 001,3	0,932
1952	554,8	1 459,5	—	4 332,9	264,7	1 337,7	131,0	8 080,6	0,311 5	10 889	1,348	176 559	21,85	8 651,3	0,934
1953	584,5	1 640,0	—	4 736,5	234,2	1 402,1	134,9	8 732,2	0,354 2	11 518	1,319	218 739	25,05	9 395,8	0,929
1954	619,2	1 839,0	—	5 316,8	219,5	1 539,9	142,2	9 676,6	0,380 8	12 317	1,273	270 621	27,97	10 414,7	0,929
1955	689,7	2 047,6	—	5 977,4	212,2	1 880,5	156,6	10 964,0	0,413 9	12 490	1,139	304 342	26,76	11 764,4	0,932
1956	739,7	2 282,2	—	6 445,3	191,2	2 187,1	174,0	12 019,5	0,428 5	12 977	1,080	342 068	28,46	12 927,0	0,930
1957	752,7	2 540,1	—	6 789,7	159,7	2 331,2	189,7	12 763,1	0,447 8	13 421	1,052	377 265	29,56	13 802,9	0,925
1958	789,0	2 837,8	—	7 136,2	153,6	2 479,8	205,8	13 602,2	0,473 3	14 312	1,052	417 701	30,71	14 679,9	0,927
1959	887,4	3 057,7	—	7 676,4	138,2	2 736,5	228,3	14 724,5	0,495 1	13 947	0,947	453 130	30,77	15 870,7	0,928
1960	1 045,2	3 242,8	—	8 258,7	125,6	3 168,7	253,1	16 094,1	0,507 9	14 654	0,911	491 471	30,54	17 376,4	0,926
1961	1 178,3	3 368,2	—	8 625,9	123,8	3 437,5	279,5	17 013,2	0,515 5	15 441	0,908	529 565	31,13	18 292,4	0,930
1962	1 296,4	3 570,4	—	9 143,4	115,7	3 691,8	303,3	18 121,0	0,516 4	16 467	0,909	581 579	32,09	19 416,5	0,933
1963	1 389,0	3 997,5	—	9 416,3	115,1	4 253,0	329,1	19 500,0	0,517 7	16 804	0,862	637 076	32,67	20 793,5	0,938
1964	1 558,6	4 494,0	—	9 847,2	93,9	4 873,1	380,7	21 247,5	0,510 1	17 172	0,808	679 193	31,97	22 736,4	0,935
1965	1 762,7	4 920,5	—	10 270,8	87,2	5 663,1	439,0	23 143,3	0,507 6	17 851	0,771	741 109	32,02	24 761,6	0,935
1966	1 835,8	5 343,6	—	10 775,1	39,5	6 068,6	491,7	24 554,3	0,525 4	18 579	0,757	840 782	34,24	26 158,0	0,939
1967	1 958,0	5 965,7	—	11 441,5	Terminated	6 729,1	562,8	26 657,1	0,546 7	19 817	0,743	950 863	35,67	28 440,5	0,937
1968	2 180,7	6 628,1	—	11 995,5		7 438,8	641,9	28 885,0	0,555 0	20 893	0,723	1 114 390	38,58	30 851,4	0,936
1969	2 307,0	7 263,4	0,1	12 641,9	—	8 573,8	719,4	31 505,6	0,556 5	21 644	0,687	1 271 785	40,37	33 606,2	0,937
1970	2 409,7	8 098,7	9,4	13 947,9	—	9 607,7	817,2	34 890,6	0,554 5	22 700	0,651	1 429 862	40,98	37 328,1	0,935
1971	2 616,3	9 251,4	13,1	14 227,1	—	11 013,8	918,3	38 040,0	0,577 2	25 050	0,659	1 604 755	42,19	40 747,7	0,934
1972	2 782,2	10 684,0	32,1	14 508,6	—	12 641,5	1 000,5	41 648,9	0,610 8	26 937	0,647	1 774 350	42,60	44 484,7	0,936
1973	2 895,5	12 572,4	179,3	15 800,0	—	14 026,0	1 105,2	46 578,4	0,648 4	28 559	0,613	1 942 949	41,71	49 770,4	0,936
1974	3 107,9	15 256,3	265,7	16 940,5	—	15 936,7	1 078,0	52 585,1	0,682 2	29 891	0,568	2 170 639	41,28	56 259,1	0,935

*Including purchased units

Summary of consolidated Escom revenue and expenditure account for past eight years

Statement No. 9

Year	Total Escom units sold Millions		Total Escom costs									Total revenue
			Interest	Redemption and other provision for loan repayment	Reserve Fund	Capital Development Fund	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	
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/Unit 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/Unit 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/Unit 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/Unit 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/Unit 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/Unit 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/Unit 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/Unit 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

Generation of electricity

Statement No. 10

Year	Total units generated in Escom power stations GWh	Escom units generated as % of national total generated %	Units sent out from Escom stations: Sent out from coal-fired power stations GWh	Units sent out from Escom stations: Sent out from other Escom power stations GWh	Units sent out from Escom stations: Total sent out from Escom power stations GWh	Units purchased by Escom GWh	Total units sent out on Escom systems (including purchased units) GWh	Escom generating capacity as at 31 December: Installed rating MW	Escom generating capacity as at 31 December: Assigned sent out rating MW	Power station plant load factor (sent out) %	Peak demand on integrated Escom MW	Integrated Escom system sent out load factor %
1950	7 773,6	69,5	7 276,3	10,1	7 286,4	131,4	7 417,8	1 440,0	na	na	na	na
1951	8 326,6	70,0	7 797,1	9,6	7 806,7	194,6	8 001,3	1 520,6	na	na	na	na
1952	8 778,0	70,1	8 219,8	7,6	8 227,4	423,9	8 651,3	1 624,6	na	na	na	na
1953	9 442,0	68,7	8 838,2	7,2	8 845,4	550,4	9 395,8	1 825,1	na	na	na	na
1954	10 651,9	70,2	9 971,6	5,9	9 977,5	437,3	10 414,8	2 052,0	na	na	na	na
1955	12 214,5	71,1	11 419,1	6,1	11 425,2	339,3	11 764,5	2 347,6	na	na	na	na
1956	13 578,4	73,3	12 663,2	6,4	12 669,6	257,2	12 926,8	2 734,9	na	na	na	na
1957	14 638,8	72,7	13 633,6	6,5	13 640,1	162,8	13 802,9	2 826,9	na	na	na	na
1958	15 582,6	73,6	14 510,5	5,3	14 515,8	164,1	14 679,9	3 036,6	na	na	na	na
1959	16 926,5	75,0	15 774,6	2,6	15 777,2	93,6	15 870,8	3 297,0	na	na	na	na
1960	18 543,3	76,1	17 305,5	2,1	17 307,6	15,3	17 322,9	3 416,5	na	na	na	na
1961	19 575,4	76,2	18 282,2	1,8	18 284,0	8,4	18 292,4	3 659,0	na	na	na	na
1962	20 805,5	77,1	19 401,1	2,8	19 403,9	12,6	19 416,5	3 759,0	na	na	na	na
1963	22 312,4	75,9	20 789,2	4,4	20 793,6	18,6	20 812,2	4 176,0	na	na	na	na
1964	24 355,3	76,1	22 634,1	4,5	22 638,6	41,0	22 679,6	4 499,6	na	na	na	na
1965	26 440,4	76,7	24 582,6	0,1	24 582,7	126,6	24 709,3	4 624,8	4 181	66,2	3 668,7	76,9
1966	27 395,5	75,1	25 504,1	—	25 504,1	629,9	26 134,0	4 836,4	4 377	65,7	3 905,5	76,4
1967	30 421,7	76,8	28 370,9	—	28 370,9	69,6	28 440,5	5 845,4	5 328	66,1	4 227,2	76,8
1968	33 061,2	76,9	30 843,5	—	30 843,5	7,9	30 851,4	6 344,7	5 800	62,9	4 657,6	75,4
1969	35 967,0	78,2	33 598,2	—	33 598,2	8,0	33 606,2	6 984,7	6 437	62,6	5 054,7	75,9
1970	39 796,2	78,4	37 320,8	—	37 320,8	7,3	37 328,1	7 583,3	7 007	62,9	5 621,5	75,8
1971	43 472,5	79,0	40 645,8	93,6	40 739,4	8,3	40 747,7	9 013,3	8 370	61,4	6 115,2	76,1
1972	47 411,1	80,2	43 662,2	812,9	44 475,1	9,7	44 484,8	9 551,3	8 846	59,6	6 630,2	76,4
1973	53 039,9	81,8	49 569,9	189,3	49 759,2	11,3	49 770,5	10 141,5	9 482	62,5	7 350,0	77,3
1974	59 797,5	84,4	55 140,9	1 110,3	56 251,1	7,9	56 259,1	10 691,5	10 002	66,3	8 552,0	75,1

Power station plant load factor = Units sent out from all Escom stations / Aggregate of assigned sent out capacity hours in year

System load factor = Units sent out on all Escom systems / (Peak demand on integrated Escom systems) × hours in year

na: figures not available

Operation of Escom's coal-fired power stations

Statement No. 11

Year	Generated in coal-fired stations GWh	Sent out from coal-fired stations GWh	Ratio sent out / generated in coal-fired stations	Tons of coal used Metric thousands	kg per unit sent out	Calorific value of coal, MJ/kg	Station heat rate MJ/unit sent out	Overall thermal efficiency sent out basis, per cent	Coal cost: Total R000	Coal cost: Rand per metric ton	Coal cost: Cents per unit sent out	Water used by coal-fired power stations Litre/USO*
1950	7 763,2	7 276,3	0,937	6 323,4	0,869	22,72	19,74	18,2	5 302,0	0,84	0,072 9	na
1951	8 316,7	7 797,1	0,938	6 662,9	0,855	22,72	19,43	18,5	6 553,0	0,98	0,084 0	na
1952	8 770,0	8 219,8	0,937	7 113,4	0,865	22,75	19,68	18,3	8 520,0	1,20	0,103 7	na
1953	9 434,6	8 838,2	0,937	7 393,9	0,837	23,08	19,32	18,6	9 862,0	1,33	0,111 6	na
1954	10 645,9	9 971,6	0,937	8 024,9	0,805	23,06	18,56	19,4	11 329,0	1,41	0,113 6	na
1955	12 208,2	11 419,1	0,935	8 999,7	0,788	22,89	18,04	20,0	13 709,0	1,52	0,120 1	na
1956	13 571,6	12 663,2	0,933	9 688,5	0,765	22,96	17,56	20,5	13 653,0	1,62	0,123 6	na
1957	14 632,1	13 633,6	0,932	10 220,6	0,750	22,79	17,09	21,1	17 256,0	1,69	0,126 6	na
1958	15 577,1	14 510,5	0,932	10 784,1	0,743	22,73	16,89	21,3	19 039,0	1,77	0,131 2	na
1959	16 923,7	15 774,6	0,932	11 548,7	0,732	22,44	16,43	21,9	20 970,0	1,82	0,132 9	na
1960	18 541,1	17 305,5	0,933	12 512,6	0,723	22,52	16,28	22,1	25 373,0	2,03	0,146 6	na
1961	19 573,4	18 282,2	0,934	13 194,9	0,722	22,39	16,17	22,3	27 713,0	2,10	0,151 6	na
1962	20 802,5	19 401,1	0,933	13 955,5	0,719	22,22	15,98	22,5	29 230,0	2,09	0,150 7	na
1963	22 307,9	20 789,2	0,932	14 721,1	0,708	22,15	15,68	23,0	31 009,0	2,11	0,149 2	na
1964	24 293,8	22 634,1	0,932	15 654,7	0,692	22 15	15,33	23,5	32 367,0	2,07	0,143 0	na
1965	26 388,1	24 582,6	0,932	16 726,7	0,680	22,39	15,23	23,6	34 986,0	2,09	0,142 3	na
1966	27 371,5	25 504,1	0,932	16 982,3	0,666	22,20	14,79	24,4	37 901,0	2,23	0,148 6	na
1967	30 421,7	28 370,9	0,933	18 307,7	0,645	22,44	14,47	24,9	42 053,0	2,30	0,148 2	na
1968	33 061,2	30 843,5	0,933	19 133,9	0,620	22,63	14,03	25,6	44 604,0	2,33	0,144 6	na
1969	35 966,9	33 598,2	0,934	19 982,9	0,595	22,73	13,52	26,6	47 453,0	2,37	0,141 2	3,49
1970	39 796,2	37 320,8	0,938	21 630,6	0,580	22,97	13,32	27,0	48 807,0	2,26	0,130 8	3,25
1971	43 378,8	40 645,8	0,937	23 416,2	0,576	23,30	13,42	26,8	52 705,0	2,25	0,129 7	3,13
1972	46 597,3	43 662,2	0,937	24 952,8	0,571	22,89	13,07	27,5	56 113,0	2,25	0,128 5	2,97
1973	52 849,3	49 569,9	0,938	27 907,9	0,563	22,47	12,65	28,5	66 837,4	2,39	0,134 8	2,86
1974	58 685,5	55 140,9	0,940	30 891,4	0,560	22,42	12,56	28,7	90 268,8	2,92	0,163 7	2,91

na = not available

*Excludes colliery and construction usage

Expansion of Escom's transmission and distribution system

Statement No. 12

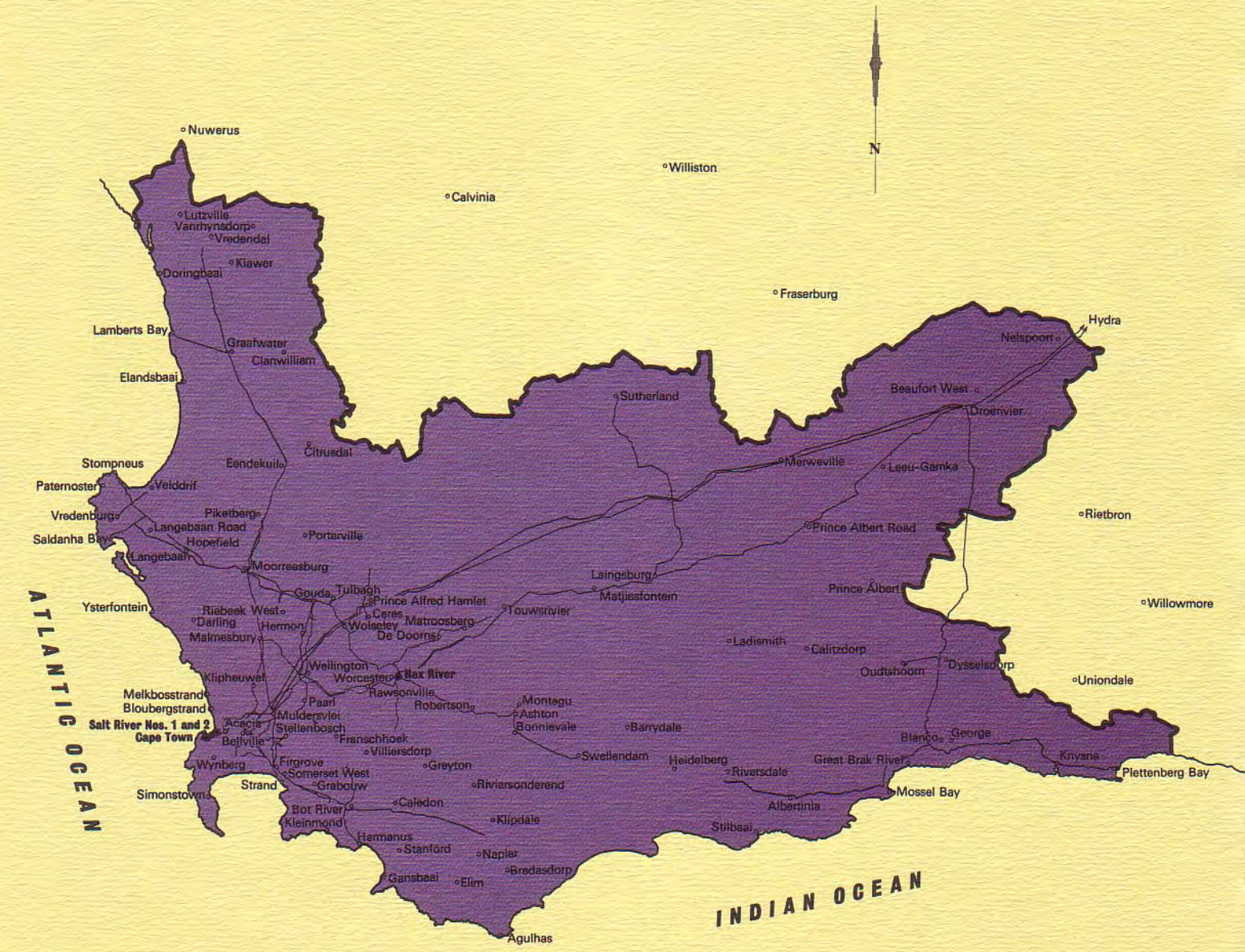
Year	Transmission/Distribution Lines – circuit kilometres (excluding service connections on reticulation systems)						Transformers, capacity in service, MVA
	400 kV	275 kV	220 kV	132 kV (including underground cables)	88 kV and below (including underground cables)	Total	
1950	—	—	—	203	10 414	10 617	6 137
1951	—	—	—	203	11 658	11 861	6 613
1952	—	—	—	427	11 880	12 307	7 023
1953	—	—	—	734	12 821	13 555	8 374
1954	—	—	—	1 051	13 085	14 136	9 663
1955	—	—	—	1 437	14 236	15 673	10 931
1956	—	—	—	1 727	15 234	16 961	11 997
1957	—	—	—	1 838	16 539	18 377	12 104
1958	—	—	—	2 274	18 393	20 667	14 346
1959	—	315	—	2 689	20 114	23 118	15 665
1960	—	315	—	2 778	21 926	25 019	15 987
1961	—	315	—	3 782	23 840	27 937	18 730
1962	—	648	—	3 853	26 114	30 615	19 265
1963	—	875	—	4 052	28 911	33 838	20 059
1964	—	1 490	—	4 375	31 898	37 763	22 981
1965	—	2 049	—	4 886	34 692	41 627	26 651
1966	—	2 194	—	5 387	37 592	45 173	26 814
1967	597	2 194	—	5 486	41 258	49 535	28 928
1968	597	2 412	—	6 080	44 928	54 017	32 191
1969	1 480	2 552	—	6 898	48 922	59 852	39 400
1970	1 916	2 599	—	7 063	52 318	63 896	43 007
1971	2 503	3 176	—	7 601	55 850	69 130	47 811
1972	3 275	3 826	—	8 352	59 860	75 313	52 025
1973	4 197	4 255	639	8 942	64 628	82 661	60 581
1974	5 040	4 417	639	9 429	68 700	88 225	65 900

Escom's distribution undertakings

The development and operation of Escom's separate distribution undertakings are reviewed on the following pages.

General note:
Working costs include interest charges and redemption fund contributions on loan capital and amounts set aside to Reserve Fund and Capital Redemption Fund.

CAPE WESTERN UNDERTAKING



REFERENCE

Area of supply . . . . . .

Escom power stations . . . . . ● Salt River

Transmission lines . . . . . ———

Transmission lines under construction ————————

10 0 10 20 30 40 50 60 70 80 90 100 Kilometres

Area of supply . . . . . 105 900 square kilometres

Cape Western Undertaking

The map shows the licensed area of supply of this undertaking at 31 December 1974. During 1974, a total of 4 241 million units of electricity were supplied to this distribution undertaking by the Central Generating Undertaking. Of the total, 1 112 million units or 26,2 per cent (31,9 per cent in 1973) were sent out from the Salt River and Hex River power stations situated in the Western Cape, the remainder having been imported from the north.

Sales of electricity

As shown in the table, a total of 3 852 million units of electricity were sold in this undertaking in 1974, which was 22,3 per cent above the corresponding total sold during the preceding year (13,6 per cent in 1973).

The main reason for the surge of growth in sales of electricity in 1974 was the extraordinary increase in bulk sales to the City of Cape Town: during the year 1974, 1 058 million units were sold to the City alone, representing an increase of 80 per cent above the corresponding figure for the previous year. This was due largely to the assistance given by Escom to the City of Cape Town in their efforts to reduce the generation of electricity at their oil-fired Table Bay power station.

The total sales of electricity in bulk to all municipalities came to 1 736 million units during the year 1974, an increase of 45,4 per cent above the corresponding figure for 1973.

Excluding the electricity sold to the Municipality of Cape Town, the remaining sales in this undertaking during the year 1974 increased by 9,1 per cent above the corresponding sales for the previous year (11,1 per cent in 1973).

The diagram indicates the increase in sales of electricity for the period 1965 to 1974, together with the average price per unit sold.

Development of the undertaking

The reliability of supply from the power stations in the north was further improved during the year by the commissioning of the third 240 MVA, 400/132 kV transformer at Muldersvlei distribution station. At present, the installation of two 75 MVAr synchronous condensers and a 132 kV, 100 MVAr shunt capacitor bank in this distribution station is in progress. Good progress is also being made with the erection of the 400 kV series capacitor bank at Komsberg substation near Laingsburg; completion is expected by the middle of 1975.

Difficulties have been encountered in obtaining servitudes for the two 400 kV transmission lines between the Muldersvlei and Acacia distribution stations in the Cape Town area. It is hoped that finality will be reached early in 1975. The 400 kV section of the Acacia distribution station is at present being designed and construction is planned to commence late in 1975.

A decision by Iscor to electrify the Sishen-Saldanha railway line has had an appreciable effect on plans for extending the transmission network towards the Saldanha area. A 400 kV transmission system is now being planned, extending from Hydra distribution station near De Aar, via the north-western Cape and the proposed Koeberg nuclear power station near Melkbosstrand, to Muldersvlei distribution station. A step-down distribution station, to be named Aurora distribution station, near Langebaanweg, is to provide supplies into the Saldanha area. The first stage, planned for completion by mid-1976, involves the construction of a single 132 kV line from Moorreesburg substation to Blouwater substation on the Iscor Saldanha site, to cater for the initial loads as a result of the first ore shipments. The sites for Aurora distribution station near Langebaanweg, and Juno distribution station near the Olifants River have been selected, and negotiations are proceeding for the purchase of the land. Surveying of the route for the 400 kV transmission lines from Koeberg nuclear power station through the Aurora and Juno distribution stations to link up with the 400 kV transmission line through the north-western Cape is progressing, and is expected to be completed during 1975.

During the year, the extension of the Southern Cape transmission system to Albertinia, Riversdale, Stilbaai and Heidelberg was completed, and all these towns, with the exception of Riversdale, which was not yet ready, are taking supplies.

Late deliveries of materials have prevented the erection of the 132 kV double circuit line between the Firgrove substation and the Lourens River substation in the Somerset West area. However, completion is now anticipated during April 1975, enabling the 132 kV busbars of both the Stellenbosch and Lourens River substations to be placed in service.

The Cape Divisional Council is, at the request of the Government, establishing residential facilities for the Coloured community at Dassenberg, near Mamre, and requires electricity there urgently. To provide this supply, approximately 40 km of 132 kV transmission line will have to be constructed from Malmesbury. From Dassenberg, this 132 kV line will be extended to the site of Koeberg nuclear power station near Melkbosstrand, initially to provide a construction supply and subsequently to serve as an additional transmission line to and from this future power station. The 66 kV transmission system was extended northwards during the year to Vredendal, enabling supplies to be provided to that town and others in the area.

Good progress was made with the supply of electricity to extensions in the urban areas, despite the shortage of money for home building. A master plan has been prepared for the establishment of several new major step-down substations in the urban areas, and once the necessary sites and wayleaves have been obtained, design and construction will be put in hand.

A proposal is under consideration for the head office of this undertaking in Cape Town to be sited at Oakdale,

Bellville, while the stores, construction and rural distribution departments are to be moved to new premises to be erected on the new Brackenfell site.

The total number of farming supplies furnished by the undertaking increased from 6 389 at the end of 1973 to 6 772 at the end of 1974.

The majority of the new farming supplies that were made available during 1974 were extensions of existing schemes. On the Vredendal farmers' scheme, 35 small users and 10 large users were connected by the end of 1974 and a further 17 consumers were connected on the Riversdale-Heidelberg-Stilbaai scheme. Terms have been accepted by the 38 applicants on the Caledon-Shaw's Pass-Jongensklip scheme and construction of the lines will commence early in 1975.

Of all the additional supplies to farmers during 1974, 160 were for farms that had not been supplied previously while the remaining 223 were additional supply points on farms already being supplied.

Electricity is still mainly used for irrigation purposes on farms in the Cape Western area except in the Vredendal area where most of the supplies will be for domestic purposes.

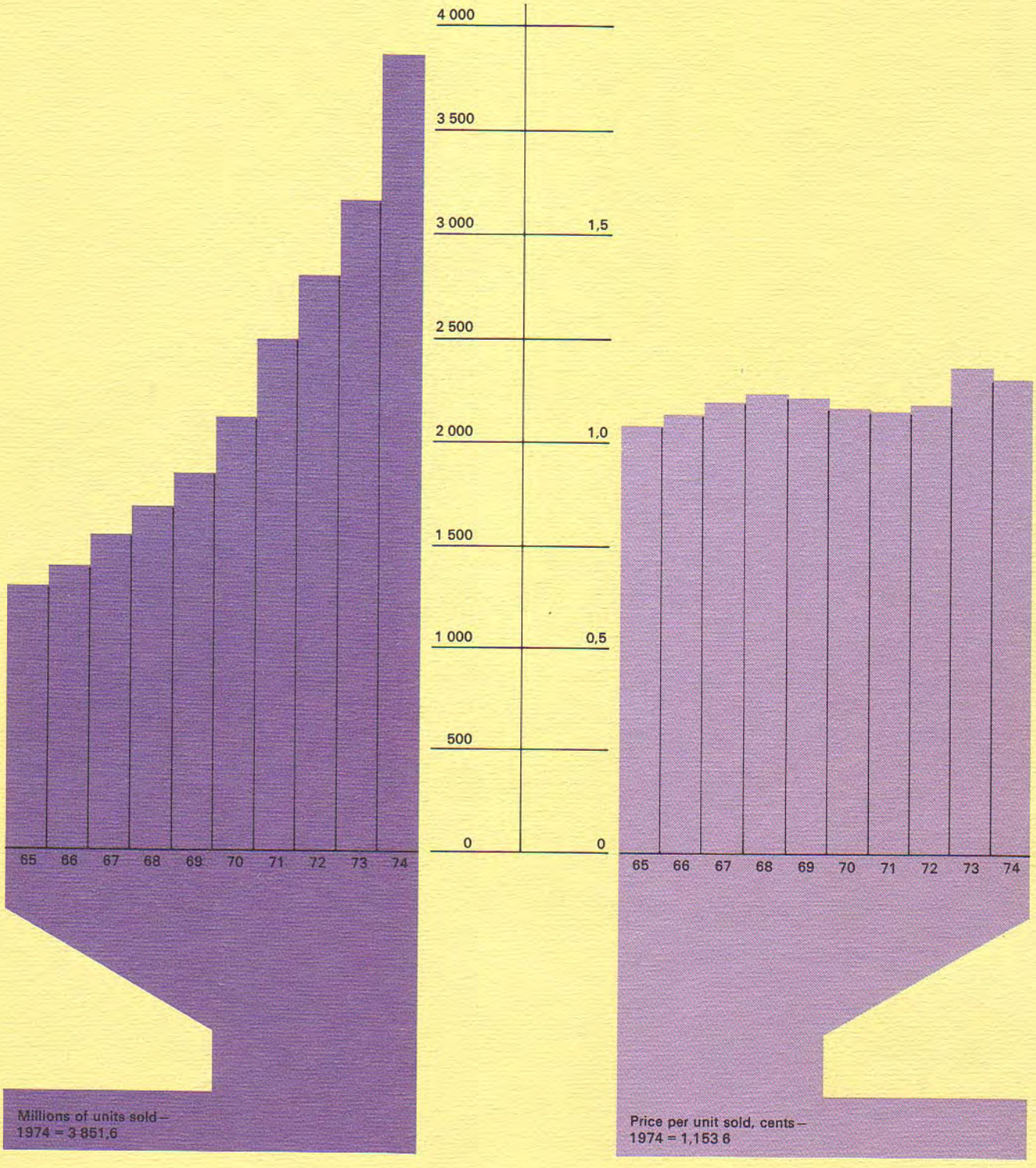
Financial

The table gives details of the units of electricity sold to the various classes of consumers, the revenue received,

figure for the preceding year (7,7 per cent higher in 1973). Total sales revenue for the year amounted to R44 431 846 and exceeded the corresponding figure for the preceding year by 19,6 per cent (22,5 per cent in 1973).

Consumer			Sales of electricity						Revenue from sales		Average price per unit sold	
Class	Number		Proportion %		Units sold		% Change		Rand	Rand	Cents	Cents
	1973	**1974**	1973	**1974**	1973	**1974**	73/72	**74/73**	1973	**1974**	1973	**1974**
Traction	6	**6**	14,32	**12,75**	450 802 116	**491 153 481**	+ 6,26	**+ 8,95**	5 490 287	**6 012 989**	1,217 8	**1,224 3**
Bulk municipal	45	**54**	37,91	**45,08**	1 193 772 829	**1 736 216 600**	+23,27	**+45,44**	10 820 418	**15 328 918**	0,906 4	**0,882 9**
Mining	—	—	—	—	—	—	—	—	—	—	—	—
Industrial	9 223	**9 636**	36,05	**31,55**	1 135 268 396	**1 215 159 909**	+ 8,94	**+ 7,04**	14 735 639	**16 186 293**	1,297 9	**1,332 0**
Domestic and street lighting	56 750	**60 177**	11,72	**10,62**	368 915 891	**409 041 684**	+ 9,61	**+10,88**	6 103 958	**6 903 646**	1,654 6	**1,687 8**
Total	66 024	**69 873**	100,00	**100,00**	3 148 759 232	**3 851 571 674**	+13,62	**+22,32**	37 150 302	**44 431 846**	1,179 8	**1,153 6**

	1973	**1974**
	R	**R**
Total revenue	37 150 302	**44 431 846**
Working costs	37 549 975	**44 487 813**
Surplus	—	**—**
Deficit	399 673	**55 967**
Accumulated to 31 December:		
Surplus	—	**—**
Deficit	1 449 346	**1 505 313**


4 000
3 500
3 000
2 500
2 000
1 500
1 000
500
0
1,5
1,0
0,5
0
65 66 67 68 69 70 71 72 73 74
65 66 67 68 69 70 71 72 73 74
Millions of units sold –
1974 = 3 851,6
Price per unit sold, cents –
1974 = 1,153 6

CAPE NORTHERN UNDERTAKING

REFERENCE

Area of supply . . . . . .

Transmission lines . . . . . .

Transmission lines under construction. . . . . .

10 0 10 20 30 40 50 60 70 80 90 100 Kilometres

Area of supply . . . . . 144 800 square kilometres

Cape Northern Undertaking

The map shows the licensed area of supply at 31 December 1974.

Sales of electricity

As shown in the table, a total of 1 210 million units of electricity was sold in this undertaking in 1974, which was 14,2 per cent above the corresponding total sold during the preceding year (18,4 per cent in 1973).

As in previous years, the chief contributor to the rate of growth achieved in this undertaking in 1974 was the mining industry. For the year 1974, sales to the mining sector comprised 45,4 per cent of total sales, as compared with 43,1 per cent for an equivalent period a year earlier. The sales to the mining sector during the year 1974 were 20,2 per cent above the sales during the preceding year (23,7 per cent in 1973).

Bulk sales to municipalities constituted 22 per cent of total sales in this undertaking during the year 1974, achieving a rate of growth of 15,2 per cent compared with the preceding year. This rate of growth was somewhat below the high rate of 21 per cent attained in this category during the year 1973. Bulk sales to Kimberley Municipality in 1974 achieved a growth rate of 10,3 per cent compared with the preceding year (8,9 per cent in 1973).

The main reason for the slightly reduced rate of growth in overall sales experienced in this undertaking in 1974, compared with the preceding year, was the reduced tempo of development of new urban areas other than Kimberley. The Municipality of Prieska took a greatly increased supply in 1973, and a new supply to the Municipality of Upington, which started in December 1972, also increased steeply in 1973. By contrast, the further increase in these two bulk supplies during 1974 was small.

The diagram indicates the increase in sales over the period 1965 to 1974, and the change in the average price per unit sold.

Development of the undertaking

For the supply of electricity to the Pomfret asbestos mine north of Hotazel, a 132 kV wood-pole transmission line, approximately 180 km long, was completed in September 1974 between the South African Railways Hotazel substation and a new 132/22 kV substation named Vesel.

A supply was made available in April 1974 to the Municipality of Kakamas. For this purpose, a 22 kV line, approximately 45 km long, was constructed from Oasis substation near Keimoes to Kakamas substation.

From Brakbos substation on the 132 kV Cuprum-Gordonia transmission line, a 132 kV wood-pole line, 28 km long, was constructed to Fibre substation near Marydale, to provide a supply to Koegas asbestos mine. A bulk supply at 22 kV was also made available from Fibre substation to Marydale Municipality.

Further progress was made with the additions to the 275 kV and 132 kV transmission systems between Kimberley and Sishen, mainly to cater for the increase in electricity required by Iscor at Sishen. At Sishen substation, a 40 MVA, 132/66 kV transformer was installed in November 1974; an additional similar transformer will follow early in 1975, to provide a temporary supply for the first stage of Iscor's export plant. To provide power at Iscor's new township at Sishen, named Kathu, a supply was made available in December 1974 from a temporary substation.

To provide additional supplies to the Northern Lime Company's lime works at Limeacres, a 10 MVA, 132/11 kV transformer was installed, and two 11 kV feeder bays were equipped at Silverstreams substation. A supply will also be made available to the Union Lime Company's new cement factory near Danielskuil. For the purpose, a 132 kV line is being constructed from Olien substation near Limeacres to Danielskuil.

In order to provide additional supplies to the Municipality of Kuruman, it became necessary to establish a new 66/11 kV substation near Kuruman, named Moffat. Two 10 MVA, 66/11 kV transformers were installed in this new substation, and a 66 kV transmission line was constructed over a distance of 15 km from Asbes substation to Moffat substation. The new supply from Moffat substation to Kuruman Municipality was made available in June 1974. A further 66 kV transmission line, 30 km long, was completed in July 1974 between Moffat substation and Valley substation, also in the Kuruman area.

Planning and design are proceeding of the 400 kV and 220 kV transmission systems required for the Sishen-Saldanha traction supplies, the supplies to the copper mines in the north-western Cape, and the Western Cape coastal supplies.

In 1975 a start will be made on the strengthening of the transmission system between Kimberley and Sishen. This will involve the construction of a 275 kV line from Boundary substation in the Kimberley area to Ferrum substation near Sishen.

To enable the De Beers diamond mine at Koffiefontein to commence underground mining, a second 132 kV overhead line is being erected over the distance of 100 km from Kimberley to Koffiefontein. This line is planned for completion by the middle of 1975.

The existing 11 kV transmission line from Riverton to Gannavlakte was rebuilt over a distance of 34 km, and extended a further 12 km to supply the G.P.O. at their Windsorton microwave station.

Three additional traction substations for the South African Railways were placed in service on the Wildhoen-Kimberley traction section during July 1974. To cope with the increasing rail traffic in the Northern Cape, sixteen additional traction substations are planned for commissioning in the Kimberley-Wildhoen and Kimberley-Sishen areas by the end of 1975.

The total number of farming supplies furnished by the undertaking increased from 2 130 at the end of 1973 to 2 240 at the end of 1974. Some 162 km of additional

transmission lines were erected during the year for the provision of the new supplies. The catastrophic floods experienced in the Northern Cape during the first two months of 1974 caused extensive damage to transmission lines and to consumers' installations. The undertaking's labour resources were in much demand for the repair of damaged lines and in some cases for the construction of new lines.

Most of the new points of supply were connected to existing rural schemes distributed over wide areas of the undertaking. There was considerable development in the Vaalharts area, where farmers use electricity not only for irrigation purposes, but also in tobacco drying ovens. The rural schemes along the Riet River and in the Upington district are now approaching completion with the construction of about 100 km of transmission line during the year.

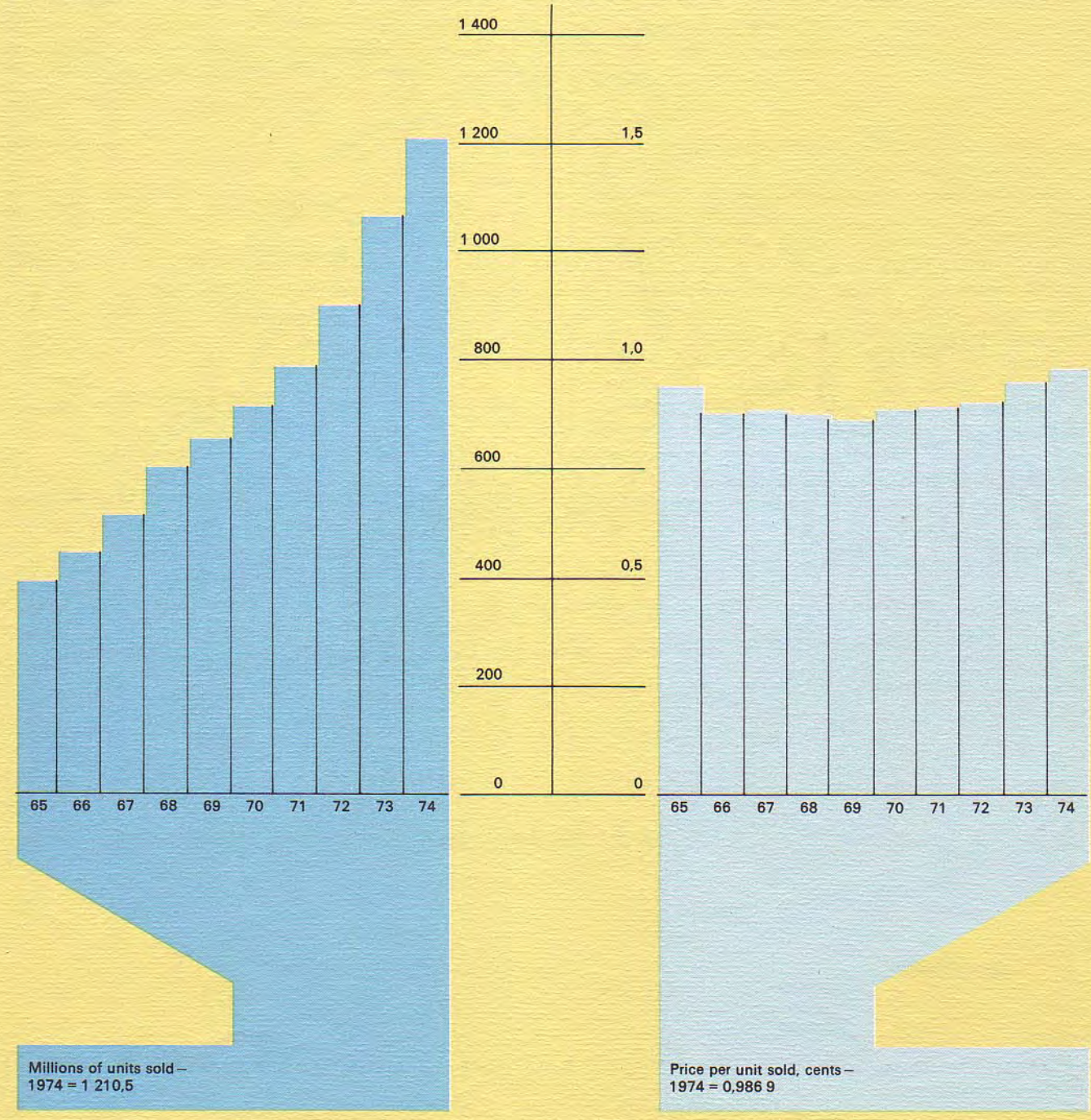
Financial

The table gives details of the units of electricity sold to the various classes of consumers, the revenue received and the working costs.

The average price of 0,986 9 cents per unit sold during 1974 is 3,5 per cent higher than the figure for the preceding year (5,3 per cent in 1973). Total sales revenue for the year amounted to R11 946 638 and exceeded the corresponding figure for the preceding year by 18,1 per cent (24,6 per cent in 1973).

Consumer			Sales of electricity						Revenue from sales		Average price per unit sold	
Class	Number		Proportion %		Units sold		% Change		Rand	Rand	Cents	Cents
	1973	**1974**	1973	**1974**	1973	**1974**	73/72	**74/73**	1973	**1974**	1973	**1974**
Traction	3	**3**	21,86	**21,58**	231 722 844	**261 213 972**	+14,12	**+12,73**	2 182 208	**2 491 794**	0,941 7	**0,953 9**
Bulk municipal	18	**21**	21,72	**21,92**	230 225 150	**265 288 500**	+21,02	**+15,23**	2 010 934	**2 502 841**	0,873 5	**0,943 4**
Mining	74	**77**	43,09	**45,38**	456 835 618	**549 276 640**	+23,68	**+20,24**	4 201 948	**5 161 253**	0,919 8	**0,939 6**
Industrial	716	**746**	10,78	**8,94**	114 261 396	**108 275 836**	+ 4,90	**− 5,24**	1 280 879	**1 344 954**	1,121 0	**1,242 2**
Domestic and street lighting	3 272	**2 884**	2,55	**2,18**	27 056 758	**26 417 955**	+11,83	**− 2,36**	436 666	**445 796**	1,613 9	**1,687 5**
Total	4 083	**3 731**	100,00	**100,00**	1 060 101 766	**1 210 472 903**	+18,35	**+14,18**	10 112 635	**11 946 638**	0,953 9	**0,986 9**

	1973	**1974**
	R	**R**
Total revenue	10 112 635	**11 946 638**
Working costs	10 310 390	**12 266 726**
Surplus	—	**—**
Deficit	197 755	**320 088**
Accumulated to 31 December:		
Surplus	106 491	**—**
Deficit	—	**213 597**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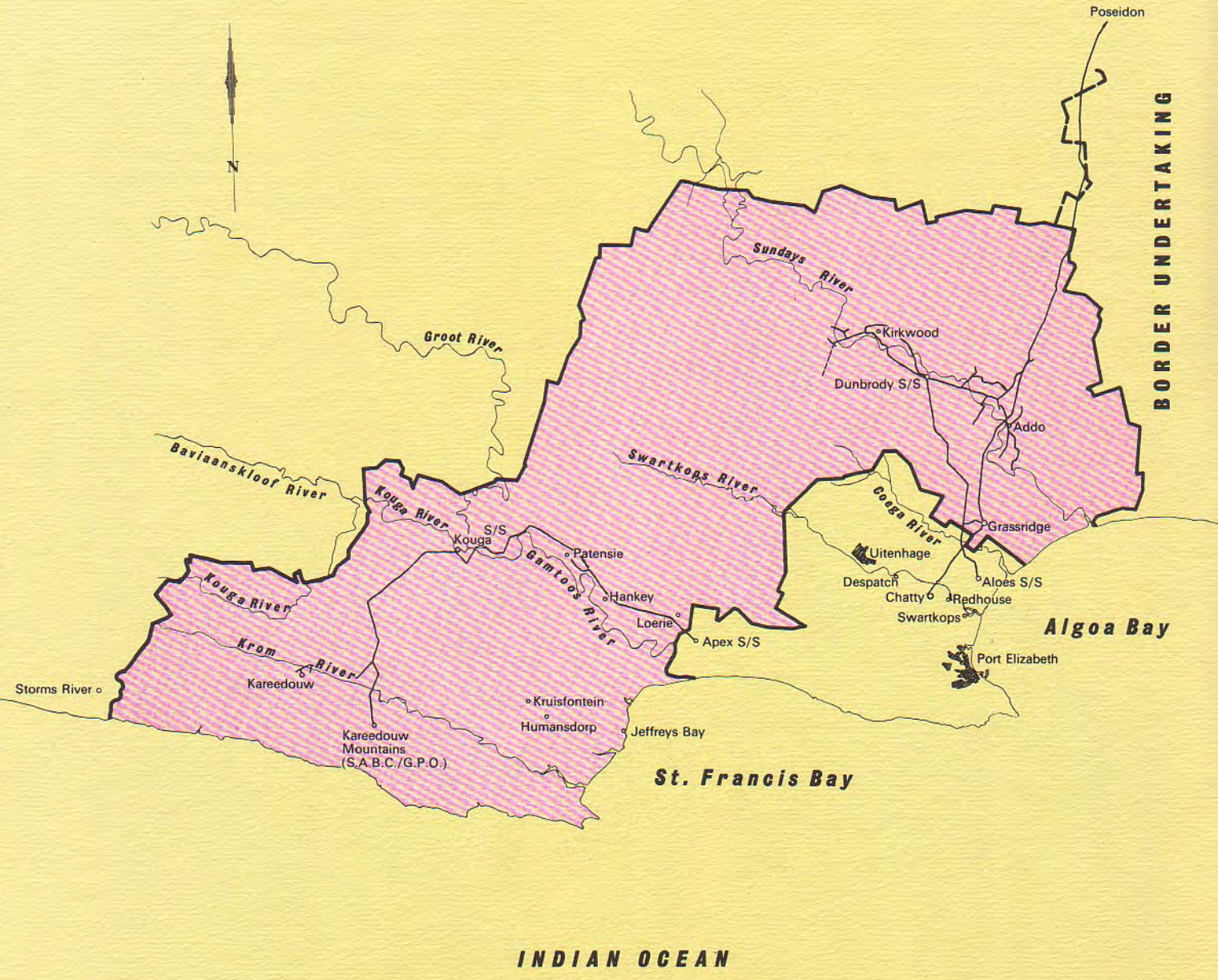
65 66 67 68 69 70 71 72 73 74
65 66 67 68 69 70 71 72 73 74
Millions of units sold –
1974 = 1 210,5
Price per unit sold, cents –
1974 = 0,986 9

CAPE EASTERN UNDERTAKING



REFERENCE

Area of supply . . . . . .

Border Undertaking . . . . . .

Transmission lines . . . . . ———

Transmission lines under construction . . . . ----------

Substation . . . . . ○ S/S

10 5 0 10 20 30 40 50 Kilometres

Area of supply . . . . . 8 000 square kilometres

Cape Eastern Undertaking

The map shows the licensed area at 31 December 1974 of this undertaking. The undertaking consists essentially of rural and urban schemes in the valleys of the Sundays and Gamtoos Rivers.

Electricity for the network in the Sundays River Valley has in the past been purchased from Port Elizabeth Municipality. For consumers in the Gamtoos Valley, Escom purchases power from the hydro-electric power station of the Department of Water Affairs at the Paul Sauer Dam.

To achieve the amalgamation of this undertaking with Escom's Orange River Undertaking, an application was made during the year to the Electricity Control Board for the licensed area of the Cape Eastern Undertaking to be incorporated in that of the Orange River Undertaking. Formal permission for this change has not yet been received.

Sales of electricity

During the year 1974, 11,5 million units of electricity were sold in this undertaking—18,9 per cent more than the units sold in the preceding year (14,8 per cent in 1973). The higher rate of growth experienced in 1974, compared with 1973, was mainly due to increased rates of growth in the bulk sales to municipalities and in the supplies to the industrial sector.

Development of the undertaking

The 22kV supply from Port Elizabeth Municipality to Escom's consumers in the Sundays River Valley was discontinued during the year. These consumers are now supplied from the Grassridge distribution station near Coega. For this purpose, a short length of 22 kV transmission line was erected to enable the line from Aloes to Dunbrody to be turned in at Grassridge.

In the Gamtoos area, extensions were carried out during the year to the distribution and reticulation systems for the villages of Hankey, Patensie and Kareedouw where a number of new domestic consumers were connected.

A total of 43 new farming supplies were provided during the year, of which 19 were in the Sundays River Valley and 24 in the Gamtoos Valley.

The increased interest shown in electrification during the year by farmers was due to various factors: generally good crops during the 1973-74 season, the higher cost of petroleum fuels, and a more systematic approach to irrigation.

Financial

The table gives details of the units of electricity sold to the various classes of consumers, the revenue received and the working costs. In this table, the units taken by Port Elizabeth Municipality from surplus generation in the hydro-electric power station at the Paul Sauer Dam are not included as sales by the Cape Eastern Undertaking.

The working cost of the undertaking is influenced to a considerable extent by the output of the hydro-electric power station at the Paul Sauer Dam, as regular sustained operation of this power station lessens the need to purchase supplementary power for the Gamtoos Valley.

The average price of 3,408 7 cents per unit sold during 1974, is 1,0 per cent higher than the figure for the preceding year (10,6 per cent in 1973). Total sales revenue for the year amounted to R391 206 and exceeded the corresponding figure for the preceding year by 20,1 per cent (27 per cent in 1973).

Consumer			Sales of electricity						Revenue from sales		Average price per unit sold	
Class	Number		Proportion %		Units sold		% Change		Rand	Rand	Cents	Cents
	1973	**1974**	1973	**1974**	1973	**1974**	73/72	**74/73**	1973	**1974**	1973	**1974**
Traction	—	—	—	—	—	—	—	—	—	—	—	—
Bulk municipal	1	**1**	20,51	**19,80**	1 979 640	**2 272 200**	+10,83	**+14,78**	38 953	**47 439**	1,967 7	**2,087 8**
Mining	—	—	—	—	—	—	—	—	—	—	—	—
Industrial	143	**216**	44,30	**50,49**	4 275 933	**5 794 065**	+ 9,31	**+35,50**	167 335	**220 451**	3,913 4	**3,804 8**
Domestic and street lighting	618	**615**	35,19	**29,71**	3 397 500	**3 410 304**	+25,42	**+ 0,38**	119 399	**123 316**	3,514 3	**3,616 0**
Total	762	**832**	100,00	**100,00**	9 653 073	**11 476 569**	+14,83	**+18,89**	325 687	**391 206**	3,373 9	**3,408 7**

	1973	**1974**
	R	**R**
Total revenue	325 687	**391 206**
Working costs	390 808	**448 704**
Surplus	—	—
Deficit	65 121	**57 498**
Accumulated to 31 December:		
Surplus	—	—
Deficit	249 187	**306 685**

Note: Above units sold by Cape Eastern Undertaking do not include units taken by Port Elizabeth Municipality at Summit substation from the hydro-electric power station of the Department of Water Affairs.

Cape Eastern Undertaking

BORDER UNDERTAKING

REFERENCE

Area of supply . . . . .

Escom power stations . . . . . West Bank

Transmission lines . . . . .

Transmission lines under construction . . . . .

Ducat's Outspan substation . . . . .

10 0 10 20 30 40 50 60 70 80 90 100 Kilometres

Area of supply . . . . . 55 400 square kilometres

Border Undertaking

The licensed area of supply of this undertaking was amended during the year under review by the transfer of an area in the vicinity of Elliot to the neighbouring Orange River Undertaking. The map shows the licensed area of supply at 31 December 1974. West Bank power station, previously controlled by this undertaking, was the last Escom power station to be transferred to the Central Generating Undertaking. The formal transfer took place on 1 January 1974, following the interconnection of Border Undertaking with the national transmission network at the end of 1973. The undertaking imported 59,6 per cent of its electricity requirements in 1974 over the interconnection.

Sales of electricity

As shown in the table, a total of 551 million units of electricity was sold in this undertaking in 1974, which was 9,3 per cent above the corresponding total sold during the preceding year (12,6 per cent in 1973).

The Municipality of East London continues to be the undertaking's largest consumer of electricity. During the year 1974, East London accounted for 69 per cent of the total units sold. The bulk sales to East London in 1974 were 7,7 per cent more than in the preceding year (10,4 per cent in 1973). Excluding the bulk supplies to the Municipality of East London, the remaining units sold in this undertaking in 1974 were 13 per cent more than in the preceding year (18,2 per cent in 1973). The diagram indicates the increase in sales of electricity for the period 1965 to 1974, and the change during this period in the average price per unit sold.

Development of the undertaking

Riverview substation in East London was placed in service in March 1974, and since then this substation, together with the existing Gately substation, enabled the output of West Bank power station to be fed into the 66 kV transmission system.

The previous 11 kV supply to East London Municipality at Nuffield Road was discontinued and a new supply at 132 kV was provided at Buffalo distribution station.

An increased supply to Butterworth Municipality was provided from Lamplough substation in January 1974. Construction continued of the 132 kV transmission line, 120 km long, from Lamplough substation to Zimbane substation at Umtata. This line is planned for completion early in 1975, after which a supply will be provided to Umtata. To cope with the increasing demand expected in the Transkei, a bank of capacitors is planned to go into service at Lamplough substation towards the end of 1975. The 132 kV transmission line, 35 km long, from Pembroke distribution station near Berlin to Kubusie substation near Stutterheim was completed, and a temporary feed into the 11 kV system at Kubusie was commissioned in November 1974. The permanent Kubusie substation is to be erected in 1975. A contract has been placed for the erection of the 132 kV line extension from Kubusie substation to Komani substation at Queenstown, planned for completion by the last quarter of 1975.

To make more effective use of the supply from the national transmission network, a 132 kV line is to be erected from Pembroke distribution station near Berlin to Buffalo distribution station near Arnoldton. Servitude negotiations are almost complete, and surveying is in progress. Erection of the line is to start in 1975, and completion is planned for early 1976.

Negotiations were continued for the servitudes for the 66 kV lines which will be built from Aloe Glen switching station near Ducats to the Royston and Greenacres 66/11 kV substations which are to be installed at Beacon Bay and Gonubie respectively, to strengthen the supplies to these areas. It is hoped that construction will commence of both these substations in the course of 1975.

The 66 kV line from Grahamstown substation to Kariega substation, and the Kariega 66/22 kV substation itself, are due to be erected in the second half of 1975. This line and substation are required for strengthening supplies in the Alexandria-Port Alfred area. The line will commence at a new substation to be erected on the outskirts of Grahamstown to be named Albany substation. The future 132 kV supply from Pembroke will be brought in at this point with transformation from 132 kV to 66 kV.

A substantial supply is required for industrial purposes at Dimbaza, between King William's Town and Alice, and it is planned to install a temporary 66/11 kV substation at this point by March 1975. A permanent substation will be erected later.

Prospect 22/11 kV substation near Kidds Beach and the Buffalo-Prospect 22/11 kV line are to be commissioned on a temporary basis early in 1975. The permanent control panels are still awaited and it is expected that all work will be completed by the middle of 1975.

Construction of the 22 kV transmission line from Buffalo distribution station near Arnoldton to Fort Jackson is planned for completion by the middle of 1975. Increased supplies to Cathcart are planned by converting the transmission line between Kubusie substation near Stutterheim and Cathcart from 11 kV to 22 kV, and installing a 22/11 kV substation at Cathcart. This work is planned for completion early in 1976.

Supply is to be given to the village of Paterson towards the end of 1975 by means of an 11 kV line from Alicedale.

The development of the Kenton on Sea and Boesmansriviermond reticulations is proceeding rapidly and requests for connections are still being received at a high rate.

The erection of the third radio repeater station at Needs Camp is in hand, and it is expected that the station will be placed in commission in the first quarter of 1975. This will complete the first stage of the new v.h.f. radio communication system for the Border Undertaking. A

radio survey is to be carried out early in 1975 to determine the requirements for extending Escom's national radio communication system to the Border Undertaking.

The control centre for the Border system has been placed in operation at Pembroke distribution station near Berlin.

The total number of farming supplies furnished by the undertaking increased from 716 at the end of 1973 to 773 at the end of 1974. Of the 57 new supplies provided during 1974, only two were additional points of supply to farmers previously connected; all the others were new supplies to farms not previously connected. Construction work is still in progress on the Zuney scheme to the west of Alexandria. An additional 20 supplies were provided for this scheme which has been planned for a total of 67 supplies.

As a result of the decision by the Municipality of Queenstown to take a partial bulk supply from Escom, a large number of farmers in the surrounding area are considering electrification, chiefly of milking machines and pumping.

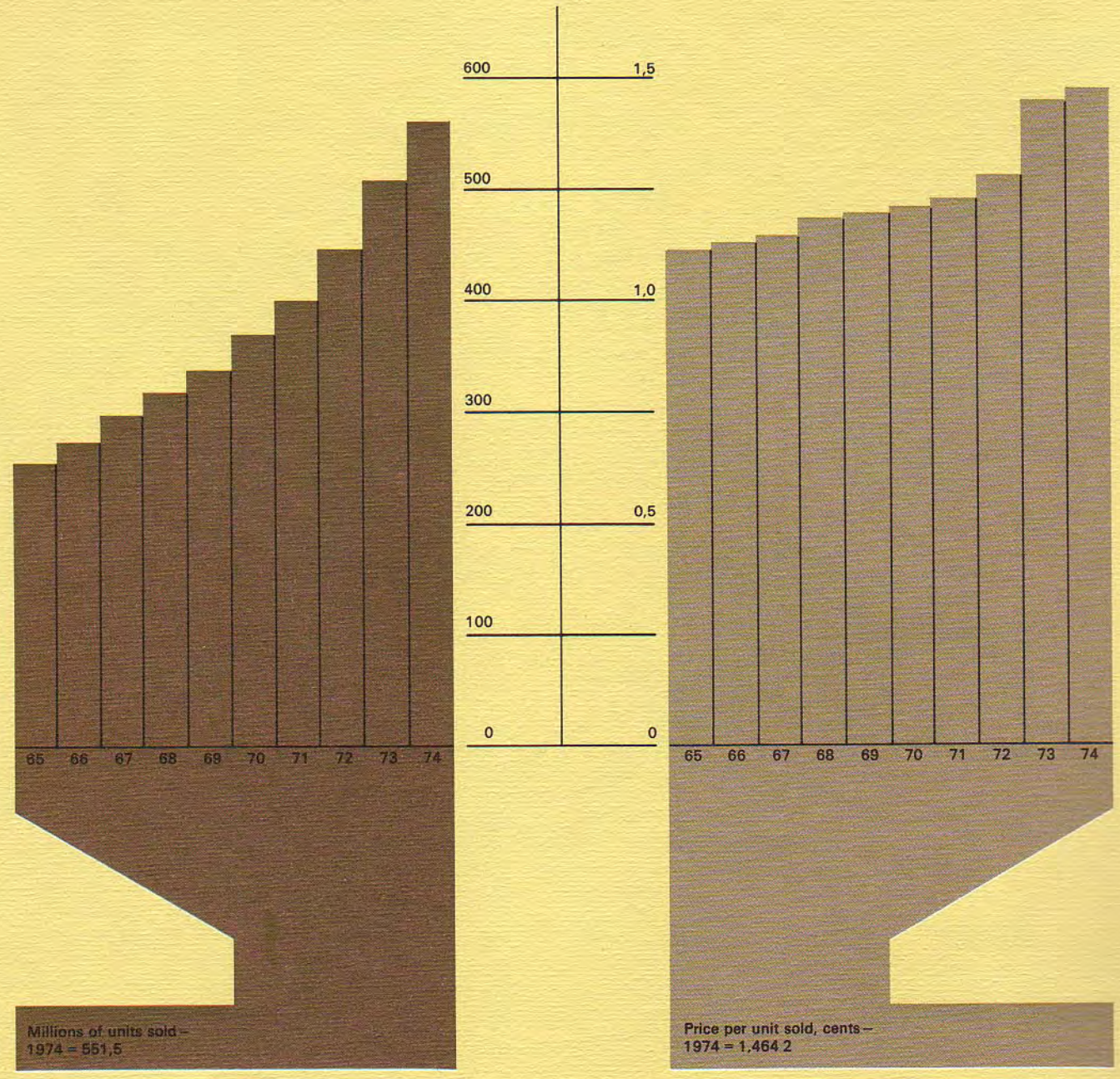
The feasibility of additional rural schemes in the Brakfontein, Keimond, Tylden, Paterson, Salem (near Kenton on Sea), Shaw Park (north-east of Port Alfred), Queenstown, Komga and Seven Fountains (near Grahamstown) areas is being investigated.

Financial

The table gives details of the units of electricity sold to the various classes of consumers, the revenue received and the working costs. The average price of 1,464 2 cents per unit sold during 1974 is 4,3 per cent higher than the figure for the preceding year (10,3 per cent in 1973). Total sales revenue for the year amounted to R8 074 898 and exceeded the corresponding figure for the preceding year by 14,0 per cent (24,3 per cent in 1973).

Consumer			Sales of electricity						Revenue from sales		Average price per unit sold	
Class	Number		Proportion %		Units sold		% Change		Rand	Rand	Cents	Cents
	1973	**1974**	1973	**1974**	1973	**1974**	73/72	**74/73**	1973	**1974**	1973	**1974**
Traction	—	—	—	—	—	—	—	—	—	—	—	—
Bulk municipal	16	**16**	87,39	**87,63**	440 576 620	**483 292 430**	+10,19	**+ 9,70**	5 698 275	**6 540 977**	1,293 4	**1,353 4**
Mining	—	—	—	—	—	—	—	—	—	—	—	—
Industrial	416	**432**	7,76	**7,33**	39 615 770	**40 406 463**	+47,38	**+ 2,00**	825 010	**872 587**	2,082 5	**2,159 5**
Domestic and street lighting	3 357	**3 746**	4,85	**5,04**	24 461 711	**27 785 537**	+14,03	**+13,59**	562 042	**661 334**	2,297 6	**2,380 1**
Total	3 789	**4 194**	100,00	**100,00**	504 654 101	**551 484 430**	+12,61	**+ 9,28**	7 085 328	**8 074 898**	1,404 0	**1,464 2**

	1973	**1974**
	R	**R**
Total revenue	7 085 328	**8 074 898**
Working costs	6 647 960	**8 329 974**
Surplus	437 368	**—**
Deficit	—	**255 076**
Accumulated to 31 December:		
Surplus	268 416	**13 340**
Deficit	—	**—**


600
500
400
300
200
100
0
1,5
1,0
0,5
0
65 66 67 68 69 70 71 72 73 74
65 66 67 68 69 70 71 72 73 74
Millions of units sold –
1974 = 551,5
Price per unit sold, cents –
1974 = 1,464 2

NATAL UNDERTAKING

TRANSVAAL
MOZAMBIQUE
SWAZILAND
ORANGE FREE STATE
LESOTHO
NATAL
INDIAN OCEAN
CAPE PROVINCE
Camden
Standerton
Amersfoort
Piet Retief
Platrand
Perdekop
Heilbron
Frankfort
Sandspruit
Volksrust
Vrede
Wakkerstroom
Quagga
Paulpietersburg
Pongola
Petrus Steyn
Clontarf
Memel
Incandu
Utrecht
Pivaan
Coronation
Boomlaer
Louwsburg
Reitz
Newcastle
Alpha
Hlobane
Mkuze
Lindley
Warden
Chivelston
Vryheid
Ngwibi
Komspruit
Arlington
Ingagane
Strathcona
Scheepersnek
Danielsrus
Bloedrivier
Doringberg
Hluhluwe
Bethlehem
Jordan
Afrikaskop
Malonjeni
Senekal
Glencoe
Dundee
Harrismith
Kestell
Mahlabatini
Paul Roux
Groenkop
Sterkfontein
Golden Gate
Van Reenen
Witzieshoek
Danskraal
Melmoth
Mtubatuba
St. Lucia
Clarens
Fouriesburg
Jagersrust
Tugela
Ladysmith
Pieters
Bergville
Winterton
Colenso
Kwambonambi
Driel
Bloukrans
Mhlatuze
Nkwaleni
Mposa
Cathedral Peak
Weenen
Empangeni
Impala
Richards Bay
Frere
Eshowe
Alusaf
Cathkin Park
Ngoye
Felixton
Champagne Castle
Willowford
Estcourt
Kranskop
Mbonyolwana
Greytown
Ahrens
Gingindlovu
Mtunzini
Mispah
Amatikulu
Mt. Alida
Sithebe
Mandini S.A.R.
Mooi River
Rietvlei
Seven Oaks
Sappi
Mandini
Dalton
Darnall
Glendale
Mpolweni
Glenside
Stanger
Lidgetton
Mersey
Montebello
Gledhow
Wartburg
Gruneck
Shakaskraal
Howick
Riverside
Driefontein
Compensation
Impendhle
Pietermaritzburg
Tongaat
Canelands
Underberg
Cato Ridge
Verulam
Elandskop
Georgedale
Umgeni
Northdene
Congella
Richmond
Eston
Donnybrook
Klaarwater
Durban
Mid Illovo
Crossmoor
Cavendish
Umlaz
Coedmore
Reunion
Umbumbulu
Warner Beach
Ixopo
Illovo
Winkelspruit
Highflats
Umgababa
Matatiele
Nkonka
Umkomaas
Umzimkulu
Umzinto
Cedarville
Hlatunkungu
Claustal
Rietvlei
Kelso
Kokstad
Weza
Harding
Hibberdene
Ingeli
Turton
Marburg
Izingolweni
Southport
Mount Fletcher
Oribi
Port Shepstone
Mount Ayliff
Bizana
Margate
Mount Frere
Ramsgate
Marina Beach
Southbroom
Trafalgar Beach
Port Edward

N

REFERENCE

Area of supply . . . . . .
Escom power stations . . . . . ◉ Congella
Transmission lines . . ——— (under construction)
Provincial boundaries . . . . . .
International boundaries . . . . . .

10 0 10 20 30 40 50 60 70 80 90 100 Kilometres

Area of supply . . . . . 106 700 square kilometres

Natal Undertaking

The map shows the licensed area of supply, at 31 December 1974, of the Natal Undertaking, which combines the areas of supply of the Natal Central Licence and the Natal Southern Licence. During 1974, a total of 9 087 million units of electricity were supplied to this distribution undertaking by the Central Generating Undertaking. Of the total, 3 860 million units or 42,5 per cent (46,3 per cent in 1973) were sent out from the Ingagane, Colenso, Congella and Umgeni power stations situated in Natal, the remainder having been imported from the north.

Sales of electricity

As shown in the table, a total of 8 500 million units of electricity were sold in this undertaking in 1974, which was 12,1 per cent above the corresponding total sold during the preceding year (9,3 per cent in 1973). The increased rate of growth during 1974 was due largely to the continuing growth of Alusaf's demand for electricity. Excluding Alusaf, the units sold in the remainder of the Natal Undertaking during the year 1974 were 8,3 per cent above the units sold in the preceding year (10,3 per cent in 1973).

The units of electricity sold to the industrial sector alone in 1974 showed an increase of 27,2 per cent compared with the preceding year (8,5 per cent in 1973). To understand a rate of growth of this magnitude, it is necessary to bear in mind that in the Natal Undertaking the industrial sector is dominated by a relatively small number of large industrial concerns: Alusaf, Iscor, Sappi and Feralloys. Depending upon the expansion programmes of these large concerns, short-term surges can be expected from time to time in their demands for electricity. The units of electricity sold to Alusaf, for example, in the year 1974 were 41,8 per cent above the units sold to this concern during the preceding year. The corresponding rate of growth in 1973, compared with the preceding year, was only 2,0 per cent. For the industrial sector excluding Alusaf, the rates of growth in sales during each of the two years 1974 and 1973, when compared with the preceding years, were 15,5 and 14,2 per cent respectively.

During the year under review, there was a decrease in the rate of growth of bulk sales to municipalities in this undertaking: in the year 1974, the total bulk sales to all municipalities supplied by Escom were 6,3 per cent above the figure for the preceding year (11,8 per cent in 1973). The reduced rate of growth in municipal bulk supplies was general, and cannot be attributed to a particular municipality: bulk sales during 1974 to the Municipality of Durban, which is still Escom's largest single consumer in this category, were 5,2 per cent higher than in the preceding year (10,7 per cent in 1973). Excluding the Municipality of Durban, the remaining bulk sales to all other municipalities in this undertaking in 1974 were 10,1 per cent more than in the preceding year (15,9 per cent in 1973).

The diagram indicates the increase in sales of electricity over the period 1965 to 1974 and the change, during this period, in the average price per unit sold.

Development of the undertaking

To improve the security of supplies to the Natal Undertaking from the pithead coal-fired power stations in the Transvaal, a second 400 kV transmission line was placed in service over the distance of 193 km from Chivelston distribution station, south of Newcastle, to Mersey distribution station near Pietermaritzburg.

With the completion of the Driel substation near Bergville, it became possible to provide supplies of electricity to the Department of Water Affairs for the first phase of their Tugela-Vaal pumping scheme. This scheme is intended as a means of supplementing the Vaal River resources by pumping water from the Tugela River over the Drakensberg in the Oliviershoek Pass area into the Sterkfontein Dam; from this dam the water is to gravitate into a tributary of the Wilge River, ultimately reaching the Vaal. The first supplies of electricity were provided during the year to the Driel pumping station and the Jagersrust pumping station which operate in series to lift the Tugela water into the Sterkfontein Dam.

The Mersey distribution station near Pietermaritzburg was extended by the installation of two 800 MVA, 400/275 kV transformers. One of these was manufactured in the Republic; it is the largest transformer ever manufactured in this country and transported on our roads.

Extensions were also completed during the year at the Georgedale distribution station near Cato Ridge and at the Klaarwater substation in the Durban area to enable Escom to provide increased supplies to the Municipality of Durban. A third 250 MVA, 275/132 kV transformer was installed at Klaarwater. A second 275 kV transmission line, 56 km long, was completed between the Mersey and Georgedale distribution stations.

To strengthen supplies to the southern region of Durban Municipality, construction commenced during the year on a 45 km length of 275 kV line from Georgedale distribution station to Illovo distribution station. Construction work on the two distribution stations also commenced.

A 275 kV transmission line, 60 km long, was constructed from Ingagane power station near Newcastle to Bloedrivier substation near Vryheid, to give reinforcement, via a 160 MVA, 275/88 kV transformer, to the Vryheid area. From here supplies will also be provided for traction signalling on the South African Railways' new line from Vryheid to Richards Bay.

Negotiations are in progress for a supply at 88 kV to the Lesotho Electricity Corporation at the border in the vicinity of Clarens in the Orange Free State. A large increase in the demand for electricity by the Municipality of Stanger is expected, due to the establishment of a new paper mill. The Empangeni Municipality's demand is growing rapidly, and the Empangeni 88/11 kV substation is being extended. Major extensions are to be made to a carbide factory at Ballengeich south of Newcastle, and

the existing substation will have to be enlarged.

The South African Railways have postponed their new traction requirements between Newcastle and Volksrust. It is anticipated that 25 kV single-phase alternating-current traction will be introduced for the new Ermelo-Vryheid-Richards Bay section. In conjunction with these supplies, consideration is being given to extending the 400 kV network in the vicinity of Richards Bay to supplement the existing 275 kV system to this rapidly developing area.

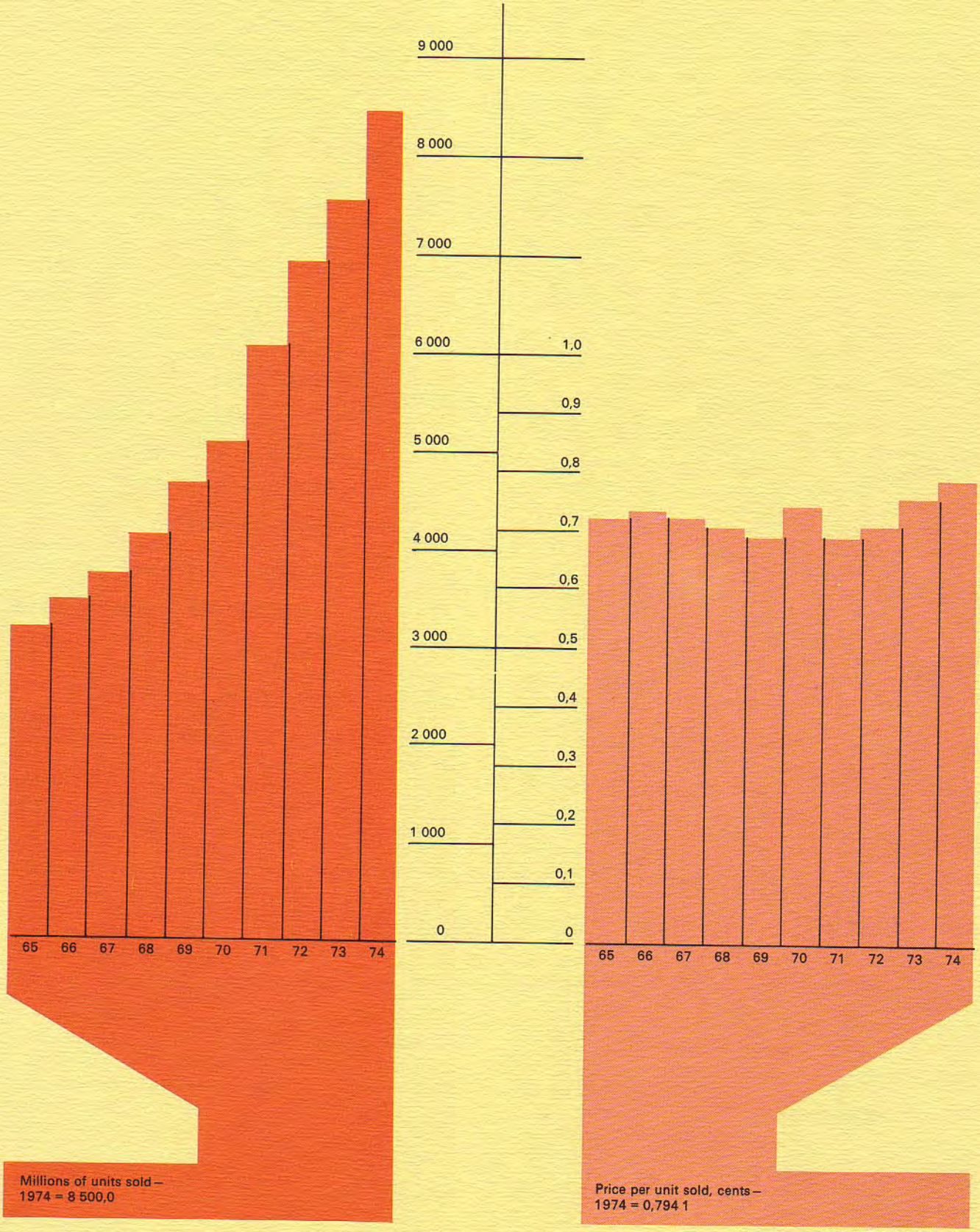
There was an unprecedented demand for electricity in the rural areas of this undertaking, as a result of the shortage and increased cost of petroleum fuels. The total number of farming supplies increased from 5 080 at the end of 1973 to 5 578 at the end of 1974, an increase of just under 10 per cent during the year (9,2 per cent in 1973). Development of the rural network continued in the Pongola area, where an additional 81 farmers took supplies during the year, bringing the total number of farming supplies in that area to 185. A scheme approved during the year to supply farmers in the Creighton area is suitable for extension to the Underberg, Himeville and Sani Pass areas. Further development of the undertaking's rural network in the Hluhluwe and Mkuze areas is expected.

Financial

The table gives details of the units of electricity sold to the various classes of consumers, the revenue received and the working costs. The average price of 0,794 1 cents per unit sold during 1974 is 5,1 per cent higher than the figure for the preceding year (7,7 per cent in 1973). Total sales revenue for the year amounted to R67 497 144 and exceeded the corresponding figure for the preceding year by 17,8 per cent (17,7 per cent in 1973).

Consumer			Sales of electricity						Revenue from sales		Average price per unit sold	
Class	Number		Proportion %		Units sold		% Change		Rand	Rand	Cents	Cents
	1973	**1974**	1973	**1974**	1973	**1974**	73/72	**74/73**	1973	**1974**	1973	**1974**
Traction	14	**14**	11,81	**11,55**	895 956 142	**981 604 416**	+ 0,27	**+ 9,56**	7 821 904	**8 840 204**	0,873 0	**0,900 5**
Bulk municipal	32	**35**	58,27	**55,26**	4 417 284 545	**4 696 638 860**	+11,82	**+ 6,32**	30 574 776	**34 542 336**	0,692 1	**0,735 5**
Mining	32	**33**	2,22	**2,07**	167 944 819	**175 921 806**	+ 2,89	**+ 4,75**	1 507 552	**1 619 643**	0,897 6	**0,920 7**
Industrial	5 087	**5 485**	25,83	**29,30**	1 958 720 697	**2 490 822 182**	+ 8,46	**+27,17**	15 063 218	**19 887 560**	0,769 0	**0,798 4**
Domestic and street lighting	19 489	**20 778**	1,87	**1,82**	141 393 615	**154 969 993**	+13,18	**+ 9,60**	2 316 690	**2 607 401**	1,638 5	**1,682 5**
Total	24 654	**26 345**	100,00	**100,00**	7 581 299 818	**8 499 957 257**	+ 9,27	**+12,12**	57 284 140	**67 497 144**	0,755 6	**0,794 1**

	1973	**1974**
	R	**R**
Total revenue	57 284 140	**67 497 144**
Working costs	58 417 954	**67 713 111**
Surplus	—	**—**
Deficit	1 133 814	**215 967**
Accumulated to 31 December:		
Surplus	—	**—**
Deficit	1 228 793	**1 444 760**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0
65 66 67 68 69 70 71 72 73 74
65 66 67 68 69 70 71 72 73 74
Millions of units sold –
1974 = 8 500,0
Price per unit sold, cents –
1974 = 0,794 1

ORANGE RIVER UNDERTAKING

REFERENCE

Area of supply . . . . . .

Transmission lines . . . . . ———

Transmission lines under construction . . . . . ----------

Escom power stations ....◉ Hendrik Verwoerd .....◎ Vanderkloof (under construction)

10 0 10 20 30 40 50 60 70 80 90 100 Kilometres

Area of supply . . . . . 139 600 square kilometres

Orange River Undertaking

The licensed area of supply of this undertaking was extended during the year under review to include an area around the town of Elliot, to enable the undertaking to supply electricity to Elliot and to farms in the vicinity. The map shows the licensed area of supply at 31 December 1974.

Sales of electricity

As shown in the table, a total of 786 million units of electricity were sold in this undertaking in 1974, which was more than three times the corresponding total for the preceding year. For the purpose of comparison, the units sold in 1973 were some 65 per cent above the figure for the preceding year.

The surge of growth during the year under review was due to regular bulk supplies to Port Elizabeth Municipality from November 1973 onwards. From the table mentioned, it is immediately obvious that the category of bulk supplies has assumed a position of dominance in this undertaking, comprising 87,4 per cent of the total sales for the year 1974. The bulk supplies to Port Elizabeth alone during the year constituted 88,6 per cent of the total municipal bulk supplies in this undertaking.

The diagram indicates the increase in sales of electricity over the period 1965 to 1974 and the change, during this period, in the average price per unit sold.

Development of the undertaking

The 22 kV transmission system was extended from Barkly East in order to give a supply to Elliot in September 1974.

The 66 kV transmission lines which had been built by the Fish River Tunnel contractors from a substation near Venterstad to a stepdown substation near Teebus were taken over to enable Escom to extend the transmission system at 22 kV to supply both Steynsburg and Hofmeyr. Steynsburg was connected in July 1974 and it is hoped that Hofmeyr will be connected by January 1975. A portion of the 11 kV transmission system has also been taken over from one of the tunnel contractors to enable a supply to be given to the Department of Water Affairs at Oviston in December 1974.

Despatch Municipality has accepted Escom's terms for a supply early in 1976. To furnish this supply a 132 kV line will be built from the neighbouring Grassridge distribution station near Coega and a 132/11 kV substation erected at Despatch.

Hanover has also accepted Escom's terms for a supply of electricity. This will entail building a 22 kV line from the existing line between Hydra near De Aar and Philipstown, and the work is expected to be completed by the middle of 1975.

Good progress is being made with the 66 kV lines from Poseidon distribution station near Bedford to give supplies to Somerset East, Graaff-Reinet and Cradock, and it is expected that these three towns should be connected early in 1976.

In order to transmit the power from the third and fourth sets at Hendrik Verwoerd power station into the transmission system, extensions have to be made to Ruigtevallei distribution station and Hydra distribution station. This work, which includes the establishment of a new 220 kV bus at Hydra, should be completed by the end of 1975.

A new 220/132 kV substation has to be built at Roodekuil near Petrusville to coincide with the installation of the hydro sets at the nearby Vanderkloof power station. This work is due for completion by the middle of 1976. A 220 kV line is required between Roodekuil substation and Hydra distribution station and this line should be operational a few months after the Roodekuil substation.

Two 400 kV series capacitor stations are being erected, one at Luckhoff and the other near Victoria West. The former should be completed by the middle of 1975 and the latter by the end of 1975.

Further extensions are planned for Hydra distribution station in 1977 to feed the 400 kV line associated with supplies to the traction substations and mining developments in the north-western Cape.

Rural electrification made further progress during the year, the number of farming supplies having increased from 73 at the end of 1973 to 137 by the end of 1974. Of the 64 new supplies provided during 1974, only 5 were additional points of supply to farmers previously connected; all the others were new supplies.

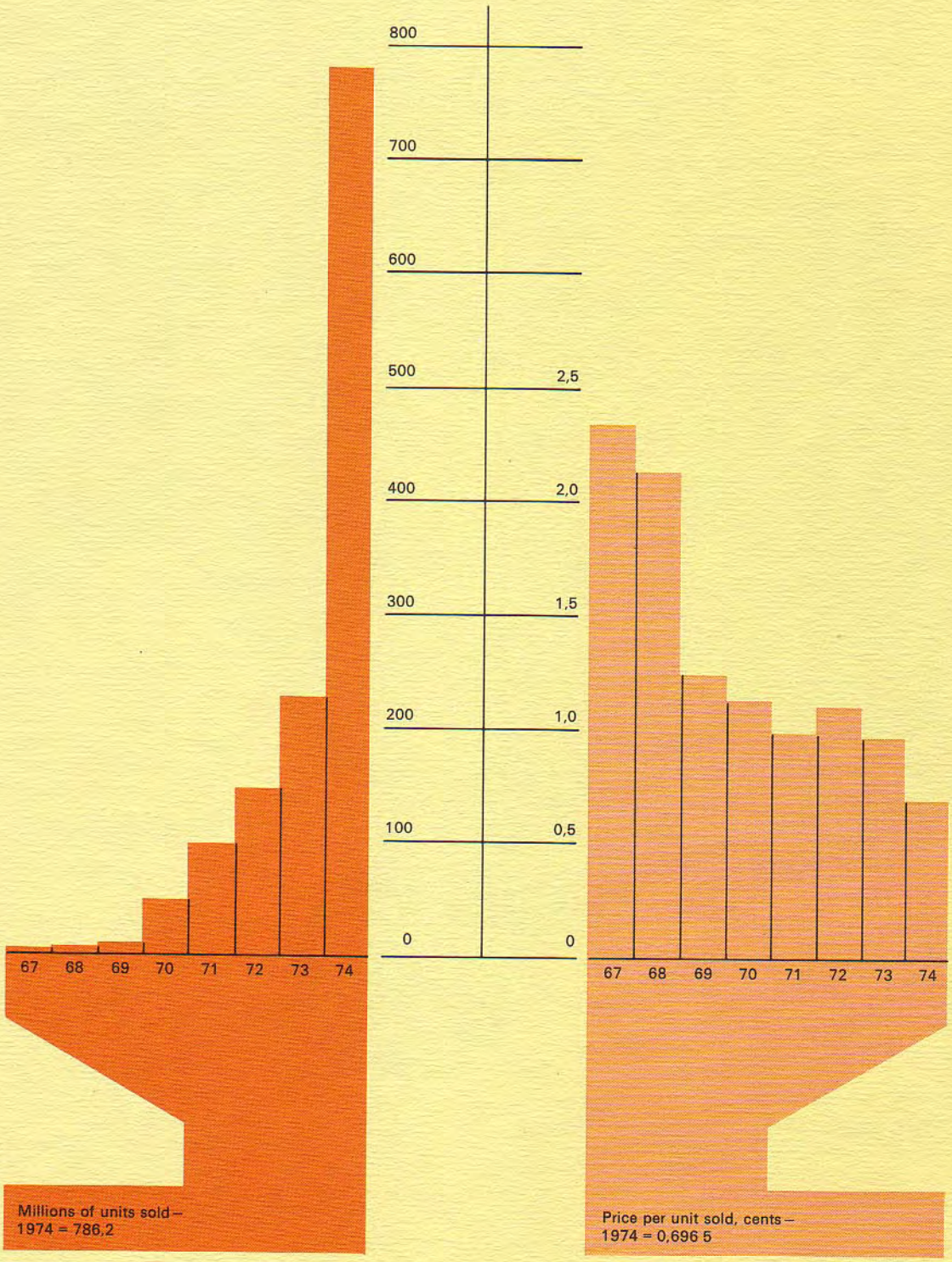
The shortage and higher price of petroleum fuels, and the competitive wages offered to Bantu labour by industry have served as an incentive to farmers to electrify as far as possible. There was considerable activity in the rural electrification of the areas near Aliwal North, Colesberg, Petrusville and De Aar. The Orania farmers' scheme near Petrusville was developed further and will be extended to the Hopetown area.

Financial

The table gives details of the units of electricity sold to the various classes of consumers, the revenue received and the working costs. The marked increase in the total units sold in this undertaking since sales to the City of Port Elizabeth commenced, has led to a reduction in the average price per unit sold.

Consumer			Sales of electricity						Revenue from sales		Average price per unit sold	
Class	Number		Proportion %		Units sold		% Change		Rand	Rand	Cents	Cents
	1973	**1974**	1973	**1974**	1973	**1974**	73/72	**74/73**	1973	**1974**	1973	**1974**
Traction	—	—	—	—	—	—	—	—	—	—	—	—
Bulk municipal	28	**31**	57,50	**87,35**	137 312 743	**686 761 881**	+119,50	**+400,14**	1 174 273	**4 220 213**	0,855 2	**0,614 5**
Mining	—	—	—	—	—	—	—	—	—	—	—	—
Industrial	57	**91**	42,41	**12,59**	101 261 910	**98 969 806**	+ 23,66	**+ 97,74**	1 121 932	**1 235 040**	1,108 0	**1,247 9**
Domestic and street lighting	45	**103**	0,09	**0,06**	213 429	**510 225**	+294,97	**+139,06**	7 761	**20 607**	3,636 6	**4,038 8**
Total	130	**225**	100,00	**100,00**	238 788 082	**786 241 912**	+ 65,25	**+229,26**	2 303 966	**5 475 860**	0,964 9	**0,696 5**

	1973	**1974**
	R	**R**
Total revenue	2 303 966	**5 475 860**
Working costs	2 311 213	**5 349 990**
Surplus	—	**125 870**
Deficit	7 247	**—**
Accumulated to 31 December:		
Surplus	—	**—**
Deficit	282 565	**156 695**


800
700
600
500
400
300
200
100
0
2,5
2,0
1,5
1,0
0,5
0
67 68 69 70 71 72 73 74
67 68 69 70 71 72 73 74
Millions of units sold –
1974 = 786,2
Price per unit sold, cents –
1974 = 0,696 5

EASTERN TRANSVAAL UNDERTAKING

REFERENCE

Area of supply . . . . . .

Escom power stations . . . ◉ Arnot . . . . ◎ Kriel (under construction)

Transmission lines . . . . . ———

Transmission lines under construction . . . . . – – – – – –

10 0 10 20 30 40 50 60 70 80 90 100 Kilometres

Area of supply . . . . . 97 600 square kilometres

Eastern Transvaal Undertaking

The map shows the licensed area of supply of this undertaking at 31 December 1974.

Sales of electricity

As shown in the table, a total of 6 527 million units of electricity were sold in this undertaking in 1974, which was 7,1 per cent above the corresponding total sold during the preceding year (16,5 per cent in 1973).

The rate of growth during the year under review might appear disproportionately low compared with the surge of growth attained in 1973. It is necessary to bear in mind, however, that the rate of growth of sales of electricity in this undertaking is determined largely by the expansion programmes of a relatively small number of large industrial concerns. These expansion programmes of large consumers have on occasion in recent years given a sudden impetus to the demand for electricity. This is well illustrated by recalling, in reversed chronological order, some recent yearly growth rates derived on the same basis as the percentage rates already mentioned: 7,1 per cent in 1974, 16,5 per cent in 1973, 14,8 per cent in 1972, 6,2 per cent in 1971, 12,3 per cent in 1970.

Specific mention may be made of the expansion programmes of the large industrial concerns Feralloys and Ferrometals, which contributed substantially towards the growth in electricity sold during 1973. These two concerns also took increased supplies of electricity in 1974, but these increases were slight compared with the sudden rise demanded by their expansion programmes in 1973.

Bulk supplies to municipalities, while a small proportion of total sales when compared with the supplies to the industrial and mining sectors, continued to grow steadily during the year 1974, showing an increase of 14,5 per cent over the sales in the preceding year (17,5 per cent in 1973). Bulk supplies to the neighbouring territories of Mozambique and Swaziland were 47 per cent more in 1974 than in the preceding year (29,5 per cent in 1973). The remarkable rate of growth attained in this category during the year 1974 was largely due to the continued growth of the new supply to the city of Lourenço Marques from 1973 onwards.

Development of the undertaking

The 400 kV Vulcan distribution station near Witbank represents the input point of three of Escom's largest power stations: it is planned to be ultimately connected with Arnot, Hendrina and Kriel power stations by two, two, and one 400 kV lines respectively. The first 400 kV line from Arnot power station was completed during the year; the second is planned for completion in 1975. The construction of the 400 kV line from Kriel power station to Vulcan distribution station is in progress, and is planned for completion in 1975. The second and third 400 kV transmission lines from Vulcan distribution station to Apollo distribution station were completed during the year.

The second 275 kV transmission line, 95 km in length, from Marathon distribution station near Nelspruit to Acornhoek substation was completed, providing reinforcement of the 275 kV network in the Lowveld area. The Delta distribution station in the Nelspruit district was completed during the year, and the 132 kV transmission line, 16 km long, from Marathon distribution station could be used to provide a new supply to Delta Manganese, a new chemical plant. The supply to Mozambique did not diminish during the disturbances in Lourenço Marques.

The extensions to Gravelotte distribution station were completed early in the year, allowing greater use to be made of the 132 kV line from Selati distribution station near Phalaborwa in providing for the increasing demand of the mining industry in the Gravelotte area and of the Tzaneen Municipality.

The construction of a 132 kV line from Steelpoort distribution station to a platinum mine in the vicinity continued. Construction of the new Nasareth 132/88 kV substation near Middelburg, intended as a reinforcement of the 88 kV network in the Middelburg-Groblersdal-Marble Hall area, is in progress, and completion is planned by the middle of 1975.

A new supply was provided during the year from the Middelburg-Roossenekal network to Transvaal Alloys at Wapadskloof. Work on a further extension to Palmer substation, near Dullstroom, for an additional supply to this company's Otavi works is proceeding and is planned for completion in 1975.

To provide an increased supply to the Kinross gold mine, the construction of the Rosco substation near Bethal is nearing completion. The Krielcol substation intended to provide supplies to Kriel Colliery was also nearing completion by the end of the year, as well as the Turbo substation intended to supply the residential township for Kriel and Matla power stations. Construction of the Makriel substation in the Ermelo district which will provide electricity for pumping the water required for Kriel power station is in progress and is planned for completion early in 1975.

Escom's terms have been accepted for substantial new supplies of electricity to two large industries: the Union Carbide-General Mining Ferrochrome smelter at Steelpoort, and a smelter at Lydenburg for Johannesburg Consolidated Investment Corporation. Increased supplies have been requested by Palabora Mining Company, Foskor, Bosveld Kunsmis, Highveld Steel and Vanadium, Ferrometals, Transalloys, Southern Cross Steel and Feralloys.

To provide these new or substantially increased supplies of electricity, considerable extension of the 275 kV and 132 kV transmission networks will be necessary. Additional 275 kV transmission lines will be required interconnecting Arnot power station with the Lydenburg, Phalaborwa, Acornhoek and Pietersburg areas, as well as a 400 kV line interconnecting Camden power station with

the Richards Bay area. Additional 132 kV transmission lines will be required to extend the network in the Roossenekal, Lydenburg, Kaapmuiden, Acornhoek and Phalaborwa areas. Supplementation at 88 kV will also be required from the Geluk, Ermelo, Uitkoms and Piet Retief areas, to link up with the Natal Undertaking.

The doubling of traction supplies to the South African Railways between Nelspruit and Komatipoort was delayed by shortages of materials, thus affecting the completion of the 275 kV section of the Komatipoort distribution station. Supply to these additional traction points was made available in December 1974. The remainder of this project is scheduled for completion early in 1975. Work is in progress on further traction supplies between Nelspruit and Witbank, on the Witbank-Pretoria section, and on the Wonderfontein-Broodsnyersplaas section, the latter two being new electrification schemes. The South African Railways have also secured supplies for nine traction substations on the Derwent-Roossenekal section. They have also requested traction supplies on the Phalaborwa-Kaapmuiden, Broodsnyersplaas-Ermelo, and Ermelo-Richards Bay sections.

The progress made in recent years with rural electrification in the undertaking was maintained during the year under review. The total number of farming supplies increased from 3 634 at the end of 1973 to 4 080 at the end of 1974, an increase of 11 per cent (14 per cent in 1973).

The Lomati substation and the 66 kV transmission line from Malelane were virtually completed during the year and are planned to be in service early in 1975, thus relieving the load on a number of rural electrification schemes in the Malelane and Komatipoort areas. Construction work is continuing on nine rural schemes in the undertaking.

New rural schemes were approved in the areas of Piet Retief-Moolman, Jericho-Sheepmoor, Karino (extensions), Lomati (extensions), Groblersdal (extensions) and Burgershall (extensions). Construction work on these schemes has not yet commenced.

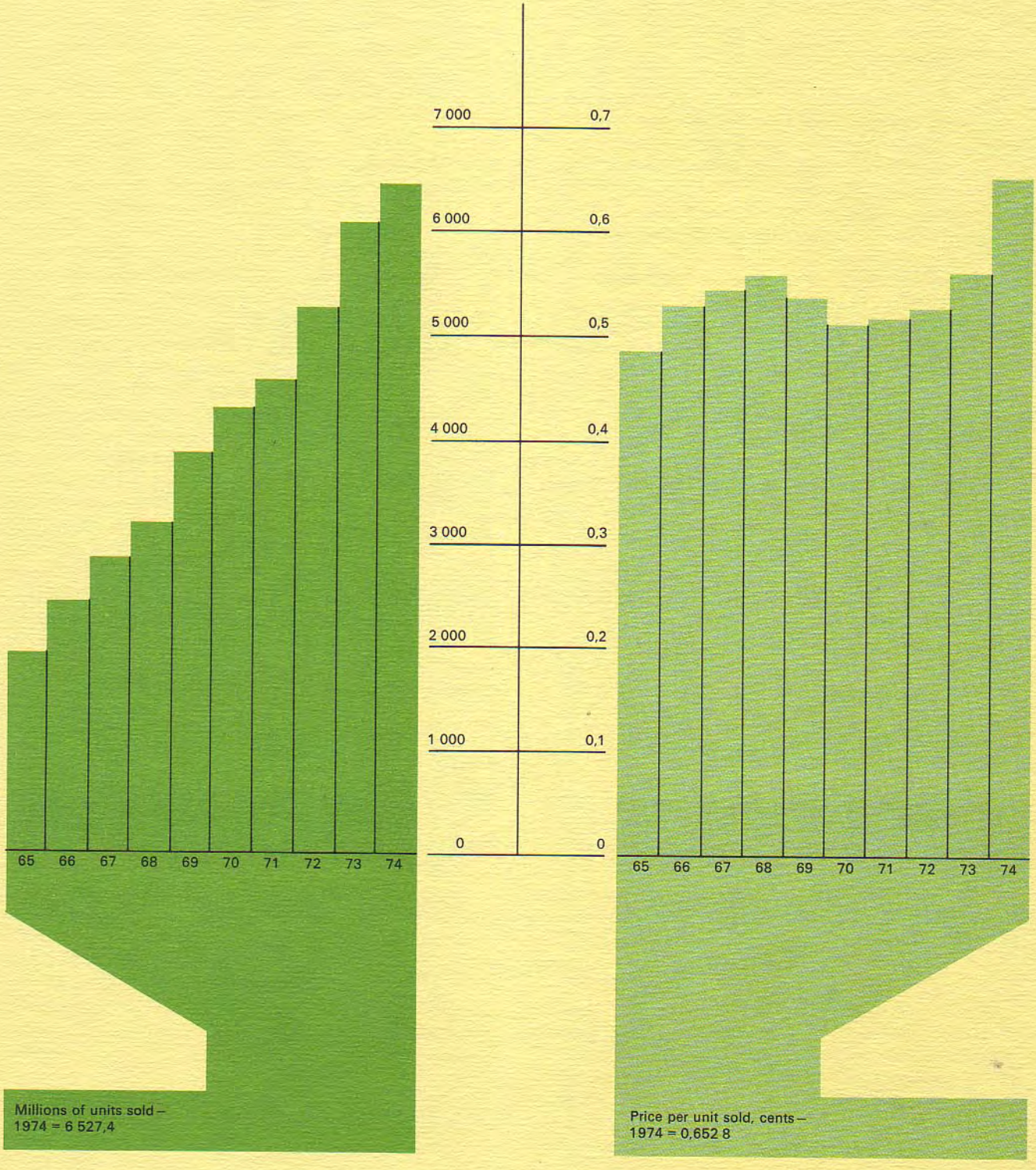
Financial

The table gives details of the units of electricity sold to the various classes of consumers, the revenue received and the working costs. The average price of 0,652 8 cents per unit sold during 1974 is 16,3 per cent higher than the figure for the preceding year (4,8 per cent in 1973). Total sales revenue for the year amounted to R42 612 527 and exceeded the corresponding figure for the preceding year by 24,5 per cent (22,1 per cent in 1973).

Consumer			Sales of electricity						Revenue from sales		Average price per unit sold	
Class	Number		Proportion %		Units sold		% Change		Rand	Rand	Cents	Cents
	1973	**1974**	1973	**1974**	1973	**1974**	73/72	**74/73**	1973	**1974**	1973	**1974**
Traction	7	**7**	5,76	**5,42**	351 255 007	**353 629 355**	+ 7,40	**+ 0,68**	2 557 212	**2 931 111**	0,728 0	**0,828 9**
Bulk municipal	27	**29**	6,72	**7,19**	409 843 674	**469 438 547**	+17,51	**+14,54**	2 456 713	**3 266 539**	0,599 4	**0,695 8**
Bulk foreign	3	**3**	2,62	**3,60**	159 650 801	**234 662 176**	+929,47	**+46,98**	1 047 971	**1 602 646**	0,656 4	**0,682 9**
Mining	94	**105**	25,54	**25,32**	1 557 451 895	**1 652 869 944**	+ 4,99	**+ 6,13**	8 676 459	**10 550 678**	0,557 1	**0,638 3**
Industrial	4 870	**5 296***	58,79	**58,00**	3 596 940 264	**3 792 090 245**	+18,76	**+ 5,43**	19 143 642	**23 881 859**	0,532 2	**0,629 8**
Domestic and street lighting	2 604	**2 776***	0,57	**0,47**	22 369 169	**24 677 194**	−27,97	**+10,32**	339 821	**379 694**	1,519 1	**1,538 6**
Total	7 605	**8 216**	100,00	**100,00**	6 097 510 810	**6 527 367 461**	+16,48	**+ 7,05**	34 221 818	**42 612 527**	0,561 2	**0,652 8**

	1973 R	1974 R
Total revenue	34 221 818	**42 612 527**
Working costs	37 040 813	**42 517 583**
Surplus	—	**94 944**
Deficit	2 818 995	—
Accumulated to 31 December:		
Surplus	—	—
Deficit	1 875 363	**1 780 419**

* Reclassification of rural industrial and rural domestic.


7 000
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0,4
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0,3
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0,2
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0,1
0
0
65 66 67 68 69 70 71 72 73 74
65 66 67 68 69 70 71 72 73 74
Millions of units sold –
1974 = 6 527,4
Price per unit sold, cents –
1974 = 0,652 8

RAND AND ORANGE FREE STATE UNDERTAKING

RHODESIA

BOTSWANA

LESOTHO

Limpopo River
Messina
Cabora Bassa
Louis Trichardt
Letaba River
Pietersburg
Potgietersrus
Naboomspruit
Great Marico River
Thabazimbi
Warmbad
Northam
Zeerust Chrome
Saulspoort
Vaalkop Pumps
Babelegi
Gopani
Impala Plats
Trident
Brits
Pretoria
Kwagga
Cullinan
Bronkhorstspruit
Vulcan
Grootpan
Wilge
Zeerust
Zwartruggens
Rustenburg
Minerva
Apollo
Esselen
Koster
Magaliesberg
Kempton Park
Delmas
Komati
Slurry
Mafeking
Randfontein
Pluto
Johannesburg
Springs
Jupiter
Eiger
Devon
Kriel
Molopo River
Watershed
Bethal
Camden
Bernina
Snowdon
Heidelberg
Coligny
Ventersdorp
Frederikstad
Fochville
Klip
Glockner
Balfour
Greylingstad
Vereeniging
Atlas
Grootvlei
Standerton
Potchefstroom
Vaal
Taaibos
Vaal River
Sannieshof
Hartebeestfontein
Parys
Highveld
Villiers
Delareyville
Ottosdal
Klerksdorp
Hermes
River
Vredefort
Cornelia
Frankfort
Vierfontein
Koppies
Heilbron
Vrede
Viljoenskroon
Vryburg
Wolmaransstad
Leeudoringstad
Tweeling
Schweizer Reneke
Makwassie
Bothaville
Balkfontein
Edenville
Petrus Steyn
Kroonstad
Vaal
Bloemhof
Steynsrus
Arlington
Wesselsbron
Odendaalsrus
Whites
Hoopstad
Ventersburg
Nestor
Virginia
Senekal
Kimberley
Hertzogville
Rosendal
Bultfontein
Theunissen
Winburg
Fouriesburg
Kimberley
Marquard
Ficksburg
River
Perseus
Dealesville
Brandfort
Leribe
Clocolan
Kimberley
Excelsior
Hydra
Tweespruit
Ladybrand
Thaba'Nchu
Maseru
Bloemfontein
Caledon
Hobhouse
Dewetsdorp
Wepener

REFERENCE

Area of supply . . . . . (shaded)
Escom power stations . ◉ Vaal . . . ◎ Grootvlei (under construction)
Transmission lines . . . . . (under construction)
Transmission lines under construction . . _____

10 0 10 20 30 40 50 60 70 80 90 100 Kilometres

Area of supply . . . . . 261 900 square kilometres

Rand and O.F.S. Undertaking

The map shows the licensed area of supply of this undertaking at 31 December 1974.

Sales of electricity

As shown in the table, a total of 31 147 million units of electricity were sold in this undertaking in 1974, which was 11,5 per cent above the corresponding total sold during the preceding year (10,8 per cent in 1973). Thus the rate of growth experienced in 1973, which was regarded as high, has been exceeded in the year under review. This remarkable rate of growth was due to sustained growth in the mining industry, and in bulk supplies to municipalities.

Sales of units to the mining industry during the year 1974 were 6,9 per cent more than in the preceding year. While this rate of growth is somewhat below the high rate of 9 per cent achieved in 1973 as a result of the revival of the mining industry in that year, it is substantially above the modest rates between 1 and 2 per cent achieved in each of the years 1972 and 1971 when compared with their preceding years. In the gold mining sector alone, Escom's sales in 1974 were 4,5 per cent above the sales in the preceding year. In 1973 the corresponding growth rate was 4,2 per cent, indicating that the revival of the gold mining industry in that year as a result of the increased price of gold has been maintained through the year under review. In the platinum mining industry, the spectacular increase in Escom's sales of 59,8 per cent experienced in 1973, as a result of the revival of that industry, stabilised during 1974 at a corresponding rate of 25,1 per cent which, although less spectacular, is nevertheless very high.

The major new bulk supplies to the Municipality of Johannesburg since 1973, and to Pretoria and Bloemfontein since 1972, have grown at the exceptional rate which can be expected from new development. Thus the total of 1 294 million units of electricity sold to these three municipalities during the year 1974 was almost double the units sold to them in 1973.

In 1974 the total bulk supplies to all municipalities in the undertaking were 20,5 per cent higher than in the preceding year (20,6 per cent in 1973). The corresponding rates of growth excluding the new supplies to the three municipalities of Johannesburg, Pretoria and Bloemfontein were 10,8 per cent in 1974 and 10,6 per cent in 1973. These figures indicate that while particularly vigorous growth was experienced in the new bulk supplies to the three major municipalities, the growth in other municipal bulk supplies was by no means sluggish.

The diagram indicates the increase in sales of electricity during the period 1965 to 1974 and the change, during this period, in the average price per unit sold.

Development of the undertaking

The transmission system serving this undertaking was further strengthened by the completion of several major projects during 1974. Other extensions to the transmission network are at present in the course of construction. The Nestor capacitor station to the south of Virginia, equipped with two series capacitor banks – one on each of the two 400 kV lines to the Cape – was commissioned during the fourth quarter of the year.

The 275 kV line from Esselen distribution station in the vicinity of Kempton Park to Warmbad substation was converted from 132 kV to 275 kV operation, and a 250 MVA, 275/132 kV transformer was installed at Warmbad for this purpose.

The Witkop distribution station outside Pietersburg will be commissioned in early 1975 and the 275 kV line between the Warmbad substation and Witkop distribution station, which will reinforce the Northern Transvaal network, is nearing completion. Supplies to the Rhodesian Electricity Supply Commission, Silicon Smelters (Pty) Limited, Cromore Limited and a second point of supply to Warmbad Municipality were provided from this network during the year. A further two points of supply will be made available to Warmbad Municipality during the second half of 1975.

The major reinforcement scheme to the Western Transvaal was completed during the year, involving two 400 kV transmission lines from Apollo distribution station near Verwoerdburg to Pluto distribution station near Tarlton, with two 750 MVA, 400/275 kV transformers installed at Pluto. From Pluto distribution station, two 400 kV transmission lines were constructed to Hermes distribution station near Stilfontein, where two 500 MVA, 400/132 kV and two 180 MVA, 132/88 kV transformers have been installed. The supply to Trident distribution station near Rustenburg will be further secured after the completion of the Pluto-Marikana 275 kV line, scheduled for construction during 1975. To provide for increased loads for the platinum mines near Northam the 275/88 kV Spitskop distribution station will be established during 1975. The 88 kV network supplying platinum mines in the Rustenburg area has been reinforced, and three new supply points have been furnished to the Rustenburg Platinum and Impala Platinum Mines.

To cater for the load growth in the Roodepoort area, a new distribution station was established on the site of the Princess distribution station. This station is supplied by 275 kV lines, initially operating at 132 kV, one from Westgate distribution station and one from Bernina distribution station. Two twin conductor 88 kV lines will be constructed in the near future from this station to the Roodepoort municipal input point.

The first stage of Eiger distribution station near Alberton will be established early in 1975 for a supply to Alberton Municipality. This also involves the construction of two 275 kV lines 20 km long, from Jupiter distribution station to Eiger distribution station for initial operation at 88 kV.

The Potchefstroom distribution station for reinforcing supplies to this area is under construction and the two

associated 132 kV lines between the Hermes and Potchefstroom distribution stations have been constructed.

To cater for the load growth in the Lichtenburg area, and in particular for the large additional loads notified by three cement companies, a third 60 MVA, 132/88 kV transformer has been installed at Watershed distribution station. The construction of a section of the 275 kV line, from Pluto distribution station near Tarlton to Watershed distribution station, to operate initially at 132 kV, is scheduled for completion during 1975. The 88 kV network based on Watershed distribution station for supply to the cement factories at Slurry and Dudfield will also be reinforced during 1975.

The first phase of the Kookfontein distribution station, for supply to the Metalloys complex near Meyerton, has been completed. Two 315 MVA transformers are scheduled for installation at this station during 1975.

To cater for substantial new supplies in the Sasol area, and also large additional loads notified by existing consumers, a new 275/88 kV distribution station will be established outside the eastern boundary of Sasolburg, and the existing 88 kV network reinforced. This work is scheduled for 1977.

The electrification of the Klerksdorp-Fourteen Streams line was reinforced and a further four additional traction supplies were made available to the South African Railways during 1975. Work was started on the provision of traction supplies on the Kroonstad-Bloemfontein line, and four new traction substations between Kroonstad and Welkom were commissioned. This project involves, inter alia, the construction of a 132 kV line from Virginia to Harvard distribution stations and the establishment of eleven 132 kV traction supply points. Additional traction supplies will also be provided on the Houtkop-Klerksdorp, Union-Volksrust and Pretoria-Witbank sections during 1975.

The undertaking continued to make progress during the year with supplies to farmers, the total number of supplies in this category having increased from 8 398 at the end of 1973 to 9 248 by the end of 1974. Of the 850 new supplies provided during 1974, 336 were additional points of supply to farmers previously connected; all the others were new supplies. The 850 additional farming supplies provided during the year were only slightly above the corresponding figure of 828 for the year 1973, the main reason being the limited resources of the undertaking in providing the new supplies requested.

The main rural schemes in the course of development are situated in the Rayton area (near Pretoria), Sannieshof, Sybrandskraal (north-east of Pretoria), Bloemhof West, Thabazimbi South, and Vanstadensrus (south-west of Wepener).

The development of new schemes was approved, involving over 700 points of supply and more than 1 000 km of new transmission lines in the areas of Bultfontein, Dealesville (along the Modder River), Dendron (north-west of Pietersburg), Gumtree (Clocolan-Ficksburg), and Rustenburg. Construction work is planned to commence late in 1975 and in 1976/77.

Financial

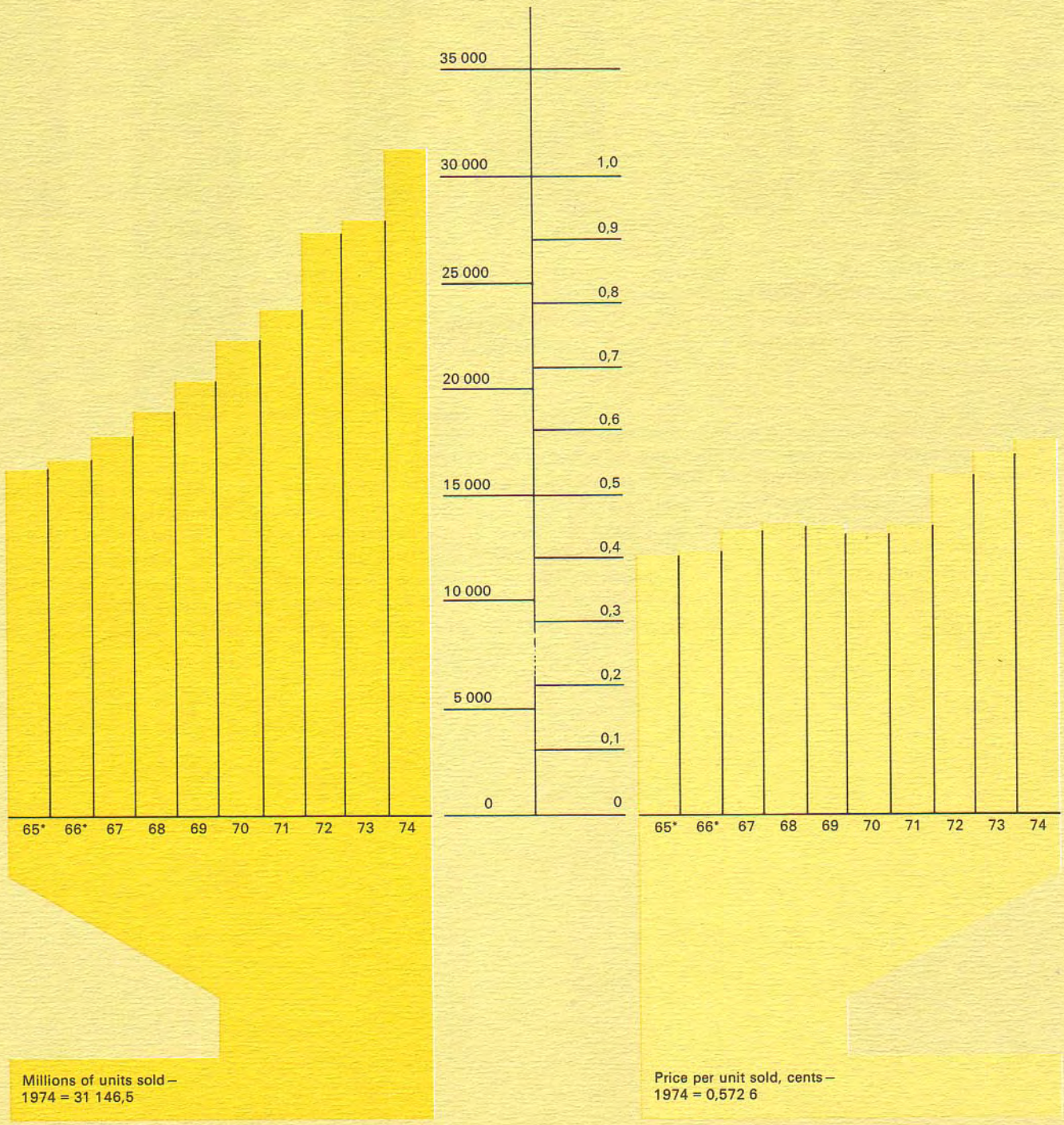
The table gives details of the units of electricity sold to the various classes of consumers, the revenue received and the working costs.

The average price of 0,572 6 cents per unit sold during 1974 is 4,2 per cent higher than the figure for the preceding year (5.2 per cent in 1973). Total sales revenue for the year amounted to R178 337 772, and exceeded the corresponding figure for the preceding year by 16.1 per cent (16.7 per cent in 1973).

Consumer			Sales of electricity						Revenue from sales		Average price per unit sold	
Class	Number		Proportion %		Units sold		% Change		Rand	Rand	Cents	Cents
	1973	1974	1973	1974	1973	1974	73/72	74/73	1973	1974	1973	1974
Traction	2	2	3,46	3,52	965 768 327	1 020 294 460	+ 3,36	+ 5,65	6 339 233	7 160 062	0,656 4	0,701 8
Bulk municipal	154	139*	20,55	22,15	5 740 838 440	6 916 404 319	+20,55	+20,48	32 001 321	40 975 125	0,557 4	0,592 4
Bulk foreign	2	3	0,06	0,09	19 730 377	30 929 404	+18,61	+56,76	135 251	191 296	0,685 5	0,618 5
Mining	102	99	48,74	46,64	13 617 742 818	14 562 473 119	+ 9,01	+ 6,94	71 219 593	77 058 469	0,523 0	0,529 2
Industrial	2 155	19 745‡	25,37	26,23	7 365 421 009	8 354 120 962	+12,57	+13,42	41 668 104	50 021 911	0,565 7	0,598 7
Domestic and street lighting	30 283	15 778‡	1,82	1,36	228 171 046	262 303 775	−50,35	+14,96	2 186 818	2 930 909	0,958 4	1,117 3
Total	32 698	35 766	100,00	100,00	27 937 672 017	31 146 526 039	+10,83	+11,49	153 550 320	178 337 772	0,549 6	0,572 6

	1973	1974
	R	R
Total revenue	153 550 320	178 337 772
Working costs	153 492 638	182 941 135
Surplus	57 682	—
Deficit	—	4 603 363
Accumulated to 31 December:		
Surplus	—	—
Deficit	2 139 429	6 742 792

* Multiple supplies to a single consumer in some cases reclassified as one consumer.
‡ Reclassification of rural industrial and rural domestic.



Millions of units sold –
1974 = 31 146,5

Price per unit sold, cents –
1974 = 0,572 6

*Total electricity and air