

HISTORICAL OVERVIEW

1882

South Africa was one of the first countries in the world to use electricity on a commercial basis. As elsewhere, the supply of electricity began under the auspices of various municipalities. Kimberley was the first to introduce electric street lights in 1882, before London had electric lights. In 1891, Johannesburg became the first town to install a reticulation system, followed by Cape Town and Pretoria in 1894, Pietermaritzburg in 1896, Durban in 1897, East London in 1899, Bloemfontein in 1900, Kimberley in 1904 and Port Elizabeth in 1906.

1906

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

1923

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

1948

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

1962

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

1973

The idea of an integrated transmission system, linking all major cities in the country, was first raised in the 1920s. By 1973, this had become a reality when all Eskom undertakings had been connected. Eskom has more than 240 000 km of power lines of which 25 000 km are part of the national grid. In 1987, the first 765 kV lines were energised.

1984

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

1985

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

1995

The National Electricity Regulator (NER) was created in 1995 and given the task of rationalising the electricity supply industry. During the latter half of the year, Government introduced a process to investigate the restructuring of state-controlled enterprises.

Electricity Council

As at 30 June 1996

Dr J.B. Maree OMSG SSAS (*Chairman*)

Dr E. Calitz

P.M. Dantjie

A.B. Dickman

K.J. Hlongwane

S. Immelman

Prof. I.J. Lambrechts

Mrs N. Majija

G. Mantashe

L.J. Mngomezulu

A.J. Morgan (*Chief Executive of Eskom*)

D.B. Mostert

S.C. Motau

Mrs J.N. Seroke

C.G. van Veijeren

A.C. van Wyk

Dr G.P.N. Venter

H. Whitehead

Management Board

As at 30 June 1996

A.J. Morgan *Chief Executive (Chairman)*

B.T. Crookes *Executive Director: Generation*

P.A. Faling *Executive Director: Transmission*

L.J. Messerschmidt *Executive Director: Distribution*

V.T.L. Ngubeni *Executive Director: Services*

Dr W.J. Kok *Executive Director: Finance*

Mrs D.N.M. Mokhobo *Executive Director: Growth and Development*

M.S. Mosikili *Executive Director: Marketing*

R.S. Dabengwa *Executive Director: Electrification*

J.A. de Beer *Executive Director: Technology*

B.A. Khumalo *Executive Director: Human Resources*

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FOREWORD

The 1995 Statistical Yearbook has a slightly different look. Our main focus remains on Eskom, while electricity statistics regarding the Sub-Saharan Africa countries have been included as before. Mauritius, having become a member of the Southern African Development Community, has also been included for the first time. The shift towards a Southern African perspective is growing.

More information specifically on South Africa will be included in a statistical yearbook to be issued by the National Electricity Regulator (NER) this year. The NER was created in 1995 and given the task of rationalising the electricity supply industry in South Africa.

A Cabinet decision in September 1994 determined that the electricity supply entities of the previous TBVC* states and self-governing territories in South Africa should be integrated into Eskom's operations as part of the ongoing rationalisation and restructuring of the electricity supply industry. We therefore no longer supply separate statistics for Transkei, Bophuthatswana and Venda.

The vision of an integrated southern African grid, shared by many utilities in the region, is now becoming a reality with the signing of the Southern African Power Pool (SAPP) agreement which was formalised at government and at utility level during 1995.

With the 400 kV line from Matimba (Ellisras) to Insukamini (near Bulawayo) in Zimbabwe being taken into commercial operation in October 1995, exchanges of electricity are now possible on a significant scale between the northern part of the region, which is predominantly hydro, and the south, where power generation is based on thermal power stations.

This represents a major step towards the operation of the SAPP as it opens the gateway between Eskom and the rest of the region and will allow trading of energy as far north as Zaire.

Allen Morgan
Chief Executive
30 June 1996

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STATISTICAL OVERVIEW

	1995	1994	1993
Financial, Rm			
Revenue	17 114	15 417	13 793
Net income	2 716	2 268	1 646
Property, plant and equipment in commission, at cost	51 686	48 247	45 623
Works under construction ^a	7 051	4 816	3 552
Net expenditure on property, plant and equipment	5 168	4 192	3 591
Net interest-bearing debt	27 278	27 884	28 027
Plant performance			
Total power station nominal capacity, MW	37 840	37 840	39 746
Total power station net maximum capacity, MW	35 951	35 926	37 636
Peak demand on integrated Eskom system, MW	25 133	24 798	23 169
Average energy availability (unit capability factor), % ^b	81,6 (84,3)	77,1 (79,9)	80,5 (81,7)
Generation load factor (after excess capacity management), % ^c	52,3 (59,0)	50,9 (58,3)	46,8 (56,4)
Integrated Eskom system load factor, %	74,1	72,8	75,1
Water consumed by Eskom power stations, Mℓ	214 329	213 220	223 650
Coal burnt, kt	79 376,9	76 883,0	75 926,4
Coal consumption, kg/kWh net	0,523	0,520	0,522
Average heat rate of coal-fired stations, MJ/kWh net	10,45	10,46	10,47
Average gross calorific value of coal (as received), MJ/kg	19,95	20,09	20,05
Overall thermal efficiency, net generation, %	34,4	34,4	34,4
Weighted average cost of coal burnt, R/t	31,99	29,98	28,48
Weighted average cost of coal burnt, c/kW	1,6735	1,5572	1,4860
Electricity output			
Total electricity production in South Africa, GWh (net) ^d	167 547	167 609	155 812
Total electricity available as a percentage of South African net production	97,4	94,4	97,9
Total electricity for Eskom system (Eskom stations and purchased), GWh ^e	165 006	160 351	154 361
Total produced by Eskom stations, GWh (net)	164 834	160 293	154 260
Subtotal from coal-fired stations, GWh (net)	151 730	148 003	145 514
Subtotal from hydroelectric stations, GWh (net)	529	1 074	146
Subtotal from pumped storage stations, GWh (net)	1 274	1 517	1 345
Subtotal from gas-turbine stations, GWh (net)	0	2	0
Subtotal from nuclear power station, GWh (net)	11 301	9 697	7 255
Total purchased for Eskom system, GWh	172	58	101
Total consumed by Eskom power stations, GWh ^f	1 866	2 113	1 898
Total available for distribution, GWh	163 140	158 238	152 463
Electricity sold, GWh ^g	153 547	149 443	143 800
Growth in GWh sales, %	2,7	3,9	4,1
Power station net maximum capacity, MW			
Subtotal coal fired (12 stations) ^h	31 769	31 744	33 488
Subtotal gas turbine (2 stations) ⁱ	342	342	368
Subtotal hydroelectric (2 stations) ^j	600	600	540
Subtotal pumped storage (2 stations) ^k	1 400	1 400	1 400
Subtotal nuclear (1 station)	1 840	1 840	1 840
Total power station net maximum capacity, MW	35 951	35 926	37 636
Employees			
Total number at 31 December	39 952	39 760	40 128
GWh sold per employee	3,843	3,759	3,584

^a Includes construction materials. ^b Capacity hours available x 100/total capacity hours in year. ^c MWh produced x 100/(Average net maximum capacity x hours in year).^d Electricity produced by Eskom, some industries and municipalities who have been issued with licences by the National Electricity Regulator to generate electricity.^e Includes Eskom electricity produced for neighbouring countries. ^f In respect of pumped storage facilities and synchronous condenser mode of operation. See Note k.^g Difference between electricity available and electricity sold is due to transmission losses. Since 1993 energy consumption for water pumped for Department of Water

1992	1991	1990	1989	1988	1987	1986
12 649	11 726	10 736	9 271	8 159	7 046	5 845
1 489	988	845	728	816	702	781
42 688	39 990	35 753	31 199	28 680	24 986	19 907
3 115	3 668	5 771	6 638	5 512	6 075	7 753
3 242	3 335	3 662	3 993	3 969	3 895	3 755
27 616	27 266	26 590	24 630	22 779	21 475	19 462
39 060	38 396	35 673	34 141	33 176	31 261	28 086
36 846	36 228	33 843	32 403	31 465	29 618	26 682
22 640	22 342	21 863	21 871	20 589	20 001	18 278
76,7	76,1	75,0	78,1	79,1	79,2	78,5
46,9 (54,6)	49,8 (58,5)	50,5 (57,3)	51,1	52,3	54,3	55,5
73,5	74,6	74,9	73,7	75,5	73,9	77,3
226 240	237 660	257 000	260 154	262 804	274 804	262 372
71 037,9	70 523,2	70 861,2	67 529,3	64 489,6	65 787,0	58 915,9
0,519	0,520	0,526	0,521	0,521	0,535	0,515
10,54	10,49	10,66	10,72	10,71	11,00	10,95
20,25	20,21	20,26	20,20	20,44	20,48	21,19
34,2	34,3	33,7	33,6	33,6	32,7	32,9
27,47	25,70	23,91	20,94	18,67	17,11	14,87
1,4263	1,3354	1,2575	1,1023	0,9727	0,9155	0,7665
149 427	148 919	147 069	146 162	140 802	134 751	130 056
97,9	98,0	97,5	96,7	97,0	96,1	95,1
148 556	148 934	146 320	143 548	139 197	132 774	126 766
148 207	148 671	146 047	143 204	138 837	132 507	126 511
136 830	135 743	134 744	128 304	123 777	122 947	114 298
752	1 980	1 010	2 759	3 162	1 617	1 623
1 333	1 804	1 841	1 039	1 403	1 774	1 785
4	0	3	3	2	2	2
9 288	9 144	8 449	11 099	10 493	6 167	8 803
349	263	273	344	360	267	255
2 295	2 933	2 953	2 265	2 567	3 229	3 018
146 261	146 001	143 367	141 283	136 630	129 545	123 748
138 126	138 687	136 168	134 347	129 493	122 524	117 353
-0,4	1,8	1,4	3,7	5,7	4,4	4,5
32 698	32 058	29 673	28 233	27 295	25 848	22 912
368	390	390	390	390	390	390
540	540	540	540	540	540	540
1 400	1 400	1 400	1 400	1 400	1 000	1 000
1 840	1 840	1 840	1 840	1 840	1 840	1 840
36 846	36 228	33 843	32 403	31 465	29 618	26 682
42 223	46 637	50 000	51 554	56 726	56 830	60 800
3,271	2,974	2,723	2,606	2,283	2,156	1,930

Affairs and Forestry has been excluded from this total. ^b Base-load stations, except in the case of older, uneconomical plant that is used only for peak demands or in emergencies. ^c Used only for peaking or in emergencies. ^d Use restricted to peaking and emergencies and availability of water in Gariep and Vanderkloof dams.

^e Pumped storage are net users of electricity and are used for peaking. Water is pumped during off-peak periods to generate electricity during peak periods.

HIGHLIGHTS OF THE YEAR

	1995	1994	Change %	Average yearly change 1991-95 %
Financial				
Revenue, Rm	17 114	15 417	11,0	9,9
Net income, Rm	2 716	2 268	19,8	28,3
Property, plant and equipment in commission, at cost, Rm	51 686	48 247	7,1	6,6
Works under construction, Rm ^a	7 051	4 816	46,4	17,7
Net expenditure on property, plant and equipment, Rm	5 168	4 192	23,3	14,4
Net interest-bearing debt, Rm	27 278	27 884	-2,2	0,0
Average price per kWh sold, cents	11,15	10,32	8,0	7,2
Average total cost per kWh sold, cents	9,40	8,82 ^b	6,6	4,9
Operations				
Total electricity sold, GWh	153 547	149 443	2,7	2,4
Coal burnt in power stations, Mt	79,4	76,9	3,3	3,0
Water consumed by power stations, Mℓ	214 329	213 220	0,5	-2,6
Peak demand on integrated system, MW	25 133	24 798	1,4	3,0
	(18.07.95)	(26.07.94)		
Assets in commission at 31 December				
Nominal capacity, MW	37 840	37 840	0,0	1,2
Net maximum capacity, MW	35 951^c	35 926	0,1	-0,2
Power lines (all voltages), km	241 802	240 972 ^b	0,3	1,6
Staff employed at 31 December, number ^d	39 952^e	39 760	0,5	-3,8
Customers				
at 31 December, number (million)	1 568	1,207	29,9	54,1

^a Includes construction materials.^b Restated.^c Rating of Arnot power station's unit 1 increased by 25 MW in January 1995.^d Excludes employees of subsidiary companies.^e Includes 865 employees taken over from BECOR and 340 from TESCOR.

	1995	1994	1993	1992	1991
Revenue, Rm	17 114	15 417	13 793	12 649	11 726
Annual increase, %	11,0	11,8	9,0	7,9	9,2
Cents per kWh	11,15	10,32	9,59	9,16	8,46
Annual increase, %	8,0	7,6	4,7	8,3	7,4
Charges against revenue					
Total operating expenditure, Rm	11 315	9 963	9 000	8 173	7 450 ^a
Annual increase, %	13,6	10,7	10,1	9,7	15,3
Depreciation, Rm	2 322	2 105	1 884	1 762	1 630
Annual increase, %	10,3	11,7	6,9	8,1	13,1
Net interest and finance charges, Rm	3 083	3 186	3 147	2 987	3 240
Annual increase, %	-3,2	1,2	5,4	-7,8	-1,9
Retained income for the year, Rm	2 666	2 168	1 852	1 397	988
Assets					
Fixed assets (at book value), Rm	43 593	40 711	38 605	36 895	35 405
Fixed assets in commission (net – after depreciation), Rm	35 005^b	33 715 ^b	33 017 ^b	31 746 ^b	30 661
Works under construction and construction materials, Rm	7 051	4 816	3 552	3 115	3 668
Non-current assets, Rm	4 498	4 074	3 762	3 501	2 387
Coal, maintenance and consumables, Rm	794	758	731	851	1 433
Debtors, Rm	1 740	1 821	1 299	1 208	1 020
Financing					
Net interest-bearing debt, Rm	27 278	27 884	28 027	27 616	27 266
Interest-free liabilities, Rm	3 349	2 586 ^c	2 137	2 340	2 014
Reserves, Rm	18 821	16 105	13 837	12 191	10 702
Debt-equity ratio	1,44	1,73	2,03	2,27	2,55

^a Excludes abnormal items.^b Excludes plant at mothballed stations.^c Restated.

SUMMARY OF OPERATIONS

Year	Coal-fired power stations					Cost of coal burnt		Specific water consumption ℓ/kWh net
	Coal burnt							
	kt	Average gross calorific value (as received) MJ/kg	Consumption kg/kWh net	Average heat rate MJ/kWh net	Overall thermal efficiency %	Weighted average R/t	c/kWh net a	
1956	9 688,5	22,96	0,765	17,56	20,5	1,62	0,1236	4,27
1957	10 220,6	22,79	0,750	17,09	21,1	1,69	0,1266	4,13
1958	10 784,1	22,73	0,743	16,89	21,3	1,77	0,1312	4,28
1959	11 548,7	22,44	0,732	16,43	21,9	1,82	0,1329	4,41
1960	12 512,6	22,52	0,723	16,28	22,1	2,03	0,1466	4,34
1961	13 194,9	22,39	0,722	16,17	22,3	2,10	0,1516	4,16
1962	13 955,5	22,22	0,719	15,98	22,5	2,09	0,1507	4,14
1963	14 721,1	22,15	0,708	15,68	23,0	2,11	0,1492	3,91
1964	15 654,7	22,15	0,692	15,33	23,5	2,07	0,1430	3,74
1965	16 726,7	22,39	0,680	15,23	23,6	2,09	0,1423	3,84
1966	16 982,3	22,20	0,666	14,79	24,4	2,23	0,1486	3,73
1967	18 307,7	22,44	0,645	14,47	24,9	2,30	0,1482	3,63
1968	19 133,9	22,63	0,620	14,03	25,6	2,33	0,1446	3,53
1969	19 982,9	22,73	0,595	13,52	26,6	2,37	0,1412	3,49
1970	21 630,6	22,97	0,580	13,32	27,0	2,26	0,1308	3,25
1971	23 416,2	23,30	0,576	13,42	26,8	2,25	0,1297	3,13
1972	24 952,8	22,89	0,571	13,07	27,5	2,25	0,1285	2,97
1973	27 907,9	22,47	0,563	12,65	28,5	2,39	0,1348	2,86
1974	30 891,4	22,42	0,560	12,56	28,7	2,92	0,1637	2,91
1975	34 231,7	22,21	0,567	12,59	28,6	4,05	0,2295	2,85
1976	37 257,4	21,87	0,579	12,66	28,4	5,39	0,3122	2,87
1977	37 505,6	21,78	0,576	12,55	28,7	6,22	0,3582	2,99
1978	39 589,5	21,61	0,574	12,44	28,9	6,67	0,3824	3,01
1979	43 264,9	21,22	0,581	12,33	29,2	6,96	0,4045	2,77
1980	46 755,0	21,34	0,568	12,16	29,6	8,12	0,4614	2,61
1981	53 903,7	21,25	0,563	12,01	30,0	9,71	0,5473	2,46
1982	55 198,4	21,39	0,551	11,82	30,5	11,75	0,6471	2,63
1983	55 010,2	21,11	0,546	11,57	31,1	12,44	0,6793	2,51
1984	58 703,6	21,38	0,533	11,45	31,4	12,55	0,6692	2,41
1985	59 488,6	21,52	0,522	11,26	32,0	13,25	0,6916	2,39
1986	58 915,9	21,19	0,515	10,95	32,9	14,87	0,7665	2,28
1987	65 787,0	20,48	0,535	11,00	32,7	17,11	0,9155	2,23
1988	64 489,6	20,44	0,521	10,71	33,6	18,67	0,9727	2,11
1989	67 529,3	20,20	0,523 d	10,72	33,6	20,90 d	1,1023	2,02
1990	70 861,2	20,26	0,526	10,66	33,7	23,91	1,2575	1,90
1991	70 523,2	20,21	0,520	10,49	34,3	25,70	1,3354	1,74
1992	71 037,9	20,25	0,519	10,54	34,2	27,47	1,4263	1,64
1993	75 926,4	20,05	0,522	10,47	34,4	28,48	1,4860	1,53
1994	76 883,0	20,09	0,520	10,46	34,4	29,98	1,5572	1,43
1995	79 376,9	19,95	0,523	10,45	34,4	31,99	1,6735	1,38

^a MWh net x 100/(average net maximum capacity x hours in year).^b Gas-turbine stations only as from 1994.^c After excess capacity management.^d Restated.

Power station output – net								gross
Coal-fired stations GWh	Hydro-electric stations GWh	Pumped storage stations GWh	Diesel and gas-turbine stations b GWh	Nuclear station GWh	Total power station output GWh	Total power station net maximum capacity MW	Average station load factor net basis a %	Total power station nominal capacity MW
12 663	7	–	–	–	12 670	2 498	61,2	2 764
13 634	6	–	–	–	13 640	2 555	61,1	2 827
14 511	5	–	–	–	14 516	2 748	62,0	3 036
15 774	3	–	–	–	15 777	2 983	62,6	3 297
17 306	2	–	–	–	17 308	3 091	65,2	3 416
18 282	2	–	–	–	18 284	3 226	66,2	3 659
19 401	3	–	–	–	19 404	3 406	65,8	3 759
20 789	4	–	–	–	20 793	3 788	65,7	4 176
22 634	5	–	–	–	22 639	4 077	65,2	4 501
24 583	–	–	–	–	24 583	4 181	67,4	4 624
25 504	–	–	–	–	25 504	4 377	67,1	4 836
28 371	–	–	–	–	28 371	5 328	66,8	5 845
30 843	–	–	–	–	30 843	5 800	62,9	6 344
33 598	–	–	–	–	33 598	6 441	62,1	6 984
37 321	–	–	–	–	37 321	7 060	62,9	7 583
40 645	94	–	–	–	40 739	8 373	61,3	9 013
43 662	813	–	–	–	44 475	8 849	59,6	9 551
49 570	189	–	–	–	49 759	9 482	62,5	10 142
55 141	1 110	–	–	–	56 251	10 002	66,3	10 692
60 400	1 098	–	–	–	61 498	10 522	68,6	11 242
64 309	1 853	–	26	–	66 188	11 688	66,8	12 444
65 114	1 924	–	12	–	67 050	12 756	61,9	13 556
69 004	1 887	–	11	–	70 902	13 595	60,7	14 434
74 485	1 144	–	14	–	75 643	15 056	60,9	15 974
82 342	992	–	28	–	83 362	17 339	57,8	18 349
95 675	1 653	415	81	–	97 824	18 989	62,2	20 049
100 217	1 016	1 519	17	–	102 769	20 523	59,3	21 749
100 738	595	1 957	5	–	103 295	21 673	55,6	22 949
110 094	560	1 994	8	3 925	116 581	23 168	58,1	24 514
113 941	624	2 107	0	5 315	121 987	24 359	58,0	25 716
114 298	1 623	1 785	2	8 803	126 511	26 682	55,5	28 026
122 947	1 617	1 774	2	6 167	132 507	29 618	54,3	31 261
123 777	3 162	1 403	2	10 493	138 837	31 465	52,3	33 176
128 304	2 759	1 039	3	11 099	143 204	32 403	51,1 c	34 141
134 744	1 010	1 841	3	8 449	146 047	33 843	57,3 c	35 673
135 743	1 980	1 804	0	9 144	148 671	36 228	58,5 c	38 396
136 830	752	1 333	4	9 288	148 207	36 846	54,6 c	39 060
145 514	146	1 345	0	7 255	154 260	37 636	56,4 c	39 746
148 003	1 074	1 517	2	9 697	160 293	35 926	58,3 c	37 840
151 730	529	1 274	0	11 301	164 834	35 951	59,0 c	37 840

POWER STATIONS IN SERVICE

at 31 December 1995

Name of station	Location	Number and rating of generator sets MW	Total nominal capacity MW	Total net maximum capacity MW ^a	Generators in reserve storage Number	Total rating MW
Coal fired						
Arnot ^b	Middelburg, Mpumalanga	6 x 350	2 100	1 980 ^c	3	990
Camden ^d	Ermelo	8 x 200	1 600	1 520	8	1 520
Duvha ^b	Witbank	6 x 600	3 600	3 450	—	—
Grootvlei ^d	Balfour	6 x 200	1 200	1 130	6	1 130
Hendrina ^b	Hendrina	10 x 200	2 000	1 900	—	—
Kendal ^{b e}	Witbank	6 x 686	4 116	3 840	—	—
Komati ^d	Middelburg, Mpumalanga	5 x 100			5	
		4 x 125	1 000	891	4	891
Kriel ^b	Bethal	6 x 500	3 000	2 850	—	—
Lethabo ^b	Sasolburg	6 x 618	3 708	3 558	—	—
Matimba ^{b e}	Ellisras	6 x 665	3 990	3 690	—	—
Matla ^b	Bethal	6 x 600	3 600	3 450	—	—
Tutuka ^b	Standerton	6 x 609	3 654	3 510	—	—
Subtotal coal fired (12)			33 568	31 769	26	4 531
Gas turbine ^f						
Acacia	Cape Town	3 x 57	171	171	—	—
Port Rex	East London	3 x 57	171	171	—	—
Subtotal gas turbine (2)			342	342	—	—
Hydroelectric ^g						
Colly Wobbles ^h	Mbashe River	3 x 14	42	42	—	—
First Falls ^h	Umtata River	2 x 3	6	6	—	—
Gariep	Norvalspont	4 x 90	360	360	—	—
Ncora ^h	Ncora River	2 x 0,4				
		1 x 1,3	2	2		
Second Falls ^h	Umtata River	2 x 5,5	11	11		
Vanderkloof	Petrusville	2 x 120	240	240	—	—
Subtotal hydroelectric (2) ⁱ			600 ^j	600 ^j	—	—
Pumped storage ^j						
Drakensberg	Bergville	4 x 250	1 000	1 000	—	—
Palmiet	Grabouw	2 x 200	400	400	—	—
Subtotal pumped storage (2)			1 400	1 400	—	—
Nuclear						
Koeberg ^b	Cape Town	2 x 965	1 930	1 840	—	—
Total Eskom stations in service (19) ⁱ			37 840	35 951	26	4 531

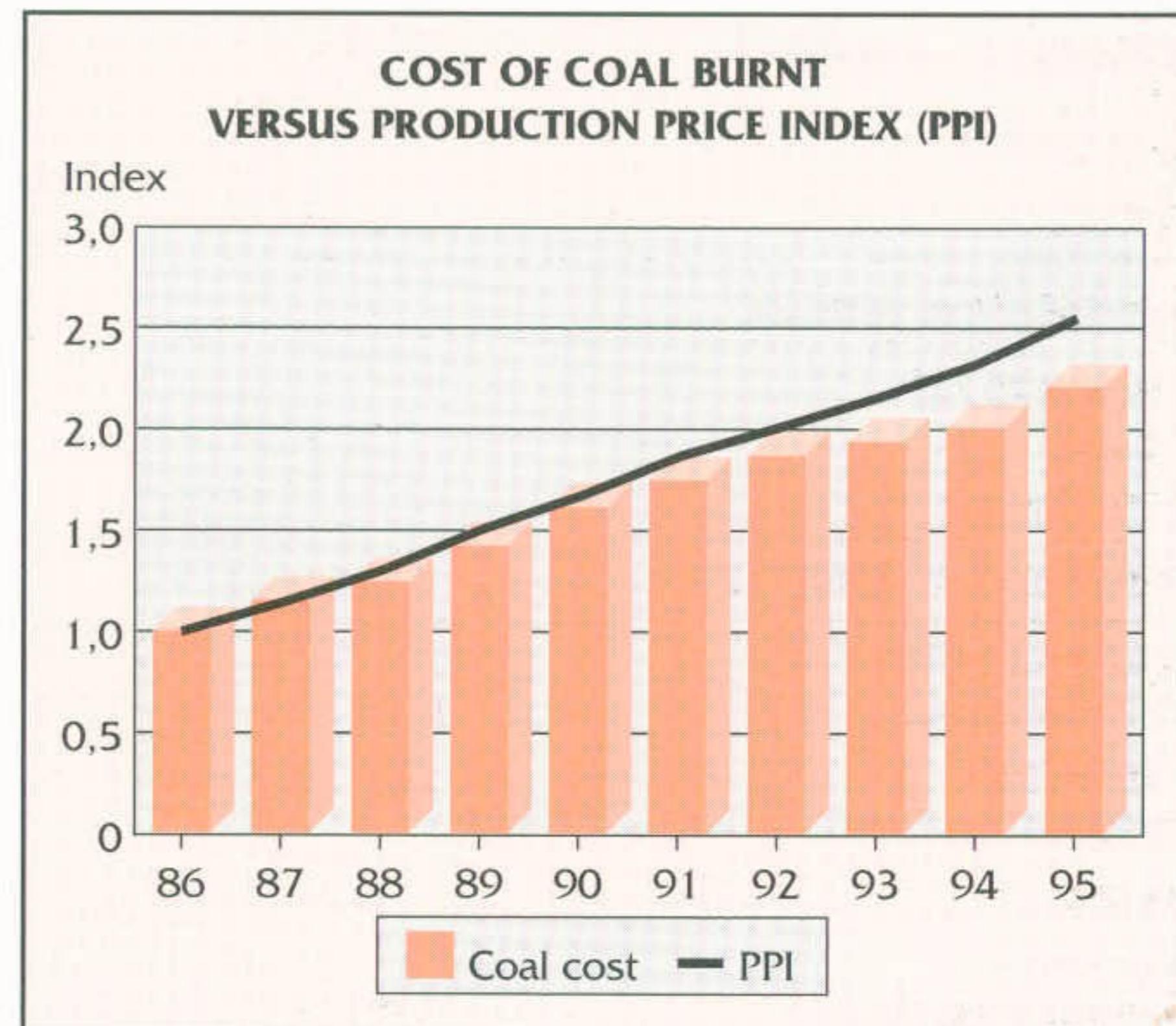
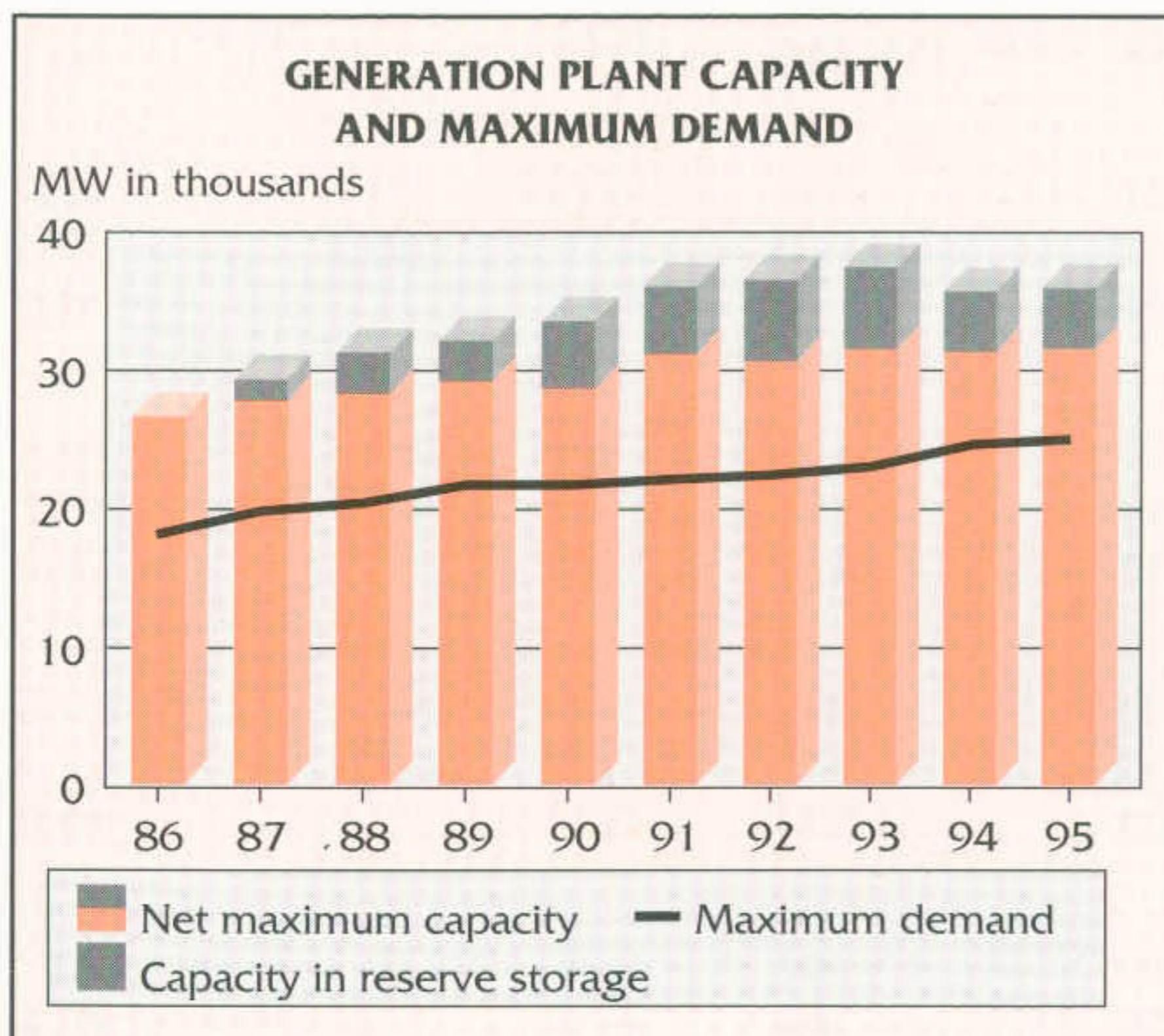
^a Difference between nominal and net maximum capacity reflects auxiliary power consumption and reduced capacity caused by age of plant and/or low coal quality.^b Base-load station.^c Rating of unit 1 increased by 25 MW in January 1995.^d In long-term reserve storage (mothballed).^e Dry-cooled unit specifications are based on design back-pressure and ambient air temperature.^f Stations used for peaking or emergency supplies.^g Use restricted to peaking, emergencies and availability of water in Gariep and Vanderkloof dams.^h During 1995, NER issued a licence to Eskom for generating electricity at this hydroelectric generating unit.ⁱ Four hydroelectric generating units with a total capacity of 61 MW not included because they are not Eskom assets. Also see Note h.^j Pumped storage facilities are net users of electricity and are used for peaking. Water is pumped during off-peak periods to generate electricity during peak periods.

GENERATING SETS ON ORDER

at 31 December 1995

Name, type and location of power station	Number and nominal capacity of sets MW	Net maximum capacity of sets MW	Total nominal capacity of station MW	Total net maximum capacity of station MW	Number of sets in service (on order)	Total nominal capacity of sets on order MW	Total net maximum capacity of sets on order MW	Year of completion first (last) set *
Majuba, coal fired	3 x 657	3 x 612						
Volksrust	3 x 713	3 x 669	4 110	3 843	0 (6)	4 110	3 843	1996 (2001)
Total generating sets on order, MW						4 110	3 843	

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



POWER STATION OPERATING STATISTICS

for the year ended 31 December 1995

Power station	Net maximum capacity MW	Net electricity generation GWh	Net maximum power produced MW	Generation load factor ^a %
Coal fired				
Arnot	990	3 863	853	44,5
Duvha	3 450	19 945	3 423	66,0
Hendrina	1 900	11 012	1 895	66,2
Kendal	3 840	21 249	3 972	63,2
Kriel	2 850	15 955	2 689	63,9
Lethabo	3 558	19 257	3 423	61,8
Majuba ^c		37	441	0,9
Matimba	3 690	24 162	3 656	74,7
Matla	3 450	19 152	3 370	63,4
Tutuka	3 510	17 098	3 488	55,6
Subtotal coal fired	27 238	151 730		62,5
Gas turbine				
Acacia	171	0	25	0,0
Port Rex	171	0	80	0,0
Subtotal gas turbine	342	0		0,0
Hydroelectric				
Gariep ^d	360	135	287	4,3
Vanderkloof	240	288	246	13,7
Subtotal hydroelectric	600	423		8,0
Pumped storage				
Drakensberg	1 000	843	1 045	9,6
Palmiet	400	431	414	12,3
Subtotal pumped storage	1 400	1 274		10,4
Nuclear				
Koeberg	1 840	11 301	1 779	70,1
Subtotal nuclear	1 840	11 301		70,1
Other power stations ^e	61	106		
Total/weighted average all Eskom	31 420	164 834		59,0
Other power sources				
External purchases		172		32,2
Subtotal other sources	0	172		32,2
Total/weighted average	31 420	165 006		59,0

^a Generation load factor = $\frac{\text{Net kWh production} \times 100}{(\text{Average net maximum capacity}) \times \text{hours in year}}$

^b Unit capability factor = $\frac{\text{Capacity hours available} \times 100}{\text{Total maximum capacity hours in year}}$

^c One unit in non-commercial service during December 1995.

^d Efficiency calculated on moisture-free basis coal burnt and calorific values.

^e The National Electricity Regulator issued a licence to Eskom for generating electricity at four hydroelectric generating units. They are, however, not Eskom assets.

Specific water consumption ℓ/kWh	Unit capability factor ^b %	Overall thermal efficiency Net generation %	Fuel burnt t	Average coal consumption kg/kWh net	Gross calorific value of coal (as received) MJ/kg	Average heat rate MJ/kWh net
1,73	79,2	33,30	1 889 205	0,49	22,03	10,81
1,83	76,8	34,50	9 346 035	0,47	22,25	10,44
2,11	75,2	32,34	5 675 456	0,52	21,57	11,13
0,11	92,9	34,31	11 146 386	0,52	19,96	10,49
1,93	86,3	35,02	8 176 448	0,51	20,04	10,28
1,80	81,1	34,89	12 989 403	0,67	15,27	10,32
0,14	91,3	33,52	12 478 252	0,52	20,77 ^d	10,74
2,10	72,6	35,47	9 428 786	0,49	20,58	10,15
1,92	90,8	35,32	8 246 937	0,48	21,09	10,19
1,38	83,8	34,43	79 376 908	0,52	19,95	10,45
		98,2		84		
		90,3		170		
		94,3				
		93,5				
		96,9				
		94,9				
		93,2				
		83,6				
		90,5				
0,07	82,3	32,10				
0,07	82,3	32,10				
		84,3		34,30		

PRODUCTION DATA OF ESKOM POWER STATIONS

Sources: Eskom Annual Report (1924 – 1984) and Eskom Statistical Yearbook (1985 – 1994)

Name of station	Location	Commercial service date of first and last unit	Last year in commercial service	Average age of generating units Years ^a	Nominal capacity MW	Net maximum capacity MW
Coal fired						
Arnot ^c	Middelburg	1971 – 1975	–	22,7	2 100	1 980
Brakpan ^d	Brakpan	1908 – 1935	1970	62,0	48	45
Camden ^e	Ermelo	1966 – 1969	1990	27,8	1 600	1 520
Central ^f	Kimberley	1950 – 1954	1966	16,0	30	28
Colenso	Colenso	1926 – 1959	1985	59,0	165	143
Congella 1	Durban	1928 – 1938	1973	45,0	68	63
Congella 2		1945 – 1949	1978	33,0	206	187
Duvha	Witbank	1980 – 1984	–	13,9	3 600	3 450
Grootvlei ^e	Balfour	1969 – 1977	1990	24,0	1 200	1 130
Hendrina	Hendrina	1970 – 1977	–	22,6	2 000	1 900
Hex River	Worcester	1952 – 1963	1988	36,0	120	114
Highveld	Sasolburg	1959 – 1963	1995	36,0	480	412
Ingagane	Newcastle	1963 – 1968	1990	27,0	500	465
Kendal	Witbank	1988 – 1993	–	4,2	4 116	3 840
King William's Town ^g	King William's Town	1948	1963	15,0	3,5	3,0
Klip	Vereeniging	1936 – 1958	1986	50,0	424	325
Komati ^e	Bethal	1961 – 1966	1990	32,0	1 000	906
Kriel	Bethal	1976 – 1979	–	17,8	3 000	2 850
Lethabo	Sasolburg	1985 – 1990	–	8,0	3 708	3 558
Majuba ^h	Volksrust	1996 – 2001	–	–	4 110	3 843
Matimba	Ellisras	1987 – 1991	–	6,6	3 990	3 690
Matla	Bethal	1979 – 1983	–	14,5	3 600	3 450
Rosherville	Germiston	1911 – 1914	1966	55,0	48	45
Salt River 1	Cape Town	1936	1973	37,0	90	85
Salt River 2		1955 – 1967	1995	40,0	240	225
Simmerpan ^d	Germiston	1909 – 1914	1957	48,0	40	37,5
Taaibos	Sasolburg	1954 – 1957	1995	41,0	480	440
Tutuka	Standerton	1985 – 1990	–	8,5	3 654	3 510
Umgeni	Pinetown	1954 – 1961	1987	33,0	480	444
Vaal	Viljoensdrif	1945 – 1954	1989	44,0	318	270
Vereeëniging ^d	Vereeëniging	1912 – 1954	1970	58,0	157	148
Vierfontein	Viljoenskroon	1953 – 1958	1990	37,0	360	336
West Bank 1	East London	1948 – 1951	1977	29,0	32	30
West Bank 2		1964 – 1969	1988	24,0	85	80
Wilge	Witbank	1954 – 1956	1995	41,0	240	221
Witbank	Witbank	1927 – 1953	1969	42,0	128	120

^a For power stations decommissioned/disposed of: numbers of years in service since commissioning of first unit.^b Where sent-out figures were not reported, gross production or sales figures were used.^c Three units in reserve storage; one to be returned to service this year. Station will be fully operational by end 1998.^d Taken over from the Victoria Falls Power Company (VFP) in 1948.^e In reserve storage.^f Taken over from Kimberley Municipality in 1927.^g Taken over from East London Municipality in 1948.^h Under construction.ⁱ Auxiliary consumption exceeded energy generated.^j Used during World War II to supplement generating capacity.^k First Eskom hydroelectric unit built in 1925. Shut down in 1927.^l Eskom's first power station and its only hydroelectric station until Gariep (previously Hendrik Verwoerd) Power Station's first unit was commissioned in 1971.

Total energy sent out by 31-12-95 b	Energy sent out GWh	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986
230 603,6	3 863	4 558	4 089	7 426	10 839	10 845	11 601	10 806	11 699	11 458	
1 495,0	—	—	—	—	—	—	—	—	—	—	—
177 128,9	—	—	—	—	—	1 846	2 971	3 529	6 489	6 594	
936,3	—	—	—	—	—	—	—	—	—	—	—
21 042,9	—	—	—	—	—	—	—	—	—	—	—
22 296,5	—	—	—	—	—	—	—	—	—	—	—
293 677,4	19 945	21 974	18 000	21 061	20 220	21 364	20 377	20 811	23 335	22 047	
104 321,6	—	—	—	—	—	2 043	2 276	2 225	5 096	4 586	
258 587,5	11 012	11 871	11 310	10 840	10 196	10 308	10 127	9 450	11 939	11 586	
9 128,6	—	—	—	—	—	—	—	—	13	6	
62 859,1	—	—	—	—	—	13	9	53	435	441	
58 916,5	—	—	—	—	—	534	596	1 069	1 690	1 908	
81 741,0	21 249	19 397	14 021	10 658	7 986	4 701	2 563	1 166	—	—	
84,6	—	—	—	—	—	—	—	—	—	—	
100 935,9	—	—	—	—	—	—	—	—	—	—	4
148 104,8	—	—	—	—	—	1 746	2 864	3 219	4 703	3 506	
274 239,4	15 955	13 395	15 080	12 716	13 408	15 312	15 773	17 666	16 014	16 395	
148 889,0	19 257	17 863	21 102	16 957	16 684	15 059	13 116	12 879	10 475	5 082	
37,0	37	—	—	—	—	—	—	—	—	—	
142 291,8	24 162	22 685	20 564	19 763	19 964	15 767	20 985	8 234	1 678	—	
291 879,4	19 152	18 737	22 634	20 807	20 408	18 565	19 859	19 616	18 816	19 192	
1 747,2	—	—	—	—	—	—	—	—	—	—	
29 796,6	—	—	12	4	7	10	21	-1 i	20	—	
739,3	—	—	—	—	—	—	—	—	—	—	
76 984,4	—	—	—	—	—	—	13	101	507	535	
148 455,0	17 098	17 523	18 699	16 605	16 033	16 458	14 665	12 032	7 690	9 271	
23 038,7	—	—	—	—	—	—	—	-5 i	17	—	
69 060,3	—	—	—	—	—	—	-2 i	364	26	575	
15 177,0	—	—	—	—	—	—	—	—	—	—	
53 600,4	—	—	—	—	—	27	62	59	396	234	
8 404,0	—	—	—	—	—	—	—	1	9	4	
45 972,9	—	—	3	59	69	146	428	831	1 498	874	
28 694,2	—	—	—	—	—	—	—	—	—	—	

PRODUCTION DATA OF ESKOM POWER STATIONS continued

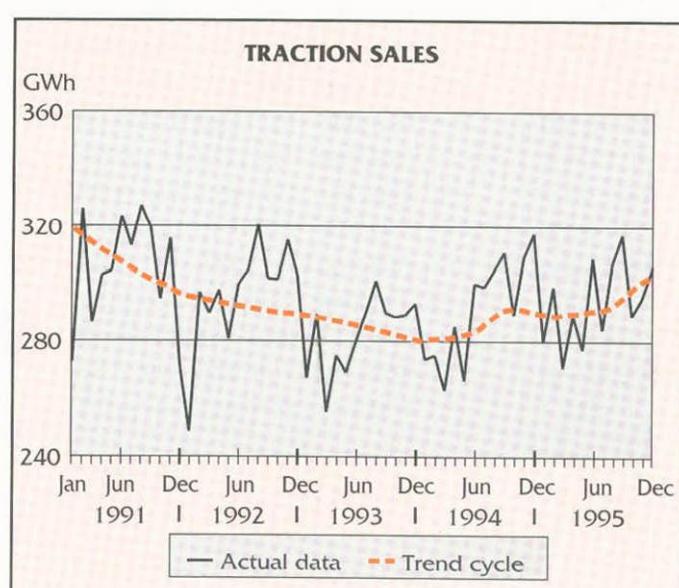
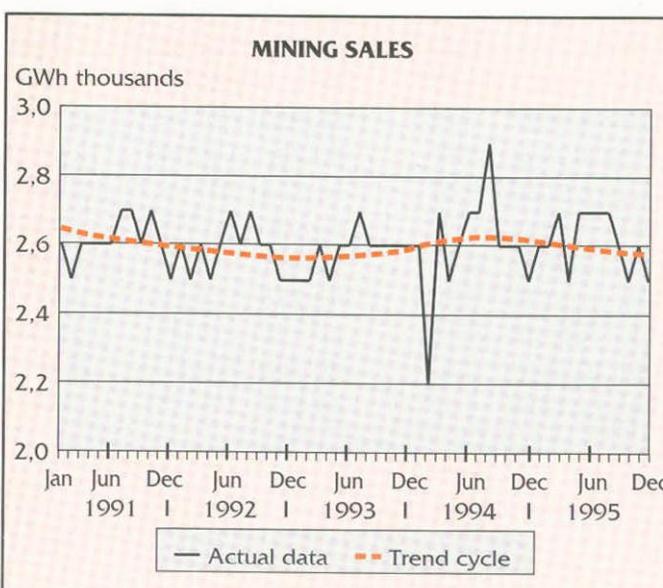
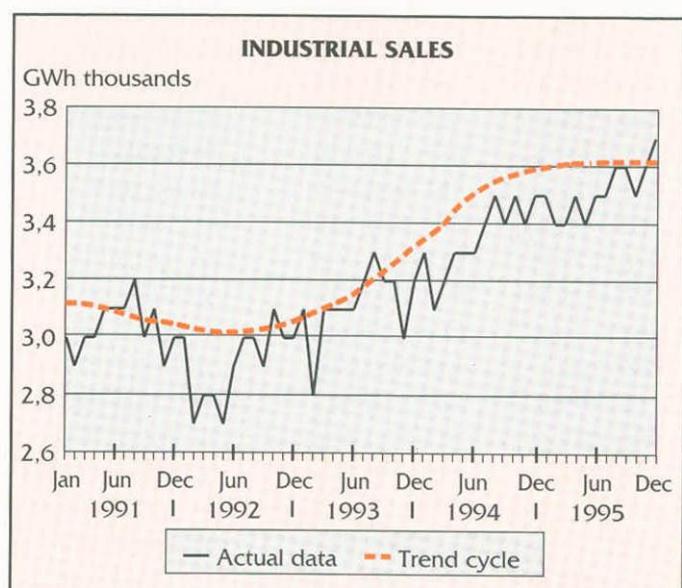
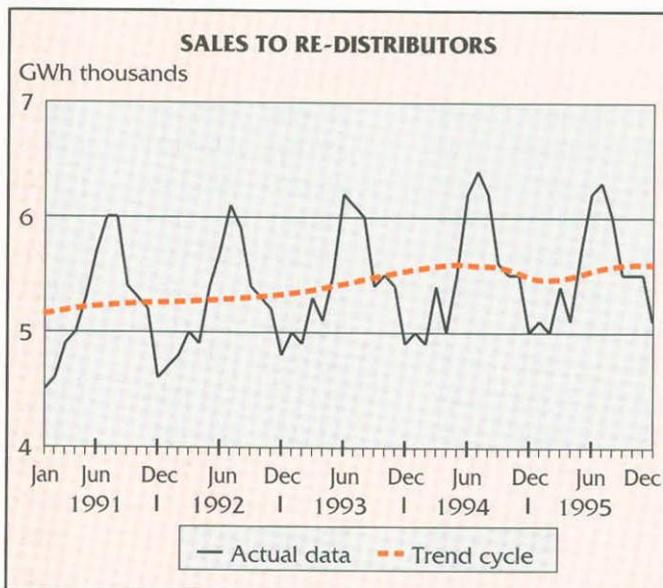
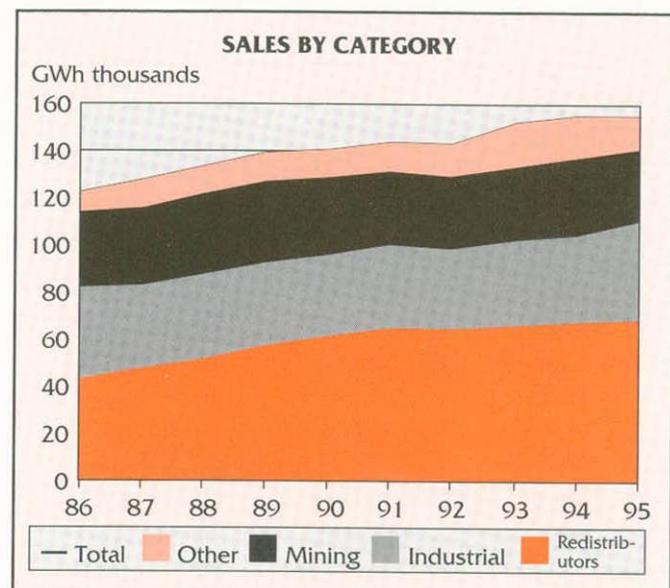
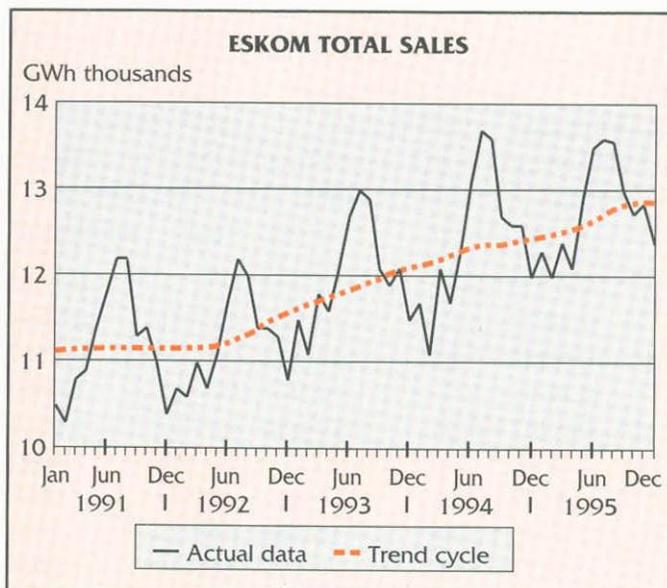
Sources: Eskom Annual Report (1924 – 1984) and Eskom Statistical Yearbook (1985 – 1994)

Name of station	Location	Commercial service date of first and last unit	Last year in commercial service	Average age of generating units Years ^a	Nominal capacity MW	Net maximum capacity MW
Gas turbine and diesel						
Acacia	Cape Town	1976	–	19,6	171	171
Alice ^b	Alice	1948	1954	6,0	0,54	0,54
Caledon ⁱ	Caledon	1939	1943	4,0	0,14	0,14
Ixopo	Ixopo	1956	1958	2,0	0,15	0,15
King William's Town	King William's Town	1950	1966	16,0	1,0	1,0
Margate ^j	Margate	1938	1944	6,0	0,166	0,166
Paratus	Walvis Bay	1986	1993	13,0	48	48
Port Rex	East London	1976	–	19,2	171	171
Port Shepstone	Port Shepstone	1944	1969	25,0	3,4	3,4
Volksrust ⁱ	Volksrust	1939	1957	18,0	0,5	0,5
Hydroelectric						
Gariep	Norvalspont	1971 – 1976	–	22,1	360	360
Ixopo	Ixopo	1956	1958	2,0	0,165	0,165
Malieveld ^k	Sabie	1925	1927	2,0	0,35	0,35
Sable Gorge ^l	Sabie	1927	1970	43,0	1,35	1,35
Vanderkloof	Petrusville	1977	–	18,9	240	240
Pumped storage						
Drakensberg	Bergville	1981 – 1982	–	14,1	1 000	1 000
Palmiet	Grabouw	1988	–	7,6	400	400
Nuclear						
Koeberg	Cape Town	1984 – 1985	–	10,8	1 930	1 840

^a For power stations decommissioned/disposed of: numbers of years in service since commissioning of first unit.^b Where sent-out figures were not reported, gross production or sales figures were used.^c Three units in reserve storage; one to be returned to service this year. Station will be fully operational by end 1998.^d Taken over from the Victoria Falls Power Company (VFP) in 1948.^e In reserve storage.^f Taken over from Kimberley Municipality in 1927.^g Taken over from East London Municipality in 1948.^h Under construction.ⁱ Auxiliary consumption exceeded energy generated.^j Used during World War II to supplement generating capacity.^k First Eskom hydroelectric unit built in 1925. Shut down in 1927.^l Eskom's first power station and its only hydroelectric station until Gariep (previously Hendrik Verwoerd) Power Station's first unit was commissioned in 1971.

Total energy sent out by 31-12-95 ^b GWh	Energy sent out GWh									
	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986
101,3	0	1	0 ⁱ	0	0	0	0	1	1	0
3,6	-	-	-	-	-	-	-	-	-	-
1,9	-	-	-	-	-	-	-	-	-	-
0,2	-	-	-	-	-	-	-	-	-	-
0,6	-	-	-	-	-	-	-	-	-	-
0,7	-	-	-	-	-	-	-	-	-	-
28,0	-	-	-	4	1	4	3	1	-	1
84,1	0	1	0 ⁱ	0	-1 ⁱ	-1 ⁱ	0	-1	1	1
6,8	-	-	-	-	-	--	-	-	-	-
0,1	-	-	-	-	-	--	-	-	-	-
16 565,9	135	575	123	251	952	441	1 328	1 472	735	792
0,7	-	-	-	-	-	-	-	-	-	-
1,0	-	-	-	-	-	-	-	-	-	-
217,1	-	-	-	-	-	-	-	-	-	-
13 533,5	288	499	23	501	1 028	569	1 431	1 690	882	831
17 863,4	843	1 023	837	883	1 098	1 160	888	1 177	1 774	1 785
3 421,0	431	494	508	450	706	681	151	226	-	-
95 385,7	11 301	9 697	7 255	9 288	9 144	8 449	11 099	10 493	6 167	8 803

AT A GLANCE – ELECTRICITY SALES



POWER STATIONS WITH HIGHEST THERMAL EFFICIENCY 1995

Station	Steam conditions at turbine inlet		Net maximum capacity MW	Net electricity production GWh	Station load factor %	Gross calorific value of coal MJ/kg *	Overall thermal efficiency %	Date of commercial operation	First and last set	Type of steam supply
	Pressure MPa (abs)	Temperature °C								
Matla	16,1	535	3 450	19 152	63,4	20,58	35,47	1979-83		Reheat
Tutuka	16,1	535	3 510	17 098	55,6	21,09	35,32	1985-90		Reheat
Kriel	16,0	510	2 850	15 955	63,9	20,04	35,02	1976-79		Reheat
Lethabo	16,1	535	3 558	19 257	61,8	15,27	34,89	1985-90		Reheat
Duvha	16,1	535	3 450	19 945	66,0	22,25	34,50	1980-84		Reheat
Kendal	16,1	535	3 840	21 249	63,2	19,96	34,31	1988-93		Reheat
Matimba	16,1	535	3 690	24 162	74,7	20,77	33,52	1987-91		Reheat
Arnot	15,9	510	990	3 863	44,5	22,03	33,30	1971-75		Reheat
Hendrina	10,3	538	1 900	11 012	66,2	21,57	32,34	1970-77		Non-reheat

* As received basis, except Matimba, which is moisture-free basis.

GENERATING UNITS WITH HIGHEST UNIT CAPABILITY FACTOR 1995

Station	Unit number	Net maximum capacity MW	Unit capability factor %	Unplanned capability loss factor %	Unplanned automatic grid separations per 7 000 operating hours		Generation load factor %	Unit age on 31/12/95 Years	Type of steam supply
					per 7 000 operating hours	Generation load factor %			
Kendal	5	640	99,0	0,7	0,9	66,5	2,0		Reheat
Tutuka	3	585	98,6	0,7	4,9	57,2	8,3		Reheat
Kriel	3	475	97,8	0,5	1,7	80,9	16,9		Reheat
Kendal	4	640	97,4	2,3	1,7	67,6	3,1		Reheat
Matla	3	575	96,9	0,6	2,5	90,8	14,1		Reheat
Duvha	5	575	96,6	3,3	2,5	83,8	11,8		Reheat
Matimba	4	615	96,5	3,5	1,7	85,8	5,3		Reheat
Duvha	4	575	95,1	3,8	2,5	87,1	12,5		Reheat
Matimba	3	615	95,0	3,9	5,6	75,1	6,3		Reheat
Matimba	2	615	94,9	3,1	0,9	78,7	7,1		Reheat

TRANSMISSION AND DISTRIBUTION EQUIPMENT IN SERVICE

as at 31 December 1995

Circuit kilometres (excluding service connections on reticulation systems) of lines and cables and capacity of transformers in service.

		1995	1994	Change
Main transmission system, km	765 kV	1 153 ^a	1 153 ^a	-
	533 kV DC (monopolar)	1 031	1 031	-
	400 kV	13 981	13 724 ^b	257
	275 kV	7 148	7 146 ^b	2
	220 kV	1 243	1 243	-
	132 kV	632	526 ^b	106
Total transmission lines, km		25 188	24 823	365
Distribution lines, km	165-132 kV	16 632	16 632 ^b	-
	88-33 kV	20 230	20 186 ^b	44
Total distribution lines, km		36 862	36 818	44
Reticulation lines, km	22 kV and lower	179 752	179 331 ^b	421
Total all lines, km		241 802	240 972	830
Cables, km	165-132 kV	47	47 ^b	-
	88-33 kV	206	206 ^b	-
	22 kV and lower	4 838	4 806 ^b	32
Total all cables, km		5 091	5 059	32
Transformers	Transmission, MVA	124 790 ^c	106 646	18 144
	Distribution and reticulation, MVA	68 681	68 555 ^b	126
Total transformer capacity, MVA		193 471	175 201	18 270
Transformers	Transmission, number	453	436	17
	Distribution and reticulation, number	213 099	167 115 ^b	45 984
Total, number		213 552	167 551	46 001

^a 282 km of 765 kV construction line presently operating at 400 kV.^b Restated.^c New base definition: transformers rated ≥ 30 MVA and primary voltage ≥ 132 kV.

MAXIMUM ONE-HOUR DEMAND

	1995	1994	1993	1992	1991	Increase 1994-95 %	Average yearly increase 1991-95 %
Maximum simultaneous one-hour demand on total Eskom system, MW	25 133	24 798	23 169	22 640	22 342	1,4	3,0
Date	18.07.95	26.07.94	22.06.93	08.07.92	21.06.91		

ELECTRICITY PRODUCTION AND SALES

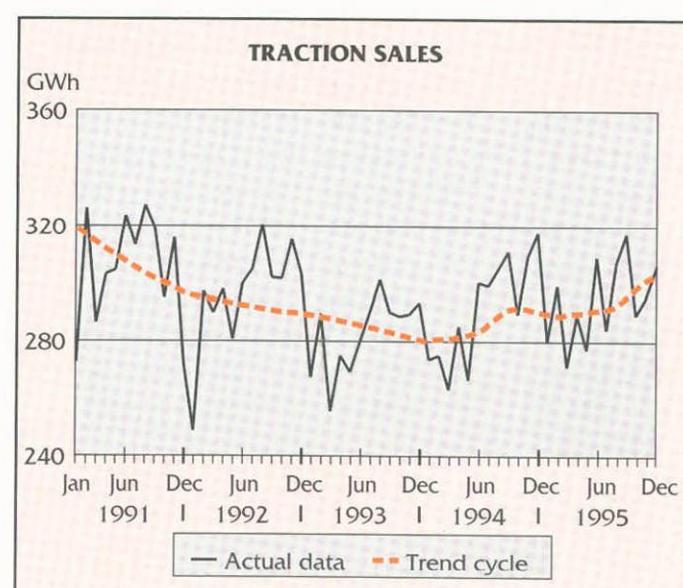
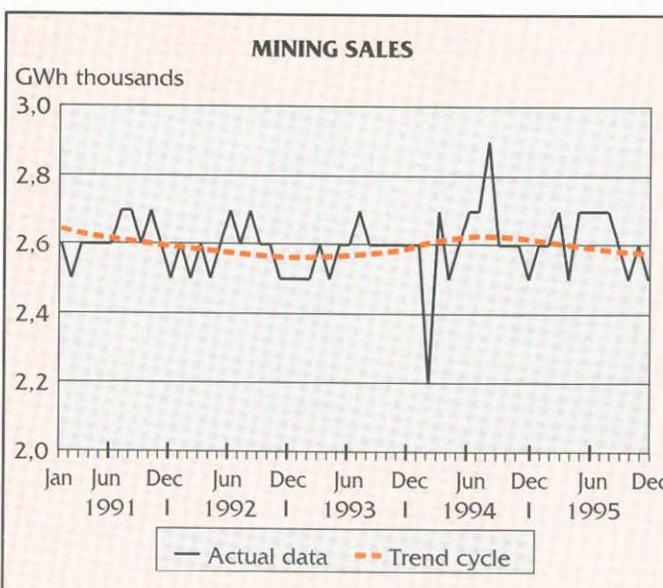
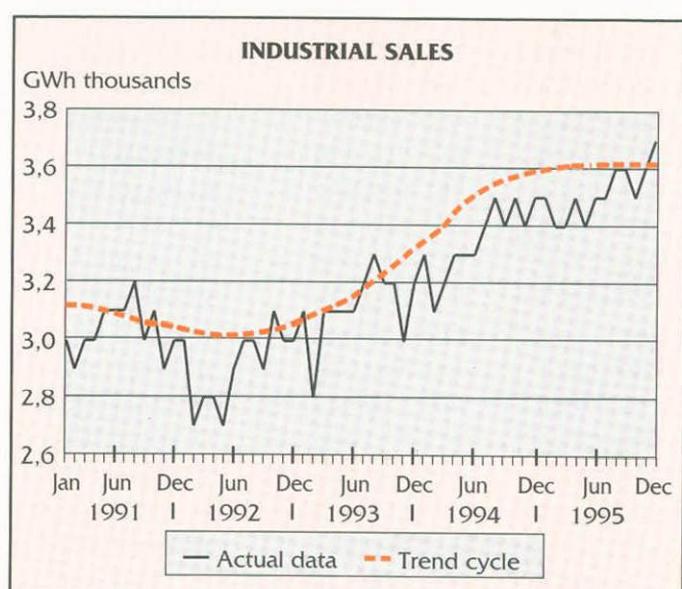
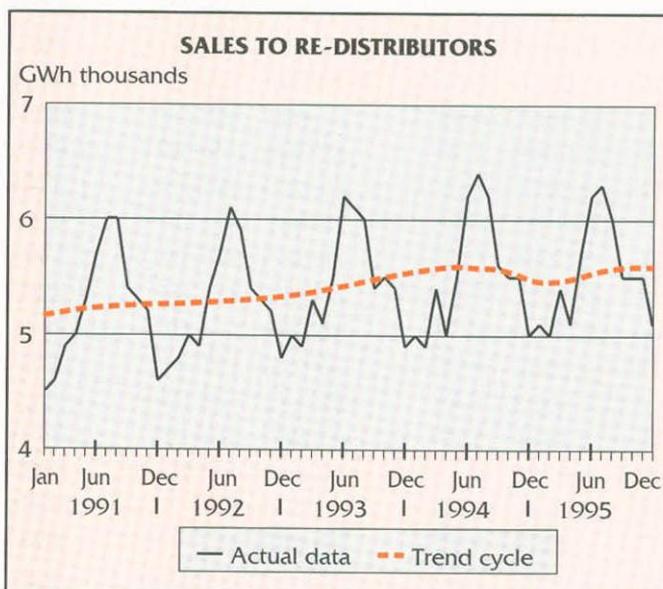
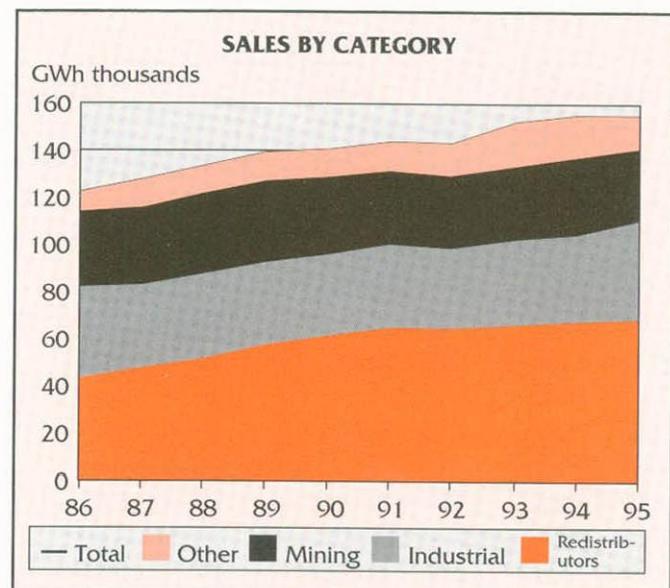
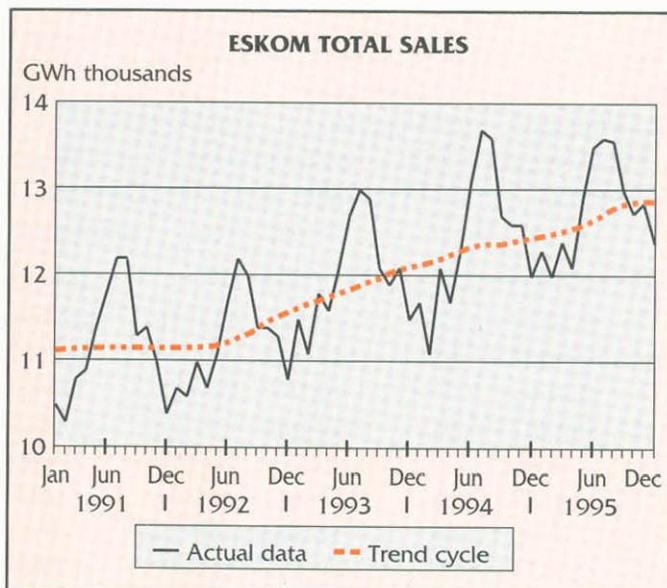
Electricity produced

Year	South Africa total produced GWh	Eskom electricity available as a percentage of South African total ^a	Electricity produced by Eskom power stations GWh	Electricity purchased from other sources GWh	Own consumption GWh	Available for distribution GWh	Peak demand on integrated Eskom system MW
1956	17 293 ^c	74,8	12 670	257	—	12 927	2 001 ^c
1957	18 720	73,7	13 640	163	—	13 803	2 151 ^c
1958	19 765	74,3	14 516	164	—	14 680	2 249 ^c
1959	21 051	75,4	15 777	94	—	15 871	2 429 ^c
1960	22 717	76,3	17 308	15	—	17 323	2 605 ^c
1961	23 760	77,0	18 284	8	—	18 292	2 733 ^c
1962	25 599	75,9	19 404	13	—	19 417	2 925 ^c
1963	27 335	76,1	20 793	19	—	20 812	3 183 ^c
1964	29 547 ^c	76,8	22 639	41	—	22 680	3 460 ^c
1965	31 939	77,4	24 583	126	—	24 709	3 669
1966	33 929 ^c	77,0	25 504	630 ^d	—	26 134	3 906
1967	36 897	77,1	28 371	70	—	28 441	4 227
1968	39 761	77,6	30 843	8	—	30 851	4 658
1969	42 847	78,4	33 598	8	—	33 606	5 055
1970	47 456	78,7	37 321	7	—	37 328	5 622
1971	51 081	79,8	40 739	8	—	40 747	6 115
1972	55 332	80,4	44 475	10	—	44 485	6 630
1973	60 700	82,0	49 759	11	—	49 770	7 350
1974	66 412 ^c	84,7	56 251	8	—	56 259	8 552
1975	70 111	87,8	61 498	35	—	61 533	9 185
1976	75 381	89,4	66 188	1 226	—	67 414	10 085
1977	79 352	89,8	67 050	4 241	27	71 264	10 735
1978	84 812	91,7	70 902	6 924	52	77 774	11 490
1979	92 616	92,8	75 643	10 394	58	85 979	12 855
1980	99 905	93,0	83 362	9 659	71	92 950	13 668
1981	106 135	93,9	97 824	2 601	712	99 713	14 674
1982	109 536	93,6	102 769	2 151	2 404	102 516	15 532
1983	112 366	93,8	103 295	5 026	2 917	105 404	15 639
1984	120 835	94,3	116 581	505	3 188	113 898	17 296
1985	126 207	94,5	121 987	507	3 265	119 229	17 852
1986	130 056 ^f	95,1 ^f	126 511	255	3 018	123 748	18 278
1987	134 751	96,1	132 507	267	3 229	129 545	20 001
1988	140 802	97,0	138 837	360	2 567	136 630	20 589
1989	146 162	96,7	143 204	344	2 265	141 283	21 871
1990	147 069	97,5	146 047 ^f	273	2 953	143 367	21 863
1991	148 919	98,0	148 671	263	2 933	146 001	22 342
1992	149 427	97,9	148 207	349	2 295	146 261	22 640
1993	155 812	97,9	154 260	101	1 898	152 463	23 169
1994	167 609	94,4 ^f	160 293	58	2 113	158 238	24 798
1995	167 547	97,4	164 834	172	1 866	163 140	25 133

^a Includes Eskom electricity supplied to neighbouring countries.^b Electricity sold includes supplies to neighbouring countries since 1988.^c Estimates based on limited information.^d Includes purchases from City of Johannesburg during serious drought.^e Air and steam production excluded.^f Correction.

	Electricity sales				Employees	
Integrated Eskom system load factor %	Ratio GWh sold b/ available for distribution	Electricity sold b GWh	Growth %	Average selling price c/kWh	Total number at 31 Dec	Ratio GWh sold/ employee
73,5	0,915 e	11 828,3 e	10,0 e	0,4209 e	12 977	0,911 e
73,3	0,913 e	12 603,5 e	6,6 e	0,4409 e	13 421	0,939 e
74,5	0,916 e	13 448,6 e	6,7 e	0,4664 e	14 312	0,940 e
74,6	0,919 e	14 586,3 e	8,5 e	0,4863 e	13 947	1,046 e
75,7	0,922 e	15 968,4 e	9,5 e	0,4987 e	14 654	1,090 e
76,4	0,923 e	16 889,4 e	5,8 e	0,5096 e	15 441	1,094 e
75,3	0,927 e	18 005,3 e	6,6 e	0,5109 e	16 467	1,093 e
74,6	0,931 e	19 384,8 e	7,7 e	0,5125 e	16 804	1,154 e
74,6	0,933 e	21 153,6 e	9,1 e	0,5073 e	17 172	1,232 e
76,9	0,933 e	23 056,1 e	9,0 e	0,5051 e	17 851	1,292 e
76,4	0,938 e	24 514,9 e	6,3 e	0,5218 e	18 579	1,319 e
76,8	0,937 e	26 657,1 e	8,7 e	0,5466 e	19 817	1,345 e
75,4	0,936	28 885,0	8,4	0,5550	20 893	1,383
75,9	0,937	31 505,6	9,1	0,5565	21 644	1,456
75,8	0,935	34 890,6	10,7	0,5545	22 700	1,537
76,1	0,934	38 040,0	9,0	0,5772	25 050	1,519
76,4	0,936	41 648,9	9,5	0,6108	26 937	1,546
77,3	0,936	46 578,4	11,8	0,6484	28 559	1,631
75,1	0,935	52 585,1	12,9	0,6822	29 891	1,759
76,5	0,940	57 869,2	10,0	0,7950	33 999	1,702
76,1	0,940	63 355,7	9,5	1,0360	36 915	1,716
75,8	0,942	67 125,4	6,0	1,5353	39 112	1,716
77,3	0,936	72 780,4	8,4	1,7887	41 040	1,773
76,4	0,937	80 582,8	10,7	1,8980	43 690	1,844
77,5	0,942	87 539,3	8,6	2,0242	47 490	1,843
77,6	0,941	93 844,0	7,2	2,2811	52 080	1,802
75,3	0,938	96 135,9	2,4	2,8038	58 850	1,634
76,9	0,932	98 251,1	2,2	3,3606	62 420	1,574
75,0	0,939	106 904,1	8,8	3,5842	64 560	1,656
76,2	0,942	112 305,9	5,1	4,1179	66 000	1,702
77,3	0,948	117 353,0	4,5	4,9803	60 800	1,930
73,9	0,946	122 523,6	4,4	5,7512	56 830	2,156
75,5	0,948	129 493,0 f	5,7 f	6,2926	56 726	2,283 f
73,7	0,951	134 347,0 f	3,7	6,9008 f	51 554	2,606
74,9	0,950	136 168,0 f	1,4	7,8844 f	50 000	2,723 f
74,6	0,950	138 687,0 f	1,8	8,4550 f	46 637	2,974
73,5	0,944	138 126,0	-0,4	9,1576 f	42 223	3,271
75,1	0,943	143 800,0	4,1	9,5918	40 128	3,584
72,8	0,944	149 443,1	3,9	10,3163	39 760	3,759 f
74,1	0,941	153 547,0	2,7	11,1458	39 952	3,843

AT A GLANCE – ELECTRICITY SALES



NUMBER OF EXTERNAL CUSTOMERS

Year	Re-distributors	Domestic and street lighting	Commercial ^a	Industrial	Mining	Rural/farming ^a	Traction	International ^b	Total	Change %
1956	125	38 944	—	3 490	166	—	6	—	42 731	6,8
1957	134	41 113	—	3 551	170	—	6	—	44 974	5,2
1958	137	43 665	—	4 216	174	—	6	—	48 198	7,2
1959	146	46 437	—	4 593	177	—	7	—	51 360	6,6
1960	155	49 968	—	5 039	183	—	7	—	55 352	7,8
1961	168	53 908	—	5 453	192	—	7	—	59 728	7,9
1962	179	56 456	—	6 410	209	—	7	—	63 261	5,9
1963	186	61 093	—	7 128	230	—	8	—	68 645	8,5
1964	187	66 397	—	7 782	240	—	9	—	74 615	8,7
1965	203	71 517	—	9 051	251	—	25	—	81 047	8,6
1966	208	77 121	—	10 278	259	—	27	—	87 893	8,4
1967	220	83 189	—	11 435	267	—	28	—	95 139	8,2
1968	233	85 227	—	13 540	276	—	31	—	99 307	4,4
1969	249	91 999	—	14 978	289	—	30	—	107 545	8,3
1970	265	98 155	—	16 336	294	—	31	—	115 081	7,0
1971	289	106 684	—	16 927	297	—	31	—	124 228	7,9
1972	310	108 517	—	18 500	299	—	32	—	127 658	2,8
1973	326	117 034	—	20 049	302	—	32	—	137 743	7,9
1974	332	106 857	—	41 647	314	—	32	—	149 182	8,3
1975	353	109 029	—	43 598	325	—	32	—	153 337	2,8
1976	365	105 482	—	61 142	333	—	33	—	167 355	9,1
1977	368	106 743	—	62 507	340	—	38	—	169 996	1,6
1978	386	109 317	—	65 797	354	—	39	—	175 893	3,5
1979	404	101 792	—	65 656	357	—	31	—	168 240	-4,4
1980	419	109 558	—	69 479	386	—	31	—	179 873	6,9
1981	434	113 552	—	77 722	403	—	31	—	192 142	6,8
1982	453	119 889	—	82 801	418	—	29	—	203 590	6,0
1983	468	124 433	—	89 439	421	—	22	—	214 783	5,5
1984	487	130 471	—	94 863	410	—	183	—	226 414	5,3
1985	528	135 770	—	101 246	524	—	183	—	238 251	5,2
1986	571	137 820	—	108 386	546	—	49	—	247 372	3,8
1987	562	142 050	—	116 067	544	—	—	—	259 223	4,8
1988	595	153 590	16 054	2 877	555	101 708	31	—	275 410	6,2
1989	625	103 111	11 958	2 593	565	110 083	34	—	228 969	-16,9
1990	673	111 709	11 948	2 561	592	114 771	32	—	242 286	5,8
1991	704	142 759	12 416	2 646	585	118 631	32	—	277 773	14,6
1992	718	397 562	17 918	2 682	583	122 097	36	4	541 600	95,0
1993	742	715 219	26 535	3 032 ^c	632	126 038 ^c	41	4	872 243	61,1
1994	704	1 053 725	20 112	5 707	631	125 864	38	4	1 207 785 ^d	38,4
1995	704	1 407 117	23 098	6 326	661	129 590	38	4	1 567 538	29,9

^a Prior to 1988, rural/farming and commercial customers were included under Industrial.^b International category comprises four main customers in Botswana, Mozambique, Namibia and Zimbabwe.^c Reclassification of customer codes.^d Correction.

TOTAL ELECTRICITY SOLD

Year	Sales per category, GWh								Own usage
	Redis-tributors	Domestic and street lighting	Commercial ^a	Industrial	Mining	Rural/farming ^a	Traction	Inter-national ^b	
1956	2 282	174	—	2 187	6 445	—	740	—	—
1957	2 540	190	—	2 331	6 790	—	753	—	—
1958	2 838	206	—	2 480	7 136	—	789	—	—
1959	3 058	228	—	2 737	7 676	—	887	—	—
1960	3 243	253	—	3 169	8 259	—	1 045	—	—
1961	3 368	279	—	3 437	8 626	—	1 178	—	—
1962	3 570	303	—	3 692	9 143	—	1 296	—	—
1963	3 998	329	—	4 253	9 416	—	1 389	—	—
1964	4 494	381	—	4 873	9 847	—	1 559	—	—
1965	4 921	439	—	5 663	10 271	—	1 763	—	—
1966	5 344	492	—	6 069	10 775	—	1 836	—	—
1967	5 966	563	—	6 729	11 441	—	1 958	—	—
1968	6 628	642	—	7 439	11 995	—	2 181	—	—
1969	7 264	719	—	8 574	12 642	—	2 307	—	—
1970	8 108	817	—	9 608	13 948	—	2 410	—	—
1971	9 265	918	—	11 014	14 227	—	2 616	—	—
1972	10 716	1 000	—	12 642	14 509	—	2 782	—	—
1973	12 752	1 105	—	14 026	15 800	—	2 896	—	—
1974	15 522	909	—	16 106	16 941	—	3 108	—	—
1975	18 055	1 013	—	18 050	17 444	—	3 307	—	—
1976	20 096	1 093	—	19 946	18 746	—	3 475	—	—
1977	20 862	1 030	—	21 586	20 139	—	3 508	—	—
1978	21 834	960	—	24 181	22 219	—	3 586	—	—
1979	24 133	940	—	27 475	24 000	—	4 035	—	—
1980	26 923	906	—	29 373	25 882	—	4 455	—	—
1981	29 961	1 002	—	31 091	27 131	—	4 660	—	—
1982	32 349	1 020	—	30 959	27 372	—	4 436	—	—
1983	32 729	1 078	—	32 286	28 021	—	4 137	—	—
1984	35 541	1 144	—	36 119	29 506	—	4 595	—	—
1985	37 451	1 204	—	38 215	30 849	—	4 587	—	—
1986	40 570	1 252	—	39 170	31 860	—	4 501	—	—
1987	45 418	1 279	—	35 262	32 849	3 022	4 049	—	645
1988	49 812	1 357	450	36 016	34 228	3 151	4 138	—	467
1989	54 861	1 237	368	35 360	34 376	3 403	4 237	—	516
1990	59 203	1 098	340	34 439	32 981	3 639	3 965	—	520
1991	62 538	1 156	344	35 530	31 257	3 762	3 656	—	455
1992	62 417	1 604	379	34 034	30 840	4 038	3 568	776	470
1993	63 591	2 778	493	37 467 ^c	30 998	3 149 ^c	3 365	1 565	394
1994	64 584	3 660	478	40 394	31 619	3 255	3 494	1 583	376
1995	66 421	3 906	579	42 244	31 293	3 383	3 522	1 832	367

^a Prior to 1988, rural/farming and commercial customers were included under Industrial. Since 1994, sales in respect of Department of Water Affairs and Forestry have been included in Industrial sales.

^b International category comprises four main customers in Botswana, Mozambique, Namibia and Zimbabwe.

^c Reclassification of customer codes.

	Sales as a percentage of total GWh sold								
Total	Redis-tributors	Domestic and street lighting	Commercial ^a	Industrial	Mining	Rural/farming ^a	Traction	Inter-national ^b	Own usage
11 828	19,3	1,5	—	18,5	54,5	—	6,3	—	—
12 604	20,2	1,5	—	18,5	53,9	—	6,0	—	—
13 449	21,1	1,5	—	18,4	53,1	—	5,9	—	—
14 586	21,0	1,6	—	18,8	52,6	—	6,1	—	—
15 969	20,3	1,6	—	19,8	51,7	—	6,5	—	—
16 888	19,9	1,7	—	20,4	51,1	—	7,0	—	—
18 004	19,8	1,7	—	20,5	50,8	—	7,2	—	—
19 385	20,6	1,7	—	21,9	48,6	—	7,2	—	—
21 154	21,2	1,8	—	23,0	46,5	—	7,4	—	—
23 057	21,3	1,9	—	24,6	44,5	—	7,6	—	—
24 516	21,8	2,0	—	24,8	44,0	—	7,5	—	—
26 657	22,4	2,1	—	25,2	42,9	—	7,3	—	—
28 885	22,9	2,2	—	25,8	41,5	—	7,6	—	—
31 506	23,1	2,3	—	27,2	40,1	—	7,3	—	—
34 891	23,2	2,3	—	27,5	40,0	—	6,9	—	—
38 040	24,4	2,4	—	29,0	37,4	—	6,9	—	—
41 649	25,7	2,4	—	30,4	34,8	—	6,7	—	—
46 579	27,4	2,4	—	30,1	33,9	—	6,2	—	—
52 586	29,5	1,7	—	30,6	32,2	—	5,9	—	—
57 869	31,2	1,8	—	31,2	30,1	—	5,7	—	—
63 356	31,7	1,7	—	31,5	29,6	—	5,5	—	—
67 125	31,1	1,5	—	32,2	30,0	—	5,2	—	—
72 780	30,0	1,3	—	33,2	30,5	—	4,9	—	—
80 583	29,9	1,2	—	34,1	29,8	—	5,0	—	—
87 539	30,8	1,0	—	33,6	29,6	—	5,1	—	—
93 845	31,9	1,1	—	33,1	28,9	—	5,0	—	—
96 136	33,6	1,1	—	32,2	28,5	—	4,6	—	—
98 251	33,3	1,1	—	32,9	28,5	—	4,2	—	—
106 905	33,2	1,1	—	33,8	27,6	—	4,3	—	—
112 306	33,3	1,1	—	34,0	27,5	—	4,1	—	—
117 353	34,6	1,1	—	33,4	27,1	—	3,8	—	—
122 524	37,1	1,0	—	28,8	26,8	2,5	3,3	—	0,5
129 620	38,4	1,0	0,3	27,8	26,4	2,4	3,2	—	0,4
134 358	40,8	0,9	0,3	26,3	25,6	2,5	3,2	—	0,4
136 185	43,5	0,8	0,2	25,3	24,2	2,7	2,9	—	0,4
138 698	45,1	0,8	0,2	25,6	22,5	2,7	2,6	—	0,3
138 126	45,2	1,2	0,3	24,6	22,3	2,9	2,6	0,6	0,3
143 800	44,2	1,9	0,3	26,1 ^c	21,6	2,2 ^c	2,3	1,1	0,3
149 443	43,2	2,4	0,3	27,0	21,2	2,2	2,3	1,1	0,3
153 547	43,3	2,5	0,4	27,5	20,4	2,2	2,3	1,2	0,2

REVENUE PER KWh BY CUSTOMER CATEGORY

Year	Actual price in c/kWh								Average for all categories	Change %
	Bulk	Domestic and street lighting	Commercial ^a	Industrial	Mining	Rural/ farming ^a	Traction	Inter- national ^b		
1956	0,545	1,363		0,399	0,334		0,635		0,421	2,7
1957	0,569	1,385		0,415	0,353		0,645		0,441	4,8
1958	0,586	1,429		0,441	0,379		0,656		0,466	5,8
1959	0,605	1,441		0,468	0,396		0,667		0,486	4,3
1960	0,601	1,449		0,483	0,414		0,664		0,499	2,5
1961	0,613	1,484		0,494	0,422		0,673		0,510	2,2
1962	0,609	1,478		0,487	0,417		0,740		0,511	0,3
1963	0,604	1,476		0,488	0,419		0,728		0,513	0,3
1964	0,591	1,443		0,490	0,412		0,691		0,507	-1,0
1965	0,591	1,398		0,482	0,406		0,696		0,505	-0,4
1966	0,597	1,385		0,511	0,418		0,717		0,522	3,3
1967	0,606	1,393		0,537	0,444		0,752		0,547	4,8
1968	0,604	1,391		0,551	0,449		0,755		0,555	1,5
1969	0,599	1,370		0,550	0,455		0,755		0,557	0,3
1970	0,600	1,345		0,550	0,450		0,756		0,555	-0,4
1971	0,614	1,361		0,573	0,472		0,763		0,577	4,1
1972	0,637	1,416		0,601	0,510		0,791		0,611	5,8
1973	0,674	1,505		0,638	0,542		0,842		0,648	6,2
1974	0,704	1,548		0,706	0,557		0,883		0,682	5,2
1975	0,808	1,708		0,822	0,659		1,016		0,795	16,5
1976	1,053	2,092		1,064	0,873		1,326		1,036	30,3
1977	1,578	3,178		1,564	1,295		2,004		1,535	48,2
1978	1,779	3,788		1,799	1,604		2,387		1,789	16,5
1979	1,872	3,983		1,892	1,731		2,602		1,898	6,1
1980	2,003	4,275		2,026	1,854		2,676		2,024	6,6
1981	2,270	4,731		2,284	2,079		2,989		2,281	12,7
1982	2,808	5,418		2,825	2,541		3,650		2,804	22,9
1983	3,367	6,232		3,377	3,048		4,551		3,361	19,9
1984	3,593	6,661		3,595	3,268		4,696		3,584	6,7
1985	4,124	7,507		4,120	3,789		5,373		4,118	14,9
1986	4,871	9,195		5,025	4,722		6,237		4,980	20,9
1987	5,580	10,954		5,470	5,540	10,440	7,612		5,751	15,5
1988	6,121	11,861	10,906	5,875	6,030	11,666	8,179		6,293	9,4
1989	6,688	12,318	11,222	6,468	6,670	12,604	9,083		6,898	9,6
1990	7,650	14,513	12,797	7,330	7,587	14,487	10,406		7,883	14,3
1991	8,252	15,779	14,284	7,784	8,127	15,858	11,419		8,472	7,4
1992	8,983	15,274	15,567	8,174	8,791	17,137	12,444	8,634	9,158	8,1
1993	9,490	12,680	16,457	8,345	9,521	19,839	13,700	7,649	10,142	10,7
1994	10,176	16,756	17,433	8,908	10,113	21,134	14,312	7,883	10,260	7,6
1995	10,772	18,152	18,653	10,401	10,616	21,992	14,651	6,932	11,146	8,0 ^c

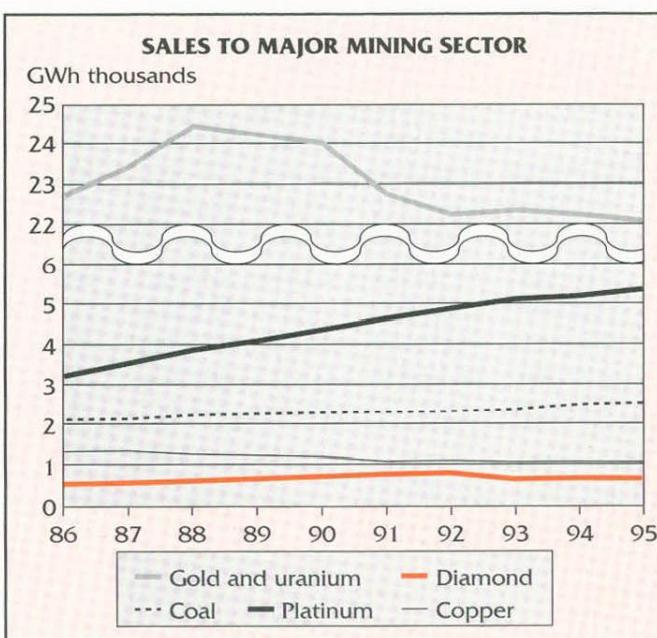
^a Prior to 1988, rural/farming and commercial customers were included under Industrial.^b International category comprises four main customers in Botswana, Mozambique, Namibia and Zimbabwe.^c Official price increase 4%; actual 8%, due to change in mix of sales, higher revenue from commodity-linked tariffs and the phasing out of capacity allocations to certain municipalities.

	Real price in c/kWh									
Production Price Index June 1995 = 100	Re-distributors	Domestic and street lighting	Commercial ^a	Industrial	Mining	Rural/ farming ^a	Traction	International ^b	Average for all categories	Change %
4,3	12,763	31,918		9,352	7,834		14,873		9,860	1,1
4,3	13,205	32,113		9,624	8,179		14,954		10,225	3,7
4,3	13,534	33,008		10,177	8,752		15,141		10,770	5,3
4,3	14,028	33,421		10,858	9,191		15,471		11,278	4,7
4,4	13,758	33,181		11,066	9,488		15,212		11,418	1,2
4,4	33,418	33,418		11,129	9,492		15,146		11,473	0,5
4,5	33,011	33,011		10,883	9,320		16,519		11,408	-0,6
4,5	32,556	32,556		10,758	9,246		16,063		11,303	-0,9
4,6	31,063	31,063		10,553	8,872		14,876		10,921	-3,4
4,8	29,173	29,173		10,054	8,464		14,527		10,538	-3,5
5,0	27,823	27,823		10,261	8,401		14,407		10,482	-0,5
5,1	27,373	27,373		10,548	8,732		14,784		10,740	2,5
5,2	26,942	26,942		10,677	8,702		14,628		10,749	0,1
5,3	25,965	25,965		10,420	8,617		14,315		10,551	-1,8
5,4	24,726	24,726		10,105	8,273		13,898		10,191	-3,4
5,7	23,874	23,874		10,060	8,274		13,386		10,126	-0,6
6,3	22,470	22,470		9,537	8,102		12,560		9,695	-4,3
7,3	20,615	20,615		8,736	7,422		11,540		8,882	-8,4
8,7	17,793	17,793		8,111	6,405		10,147		7,843	-11,7
10,1	16,910	16,910		8,138	6,525		10,061		7,871	-0,4
11,6	18,030	18,030		9,173	7,522		11,434		8,931	13,5
12,8	24,827	24,827		12,220	10,114		15,656		11,995	34,3
14,1	26,862	26,862		12,758	11,379		16,928		12,686	5,8
16,7	23,848	23,848		11,332	10,366		15,580		11,365	-10,4
19,5	21,925	21,925		10,388	9,508		13,724		10,381	-8,7
21,8	21,704	21,704		10,476	9,535		13,710		10,464	0,8
24,9	21,760	21,760		11,345	10,203		14,657		11,260	7,6
26,8	23,225	23,255		12,600	11,374		16,980		12,540	11,4
29,8	22,354	22,354		12,063	10,967		15,757		12,028	-4,1
36,2	20,739	20,739		11,381	10,467		14,844		11,375	-5,4
42,1	21,841	21,841		11,936	11,216		14,814		11,830	4,0
46,9	23,355	23,355		11,662	11,813	22,260	16,230		12,263	3,7
53,7	22,088	22,088	20,309	10,941	11,228	21,724	15,231		11,718	-4,4
61,5	20,030	20,030	18,248	10,516	10,845	20,493	14,768		11,217	-4,3
69,7	20,821	20,821	18,359	10,516	10,884	20,783	14,929		11,309	0,8
75,7	20,844	20,844	18,869	10,283	10,736	20,949	15,084		11,191	-1,0
81,2	18,810	18,810	19,171	10,067	10,826	21,105	15,325	10,633	11,278	0,8
86,1	14,727	14,727	19,114	9,692	11,058	23,042	15,912	8,884	11,779	4,4
94,4	17,750	17,750	18,467	9,436	10,713	22,388	15,161	8,351	10,928	-7,2
102,4	10,520	17,727	18,216	10,157	10,367	21,477	14,308	6,770	10,885	-0,4

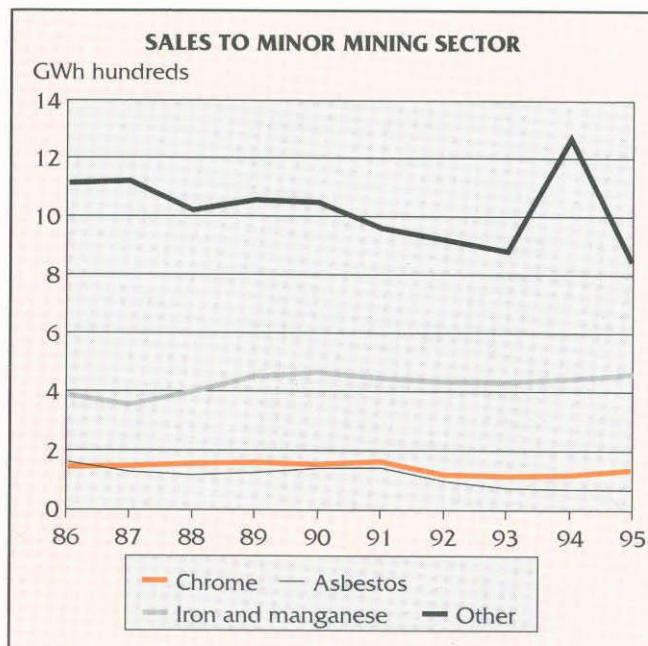
SALES TO MINING SECTOR, GWh

Year	Gold and uranium	Diamond	Coal	Platinum	Copper	Chrome
1971	11 662	297	563	962	374	25
1972	11 773	325	589	990	422	31
1973	12 263	334	620	1 581	565	33
1974	12 803	338	648	1 978	653	52
1975	13 108	346	705	2 001	679	42
1976	13 918	343	812	2 184	728	61
1977	14 708	342	941	2 287	874	84
1978	16 241	497	1 078	2 388	1 023	106
1979	17 201	596	1 248	2 772	1 042	126
1980	18 230	505	1 392	2 867	1 189	117
1981	19 367	561	1 595	2 929	1 220	115
1982	20 058	521	1 697	2 319	1 277	108
1983	20 752	516	1 696	2 425	1 283	106
1984	21 580	522	1 907	2 874	1 274	114
1985	22 088	526	2 116	3 213	1 276	137
1986	22 759	554	2 146	3 247	1 350	143
1987	23 420	582	2 164	3 565	1 369	146
1988	24 471	630	2 260	3 893	1 284	154
1989	24 251	683	2 290	4 121	1 256	158
1990	24 034	738	2 323	4 387	1 223	152
1991	22 780	791	2 336	4 659	1 117	162
1992	22 268	821	2 349	4 897	1 136	118
1993	22 370	665	2 402	5 124 ^a	1 104	113
1994	22 255	685	2 523	5 201 ^a	1 105	117
1995	22 111	676	2 566	5 369 ^a	1 100	134

^a Platinum mines also included under Redistributors in Total electricity sold on p 26.



Asbestos	Iron	Manganese	Other	Total	Growth %
152		92	100	14 227	2,0
161		101	117	14 509	2,0
168	86	27	123	15 800	8,9
193	104	30	142	16 941	7,2
238	121	37	167	17 444	3,0
266	180	49	205	18 746	7,5
275	271	62	295	20 139	7,4
223	272	72	319	22 219	10,3
233	334	83	365	24 000	8,0
237	293	95	957	25 882	7,8
237	354	105	648	27 131	4,8
235	329	114	714	27 372	0,9
225	243	78	697	28 021	2,4
186	321	75	653	29 506	5,3
184	310	84	915	30 849	4,6
162	298	89	1 112	31 860	3,3
129	267	88	1 119	32 849	3,1
118	295	104	1 020	34 228	4,2
126	323	129	1 055	34 392	0,5
141	325	140	1 047	34 510	0,3
143	315	131	959	33 394	-3,2
98	313	121	920	33 041	-1,1
74	326	108	880	33 166	0,4
70	327	117	1 266	33 666	-1,5
69	339	123	845	33 332	-1,0



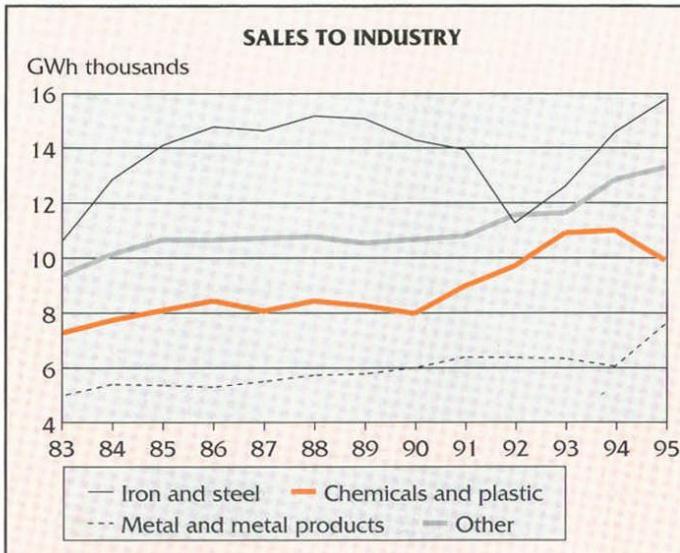
SALES TO INDUSTRY, GWh

By Standard Industrial Classification of selected economic activities (SIC) ^a

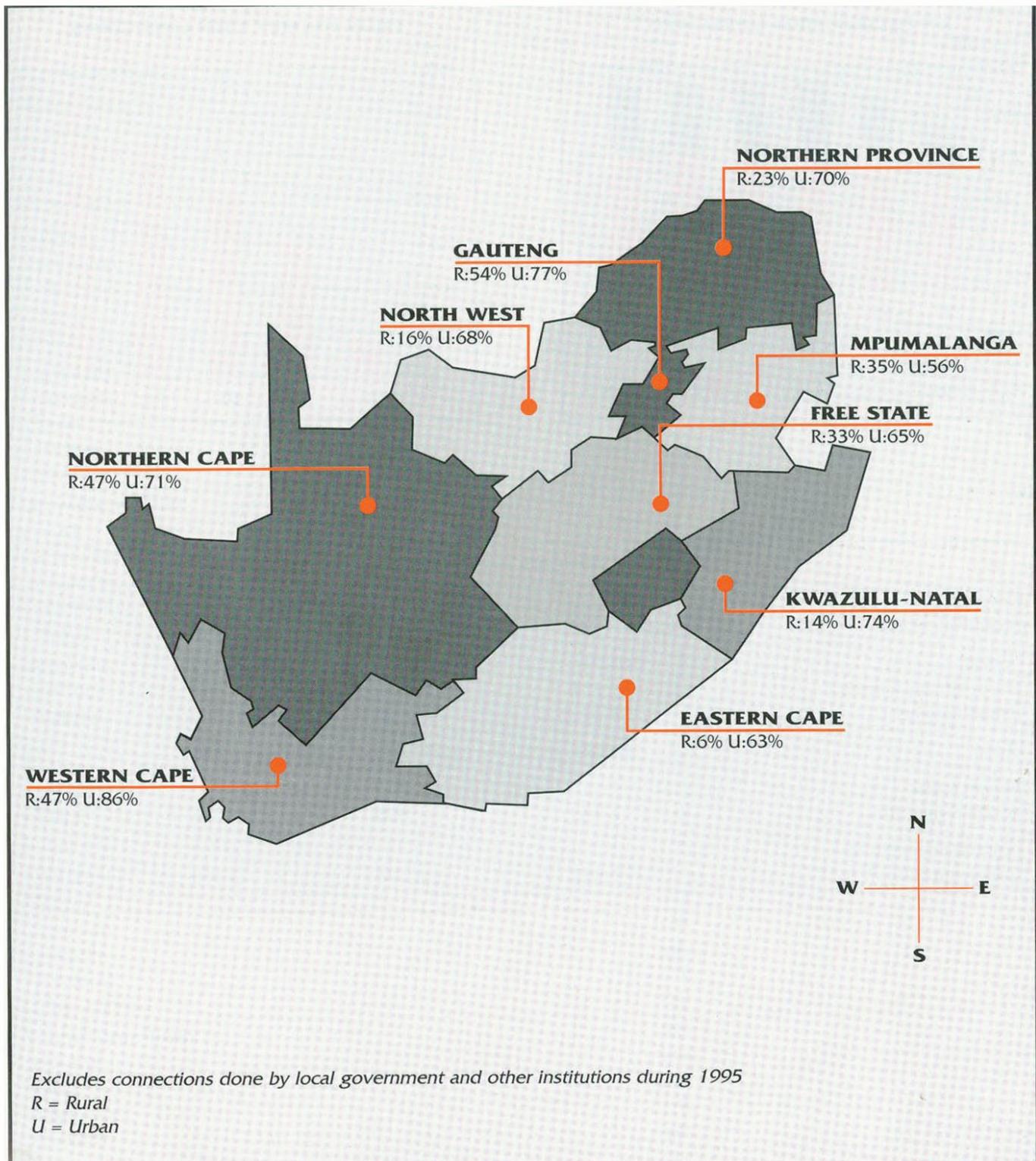
Year	11 ^b	31	32	33	34	35 ^c	351	352	Other	Total	Growth %
1983	255	347	1 184	7 258	1 307	286	10 664	4 699	6 285	32 286	
1984	293	361	1 470	7 716	1 379	291	12 874	5 096	6 639	36 119	11,9
1985	337	401	1 735	8 079	1 236	282	14 116	5 067	6 961	38 215	5,8
1986	322	422	1 689	8 427	1 209	236	14 792	5 054	7 019	39 170	2,5
1987	313	403	1 429	8 063	1 226	170	14 649	5 320	7 355	38 929	-0,6
1988	303	410	1 474	8 417	1 345	157	15 177	5 561	7 241	40 085	3,0
1989	305	398	1 270	8 253	1 221	132	15 077	5 639	7 353	39 647	-1,1
1990	339	366	1 326 ^d	7 967 ^d	1 195	114 ^d	14 298 ^d	5 874 ^d	7 459	38 938	-1,8
1991	329	365	1 346 ^d	8 959 ^d	1 074	92 ^d	13 946 ^d	6 291 ^d	7 688 ^d	40 091	3,0
1992	793	372	1 430 ^d	9 703 ^d	986	92 ^d	11 276 ^d	6 272 ^d	7 996 ^d	38 921	-2,9
1993	1 465	391	1 359 ^d	10 914 ^d	975	93 ^d	12 608	6 236	7 462 ^d	41 503	6,6
1994	1 839	416 ^d	1 348 ^d	10 992 ^d	1 051 ^b	95 ^d	14 604	5 945	8 213 ^d	44 503	7,2
1995	1 839	475	1 509	9 908	1 143	109	15 775	7 467	8 368	46 573	4,7

Standard Industrial Classification Divisions

- 11 Agriculture, hunting and related services.
- 31 Manufacture of textiles, clothing and leather goods.
- 32 Manufacture of wood and of products of wood and cork, manufacture of paper and paper products.
- 33 Manufacture of coke, refined petroleum products and nuclear fuel, manufacture of chemicals and chemical products, manufacture of rubber and plastic products.
- 34 Manufacture of other non-metallic mineral products.
- 35 Manufacture of basic metals, fabricated metal products, machinery and equipment, and office, accounting and computing machinery.
- 351 Manufacture of basic iron and steel.
- 352 Manufacture of basic precious and non-ferrous metals.

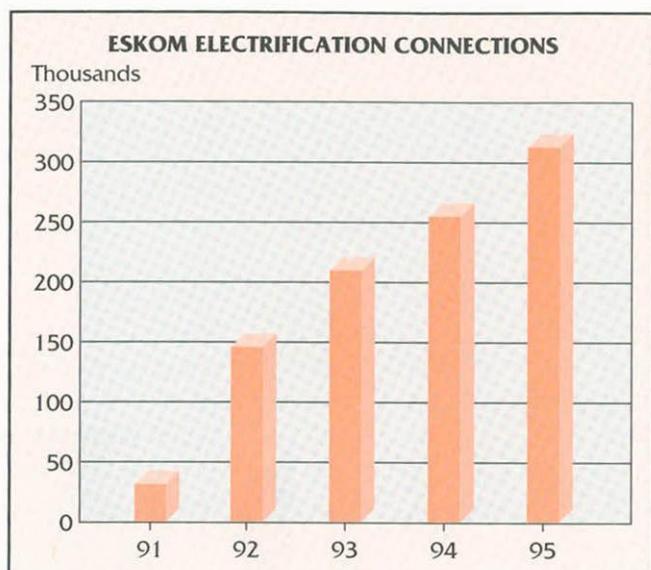
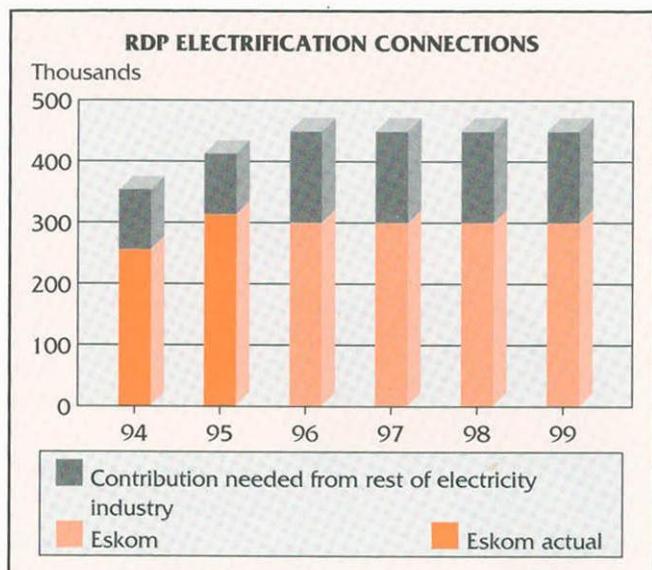
^a SIC codes were revised in 1992.^b Prior to 1992, small power customers were included under Other.^c This reflects the balance after deduction of codes 351 and 352.^d Revised.

PERCENTAGE HOUSES ELECTRIFIED AS AT END 1995



SOUTH AFRICA

AT A GLANCE – ELECTRIFICATION



ELECTRIFICATION PROGRESS				
Connections	Jan 1991 up to Dec 1993	1994	1995	Inception to date
Eskom	384 911	254 383	313 179	952 473
Farm worker houses	28 772	16 838	15 134	60 744
Municipalities	92 378	106 950	59 046	258 374
Total	506 061	378 171	387 359	1 271 591
Total capital expenditure, Rm	1 148	808	1 055	3 012
Capital expenditure per connection, R	2 983	3 176	3 370	3 162

Magisterial district	Number of connections made in 1994	Number of connections made in 1995
Eastern Cape		
Aberdeen	0	714
Addo	387	253
Albany	1 257	713
Alexandria	19	8
Alicedale	7	28
Aliwal North	0	112
Barkly East	0	955
Bathurst	226	528
Bizana	0	445
Burgersdorp	1 176	210
Butterworth	0	1 880
Cathcart	541	1 777
Chalumna	2	50
Clearview	38	0
Cofimvaba/St Marks	0	303
Cradock	162	47
Deetlefsville	254	0
East London	0	1 153
Elliot	1 339	1 434
Elliotdale	728	181
Engcobo	0	3 863
Fort Beaufort	0	1 602
Glengarry	0	496
Graaff-Reinet	0	780
Hankey	350	39
Herschel	21	2 679
Hewu	0	3 045
Hofmeyr	0	348
Humansdorp	59	76
Idutywa	0	191
Jamestown	70	0
Jansenville	338	45
Kareedouw	1	1
Kenton on Sea	471	27
King William's Town	63	9
Kirkwood	179	75
Kuyasa	336	0
Kwezi	10	0
Lady Grey	265	17
Maclear	421	212
Mafulatshepe	680	0
Matatiele	0	654
Mavuya	542	0
Maxesibeni	0	184

ELECTRIFICATION STATISTICS – CONTINUED

	Number of connections made in 1994	Number of connections made in 1995
Magisterial district		
Mdantsane	0	315
Molteno	402	649
Mqanduli	0	244
Ngqeleni	0	1 882
Nqamakwe	0	251
Patensie	95	5
Paterson	96	161
Peddie	0	5 610
Port Alfred	1 377	669
Port Elizabeth	300	454
Sterkspruit	1 764	202
Sterkstroom	98	209
Steynsburg	248	137
Steyterville	137	9
Stutterheim	435	941
Tabankulu	0	676
Transkei	1 834	0
Tsolo	0	252
Tsomo	0	103
Ugie	250	287
Umasizakhe	444	0
Umtata	0	6 245
Venterstad	337	435
Willowvale	0	85
Zwelitsha	0	2 010
Subtotal	17 759	46 965
Free State		
Arlington	54	633
Bethlehem	573	1 219
Bethulie	712	195
Bloemfontein	0	5 406
Boshof	328	12
Brandfort	146	287
Bultfontein	1 070	384
Clarens	49	35
Dewetsdorp	67	10
Excelsior	95	1 244
Fauresmith	227	19
Ficksburg	982	1 044
Fouriesburg	261	88
Frankfort	25	912
Harrismith	131	92
Heilbron	791	1 254
Hennenman	1 257	1 004

	Number of connections made in 1994	Number of connections made in 1995
Magisterial district		
Hertzogville	168	45
Hoopstad	603	282
Jacobsdal	34	0
Ladybrand	440	251
Marquard	1 101	266
Odendaalsrus	2 659	1 651
Petrus Steyn	768	128
Petrusburg	718	23
Philippolis	535	17
Reddersburg	222	64
Reitz	366	290
Rouxville	440	47
Senekal	99	50
Smithfield	0	97
Springfontein	17	32
Steynsrus	691	261
Theunissen	1 799	312
Trompsburg	397	48
Ventersburg	569	909
Viljoenskroon	1 159	334
Virginia	2 478	775
Vrede	685	239
Welkom	7 841	1 406
Wepener	480	180
Wesselsbron	935	439
Winburg	3	1 316
Zastron	720	771
Subtotal	32 695	24 071
Gauteng		
Benoni	6 955	9 151
Boksburg	923	102
Brakpan	4 916	3 934
Carletonville	1 344	2 641
Germiston	74	3 308
Heidelberg	983	192
Johannesburg	813	205
Kempton Park	3 419	587
Krugersdorp	1 311	2 349
Nigel	925	5 787
Pretoria	0	893
Randfontein	5 244	0
Roodepoort	784	1 377
Sandton	830	0
Vanderbijlpark	13 684	8 958

ELECTRIFICATION STATISTICS – CONTINUED

	Number of connections made in 1994	Number of connections made in 1995
Magisterial district		
Vereeniging	3 398	2 761
Westonaria	128	2 884
Subtotal	45 731	45 129
KwaZulu-Natal		
Alfred	0	1 005
Bergville	755	999
Cato Ridge	683	0
Dundee	158	364
Embumbulu	357	267
Empangeni	1 834	0
Emzileni	389	783
Eshowe	2 842	1 622
Estcourt	5 318	1 745
Ezingolweni	2 428	1 259
Hlabisa	2 146	2 087
Hlanganani	0	1 191
Imbali	5 600	0
Inkanyезi	18	100
Kliprivier	306	335
Kwamapumulu	0	2 103
Ladysmith	682	0
Louwsburg	148	0
Lower Umfolozi	2 466	3 110
Madadeni	1 498	2 541
Mapumulo	345	0
Margate	85	0
Mooi River	0	361
Mount Currie	0	100
Mpumalanga	863	1 017
Mtonjaneni	0	83
Mtunzini	0	907
Ncotshane	1 112	719
Ndwedwe	451	1 197
New Hanover	357	60
Newcastle	3 946	2 477
Ngotshe	74	279
Nongoma	100	469
Nqutu	0	613
Ongoye	0	179
Pietermaritzburg	981	4 289
Pinetown	1 557	858
Polela	746	808
Pongola	212	0
Port Shepstone	2 589	5 427

	Number of connections made in 1994	Number of connections made in 1995
Magisterial district		
Richmond	654	2 008
Simdlangentsha	0	60
Umzinto	85	1 068
Vryheid	124	2 120
Vulindlela	878	1 374
Weenen	254	0
Subtotal	43 041	45 984
Mpumalanga		
Amersfoort	99	134
Balfour	476	1 585
Delmas	161	1 646
Ermelo	290	0
Groblersdal	25 980	34 057
Kwamhlanga	660	99
Kwandebele	425	0
Mkobola	662	541
Volkspark	0	1 076
Piet Retief	467	0
Wakkerstroom	76	0
Subtotal	29 296	39 138
Northern Cape		
Askham	4	0
Barkly West	305	344
Calvinia	0	55
Carnarvon	621	0
Colesberg	799	933
Gordonia	514	295
Griekwastad	31	0
Groblershoop	381	0
Hanover	9	17
Hartswater	426	2 507
Herbert	606	33
Hopetown	18	2
Kakamas	38	0
Kanoneiland	2	0
Kathu	264	0
Kenhardt	0	157
Kimberley	183	1 246
Kuruman	525	1 306
Loxton	100	0
Marydale	325	0
Namakwaland	1 559	365
Naudesfontein	1	0

ELECTRIFICATION STATISTICS – CONTINUED

	Number of connections made in 1994	Number of connections made in 1995
Magisterial district		
Niekerkshoop	41	0
Noupoort	393	41
Olifantshoek	525	0
Petrusville	37	17
Philipstown	185	17
Postmasburg	628	0
Prieska	292	5
Reivilo	2	0
Richmond	0	616
Richtersveld	92	199
Ritchie	90	128
Smithskraal	1	0
Van Aswegenhoek	1	0
Van Zylsrus	9	0
Victoria West	435	16
Vryburg	89	251
Vryheid	17	0
Warrenton	786	10
Windsor-ton	312	0
Subtotal	10 646	8 560
Northern Province		
Bochum	0	1 603
Bolobedu	341	820
Ellisras	27	265
Gazankulu	4 181	0
Giyani	5 197	203
Malumulele	699	250
Mapulaneng	658	3 037
Mhala	5 007	4 223
Mokerong	576	5 053
Namakgale	0	1 083
Naphuno	593	3 128
Nebo	300	5 474
Pietersburg	17 248	24 369
Potgietersrus	520	3 582
Sekgosese	0	2 269
Sekhukhuneland	0	6 542
Seshego	2 654	4 120
Thabamooopo	2 577	3 892
Thabazimbi	180	1 294
Thohoyandou	0	170
Warmbaths	118	672
Subtotal	40 876	72 049

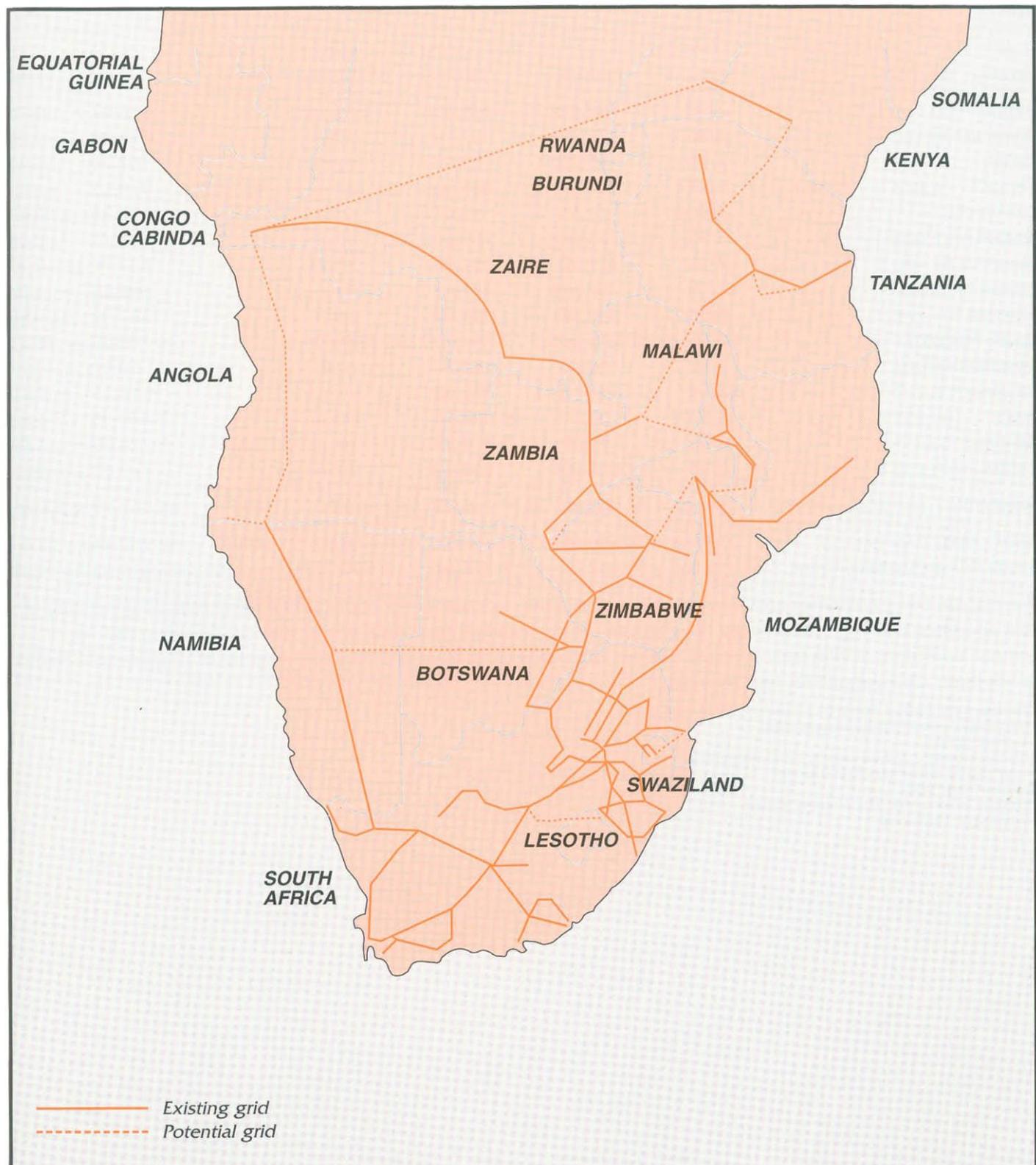
Magisterial district	Number of connections made in 1994	Number of connections made in 1995
North West		
Bloemhof	310	421
Brits	834	498
Coligny	261	333
Delareyville	91	0
Hartbeesfontein	215	246
Klerksdorp	0	72
Koster	246	355
Leeudoringstad	387	156
Lichtenburg	398	52
Madikwe	1 330	1 613
Makwassie	233	276
Moretele	581	6 508
Orkney	929	482
Ottosdal	22	289
Rustenburg	704	2 717
Sannieshof	235	117
Schweizer-Reneke	628	2 090
Stilfontein	849	259
Swartruggens	13	1
Thabazimbi	4	0
Wolmaransstad	517	1 155
Zeerust	180	6
Subtotal	8 967	17 646
Western Cape		
Beaufort West	0	6
Bellville	42	188
Bredasdorp	0	98
Caledon	149	122
Ceres	0	58
George	0	1
Goodwood	0	157
Gouda	15	6
Grabouw	113	8
Heidelberg	14	0
Hermanus	0	13
Khayelitsha	21 334	9 940
Knysna	0	80
Kraaifontein	177	0
Kuils River	1 613	213
Ladismith	22	934
Laingsburg	0	2
Malmesbury	38	83
Mitchells Plain	216	372

ELECTRIFICATION STATISTICS – CONTINUED

Magisterial district	Number of connections made in 1994	Number of connections made in 1995
Oudtshoorn	0	53
Piketberg	2	20
Porterville	105	0
Riversdale	0	33
Somerset West	114	141
Stellenbosch	87	94
Strand	535	725
Swellendam	22	90
Tulbagh	10	31
Vanrhynsdorp	0	122
Vredenburg	380	17
Vredendal	295	16
Worcester	0	14
Wynberg	89	0
Subtotal	25 372	13 637
Total	254 383	313 179

S U B - S A H A R A N A F R I C A

EXISTING AND POTENTIAL ELECTRICAL POWER GRID



NET MAXIMUM GENERATING CAPACITY

Sources: Information obtained from electricity utilities and South Africa's National Electricity Regulator

MW

Country	Year ended	Thermal	Hydro	Nuclear	Geo-thermal	Total	% of total
Angola ^{a c}	12/95	125.22	200.80	–	–	326.02	0.74
Botswana ^{a b}	3/96	172.00	–	–	–	172.00	0.39
Congo	12/95	18.20	89.00	–	–	107.20	0.24
Kenya ^d	6/95	100.48	569.50	–	45.35 ^e	715.33	1.62
Lesotho ^{a b}	3/96	1.56	3.27	–	–	4.83	0.01
Malawi ^a	3/95	24.56	164.60	–	–	189.16	0.43
Mauritius ^a	12/95	277.70	54.20	–	–	331.90	0.75
Mozambique ^a	12/95	97.39	491.19 ^f	–	–	588.58	1.34
Namibia ^{a b}	6/95	147.00	240.00	–	–	387.00	0.88
South Africa ^{a b}	12/95	30 612.00 ^g	2 248.80 ^h	1 840.00	–	34 700.80	78.75
Swaziland ^{a b}	3/95	9.50	40.50	–	–	50.00	0.11
Tanzania ^a	12/95	139.15	375.00	–	–	514.15	1.17
Zaire	12/94	37.80	2 442.16	–	–	2 479.96	5.63
Zambia ^a	3/95	84.00	1 670.00	–	20.00	1 774.00	4.03
Zimbabwe ^a	6/95	1 056.00	666.00	–	–	1 722.00	3.91
Total, MW		32 902.56	9 255.02	1 840.00	65.35	44 062.93	100.00
SADC, MW		32 746.08	6 154.36	1 840.00	20.00	40 760.44	92.51
South African Customs Union, MW		30 942.06	2 532.57	1 840.00	0	35 314.63	80.15

Thermal electricity comprises conventional plants of all types, whether or not equipped for the combined generation of heat and electric energy. Accordingly, they include steam-operated generating plants, with condensation (with or without extraction) or with back-pressure turbines and plants using internal combustion engines or gas turbines whether or not these are equipped for heat recovery.

^a Member of the Southern African Development Community (SADC).^b Member of the South African Customs Union.^c Available capacity.^d Effective capacity = sent-out capacity + own use capacity.^e Includes wind turbine capacity of 0.35 MW.^f Includes Cahora Bassa.^g Excludes Eskom's 4 531 MW in reserve storage.^h Includes pumped storage.

S U B - S A H A R A N A F R I C A

GROSS PRODUCTION OF ELECTRICITY

Sources: Information obtained from electricity utilities and South Africa's National Electricity Regulator

GWh

Country	Year ended	Thermal	Hydro	Nuclear	Geo-thermal	Total	% of total
Angola ^a	12/95	165.00	877.00	—	—	1 042.00	0,50
Botswana ^{a b}	3/96	1 017.00	—	—	—	1 017.00	0,49
Congo	12/95	1.86	352.01	—	—	353.87	0,17
Kenya	6/95	283.68	3 103.09	—	291.56 ^c	3 678.33	1,77
Lesotho ^{a b}	3/96	0	0	—	—	0	0
Malawi ^a	3/95	4.41	856.11	—	—	860.52	0,41
Mauritius ^a	12/95	913.20	134.18	—	—	1 047.38	0,50
Mozambique ^a	12/95	28.57	335.90 ^d	—	—	364.47	0,18
Namibia ^{a b}	6/95	124.60	1 134.10	—	—	1 258.70	0,61
South Africa ^{a b}	12/95	161 324.00	2 090.00 ^e	11 301.00	—	174 715.00	84,18
Swaziland ^{a b}	3/96	0.84	109.00	—	—	109.84	0,05
Tanzania ^a	12/95	252.00	1 539.00	—	—	1 791.00	0,86
Zaire ^f	12/94	5.40	5 373.60	—	—	5 379.00	2,59
Zambia ^a	3/95	14.00	8 102.00	—	—	8 116.00	3,91
Zimbabwe ^a	6/95	5 526.30	2 284.70	—	—	7 811.00	3,76
Total, GWh		169 660.86	26 290.69	11 301.00	291.56	207 544.11	100,00
SADC, GWh		169 369.92	17 461.99	11 301.00	0	197 085.53	94,96
South African Customs Union, GWh		162 466.44	3 333.10	11 301.00	0	177 100.54	85,33

^a Member of the Southern African Development Community (SADC).

^b Member of the South African Customs Union.

^c Includes 1,09 GWh generated by wind turbine.

^d Includes Cahora Bassa.

^e Includes pumped storage.

^f Statistics for year ended 31 December 1994 not available at time of publication.

UTILISATION OF NET MAXIMUM GENERATING CAPACITY

Sources: Information obtained from electricity utilities and South Africa's National Electricity Regulator

Kilowatt-hours produced per kilowatt

Country	Year ended	Thermal	Hydro	Nuclear	Geo-thermal	Total
Angola ^a	12/95	1 318	4 368	—	—	3 196
Botswana ^{a b}	3/96	5 913	—	—	—	5 913
Congo	12/95	102	3 955	—	—	3 301
Kenya	6/95	2 823	5 449	—	6 429	5 142
Lesotho ^{a b}	3/96	0	0	—	—	0
Malawi ^a	3/95	180	5 201	—	—	4 549
Mauritius ^a	12/95	3 288	2 476	—	—	3 156
Mozambique ^a	12/95	293	684	—	—	619
Namibia ^{a b}	6/95	848	4 725	—	—	3 252
South Africa ^{a b}	12/95	5 270	929	6 142	—	5 035
Swaziland ^{a b}	3/95	88	2 691	—	—	2 197
Tanzania ^a	12/95	1 811	4 104	—	—	3 483
Zaire ^c	12/94	143	2 200	—	—	2 169
Zambia ^a	3/95	167	4 851	—	0	4 575
Zimbabwe ^a	6/95	5 233	3 430	—	—	4 536
Total		5 156	2 841	6 142	4 462	4 710
SADC, MW		5 172	2 837	6 142	0	4 835
South African Customs Union, MW		5 251	1 316	6 142	0	5 015

^a Member of the Southern African Development Community (SADC).^b Member of the South African Customs Union.^c Statistics for year ended 31 December 1994 not available at time of publication.

PRODUCTION AND TRADE OF ELECTRICITY

Sources: Information obtained from electricity utilities and South Africa's National Electricity Regulator

Quantities in gigawatt-hours and in kilowatt-hours per capita

Country	Year ended	Gross production	Imports	Exports	Total available	% of total	kWh per capita
Angola ^a	12/95	1 042,0	–	–	1 042,0	0,50	99
Botswana ^{a b}	3/96	1 017,0	382,0	–	1 399,0	0,67	999
Congo	12/95	353,9	166,2	–	520,1	0,25	226
Kenya	6/95	3 678,3	187,2	–	3 865,5	1,86	148
Lesotho ^{a b}	3/96	434,5	434,5	–	434,5	0,21	217
Malawi ^a	3/95	860,5	–	1,0	859,5	0,41	108
Mauritius ^a	12/95	1 047,4	–	–	1 047,4	0,50	952
Mozambique ^{a c}	12/95	364,5	608,0	–	972,5	0,47	56
Namibia ^{a b}	6/95	1 258,7	766,9	–	2 025,6	0,97	1 447
South Africa ^{a b}	12/95	174 715,0	172,0	3 047,0	171 840,0	82,70	4 373
Swaziland ^{a b}	3/95	109,8	597,0	–	706,8	0,34	862
Tanzania ^a	12/95	1 791,0	11,4	–	1 802,4	0,87	68
Zaire ^d	12/94	5 379,0	52,5	1 278,3	4 153,2	2,00	110
Zambia ^a	3/95	8 116,0	–	1 067,0	7 049,0	3,39	766
Zimbabwe ^a	6/94	7 811,0	2 312,4	45,5	10 077,9	4,85	969
Total, GWh		207 544,1	5 690,1	5 438,8	207 795,4	100,00	1 070
SADC, GWh		198 132,9	5 284,2	4 160,5	199 256,6	95,89	2 277
South African Customs Union, GW		177 100,5	2 352,4	3 047,0	176 405,9	84,89	3 927

^a Member of the Southern African Development Community (SADC).^b Member of the South African Customs Union.^c Includes Cahora Bassa.^d Statistics for year ended 31 December 1994 not available at time of publication.

SUB - SAHARAN AFRICA

ANGOLA

Source: Empresa Nacional de Electricidade (ENE) for the year ended 31 December 1995

Source of power	Type	Nominal capacity MW	Available capacity MW
Independent electricity systems			
Northern system:			
Kwanza Norte	Hydro	180,00	180,00
Bengo	Hydro	17,80	0
Luanda	Gas turbine	92,60	24,40 ^a
	Diesel	32,60 ^b	32,60 ^b
Malange	Diesel	1,86	1,00
Kwanza Sul	Diesel	10,99	5,85
Central system:			
Benguela	Hydro	49,40	7,20
	Gas turbine	22,80	0
	Diesel	26,25	18,65 ^c
Huambo	Hydro	3,05	0
	Gas turbine	10,00	0
	Diesel	9,11	2,80 ^d
Southern system:			
Huila	Hydro	41,10	13,60
	Diesel	11,86 ^b	2,80 ^e
Namibe	Diesel	16,06	12,60 ^f
Isolated power stations			
Cabinda	Gas turbine	10,00	10,00
	Diesel	11,58 ^b	5,48 ^g
Uige	Hydro	1,12	0 ^h
	Diesel	1,90	0 ^h
Bié	Hydro	1,62	0
	Diesel	3,16	0 ^h
Moxico	Diesel	2,72	1,04 ⁱ
Total ENE, MW		557,58	318,02
Other producers of electricity			
Refinaria (Luanda) i	Gas turbine	10,00	8,00
Total source of power, MW		567,58	326,02
System peak demand (simultaneous one-hour demand)	Date and time	1995 MW	1994 Date and time MW
Northern system	24-11-95 19:45	138,0	12-01-94 21:05
Central system	16-02-95 20:15	20,4	22-04-94 19:35
Southern system	26-02-95 21:00	13,8	15-03-94 20:40
Cabinda	18-10-95 19:30	6,4	18-02-94 19:35
Kwanza Sul	21-12-95 11:00	2,1	03-11-94 10:30
			1,3

	1995	1994	Change
	GWh	GWh	%
Electricity produced by ENE power stations (net)			
Hydro (net)	877	736	19,2
Thermal (net)	165	201	-17,9
Total electricity produced (net), GWh	1 042	937	11,2
Electricity sold	1995	1994	Change
	GWh	GWh	%
Domestic	184	154	19,5
Agriculture	48	38	26,3
Industrial	136	125	8,8
Street lighting and other	6	7	-14,3
Distribution utility	528	487	8,4
Total electricity sold, GWh	902	811	11,2
Number of customers	1995	1994	Change
			%
High voltage	5	5	0
Medium voltage	1 138	1 048	8,6
Low voltage	80 988	79 877	1,4
Street lighting	14	14	0
Total number of customers	82 145	80 944	1,5
Transmission and distribution equipment in service	1995	1994	Change
	km	km	km
Overhead lines			
220 kV	549	549	0
150 kV	572	572	0
100 kV	159	159	0
60 kV	606	606	0
30 kV	227	195	32
Total overhead lines, km	2 113	2 081	32
Number of ENE employees	1995	1994	Change
			%
GWh sold per employee	3 342	3 267	2,3
Population of Angola (1992 estimate), number	0,270	0,248	8,9
Average selling price, Kzr/kWh ^d	10,5 million ^c	9 million	16,7
High voltage	Kzr 0,90	Kzr 0,68	32,4
Medium voltage	Kzr 1,10	Kzr 0,83	32,5
Low voltage	Kzr 2,80	Kzr 2,12	32,1
Street lighting	Kzr 1,40	Kzr 1,06	32,1

^a Only one unit in service.

^b Two emergency diesel power station units of 12 MW and 6 MW were installed.

^c One more unit of 5 MW at Lobito Power Station has been rehabilitated.

^d Two diesel groups of 1,4 MW each have been rehabilitated.

^e Two emergency diesel groups 1,4 MW each have been rehabilitated.

^f A unit of 5,6 MW has been rehabilitated at the Namibe Power Station.

^g Two emergency diesel groups of 1,4 MW and 1,0 MW were installed.

^h Diesel and hydro power stations were destroyed during the war.

ⁱ A diesel group of 0,56 MW was installed.

^j Private industry.

^k 1995 estimate.

^l Kwansa reajustado (US\$ 1 = Kzr 6 000,00 in 1995) replaced the novos kwanza (Nkz) previously used in Angola – Kzr 1,00 = Nkz 1 000,00

S U B - S A H A R A N A F R I C A

BOTSWANA

Source: Botswana Power Corporation (BPC) for the year ended 31 March 1996

Source of power	Type	Nominal capacity	Net maximum capacity
		MW	MW
Morupule	Coal fired	132	118
Selebi-Phikwe	Coal fired	65	54
Total own source		197	172
Other sources			
Eskom		205	205
Zimbabwe		120	120
Total other sources		325	325
Total source of power, MW		522	497
System peak demand (simultaneous one-hour demand) *	Date and time	1995/96 MW	1994/95 MW
	21-07-95 10:09	204,9	26-07-94 10:00
Electricity produced		1995/96 GWh	1994/95 GWh
Coal fired		1 017	1 011
Total electricity produced, GWh		1 017	1 011
Electricity imported, GWh		382	298
Station usage		124	124
Total available for distribution, GWh		1 275	1 185
System losses		67	79
Electricity sold		1995/96 GWh	1994/95 GWh
Commercial		349	276
Domestic		161	150
Government		79	74
Mining		619	606
Total electricity sold, GWh		1 208	1 106
Number of customers		1995/96	1994/95
Commercial		5 287	4 964
Domestic		37 798	37 346
Government		2 032	1 850
Mining		4	4
Total number of customers		45 121	44 164

Transmission and distribution equipment in service

	1995/96	1994/95	Change
	km	km	km
Overhead lines			
220 kV	902,0	902,0	0
132 kV	817,8	817,8	0
66 kV	374,1	374,1	0
33 kV	623,8	598,9	24,9
11 kV	1 200,5	1 123,7	76,8
0,4 kV	1 198,9	1 107,3	91,6
Total overhead lines, km	5 117,1	4 923,8	193,3
Underground cable	1995/96	1994/95	Change
	km	km	km
11 kV	257,3	248,5	8,8
0,4 kV	284,4	269,8	14,6
Total underground cable, km	541,7	518,3	23,4
Total, km	5 658,8	5 442,1	216,7
Transformers	1995/96	1994/95	Change
	MVA	MVA	MVA
220/132 kV	240,00	240,00	0
220/66 kV	80,00	—	80,00
220/33 kV	80,00	80,00	0
220/11 kV	315,00	285,00	30,00
132/33 kV	90,00	90,00	0
132/11 kV	260,00	260,00	0
132/6,6 kV	40,00	40,00	0
66/33 kV	20,00	20,00	0
66/11 kV	42,95	42,95	0
33/11 kV and 33/0,4 kV	75,78	73,76	2,02
11/0,4 kV	382,67	359,28	23,39
Total, MVA	1 626,40	1 490,99	135,41
	1995/96	1994/95	Change
			%
Number of BPC employees	1 680	1 700	-1,2
GWh sold per employee	0,720	0,651	10,6
Population of Botswana (1991 census), number	1,4 million	1,4 million	0
Average selling price, thebe/kWh	20,19	21,04	-4,0

* BPC now uses net maximum demand.

S U B - S A H A R A N A F R I C A

CONGO

Source: Department of Electricity and Water Affairs (Congo) for Societe Nationale d' Electricite (SNEL) for the year ended 31 December 1995

Source of power	Type	Nominal capacity	Avaliable capacity
		MW	MW
Moukoukoulou	Hydro	74,0	74,0
Djoué	Hydro	15,0	15,0
Pointe Noire	Diesel	20,4	9,3
Dolisie	Diesel	1,5	0,4
Selebi-Phikwe	Diesel	8,5	8,5
Total source of power, MW		119,4	107,2
Electricity produced	1995 GWh	1994 GWh	Change %
Hydro	352,01	322,07	9,3
Diesel	1,86	0	100,0
Total electricity produced, GWh	353,87	322,07	9,9
Imports from Zaire	166,21	183,60	-9,5
Total available for distribution, GWh	520,08	505,67	2,8
System losses	184,20	26,02	607,9
Electricity sold	1995 GWh	1994 GWh	Change %
Medium and high voltage	187,02	—	—
Low voltage	148,86	—	—
Total electricity sold, GWh	335,88	479,65	-30,0
Number of customers	1995	1994	Change %
Medium and high voltage	433	441	-1,8
Low voltage	100 180	101 326	-1,1
Total number of customers	100 613	101 767	-1,1
Transmission and distribution equipment in service	1995 km	1994 km	Change km
Overhead lines			
220 kV	454,0	451,0	3,0
110 kV	267,0	267,0	0
35 kV	117,6	117,6	0
30 kV	94,2	94,2	0
Total overhead lines, km	932,8	929,8	0
Underground cable	1995 km	1994 km	Change km
30 kV	37,0	37,0	0
20 kV	300,0	300,0	0
6,6/5,5 kV	145,0	145,0	0
Low voltage	395,0	395,0	0
Total underground cable, km	877,0	877,0	0
Total, km	1 809,8	1 806,8	3,0

Transformers Highest voltage	1995 MVA	1994 MVA	Change MVA
220 kV	361,8	361,8	0
110 kV	169,0	169,0	0
35/10 kV and 30/0,4 kV	16,2	16,2	0
Total, MVA	547,0	547,0	0
	1995	1994	Change %
Number of SNEL employees	1 268	1 363	-7,0
GWh sold per employee	0,265	0,263 *	-24,7
Population of Congo, number	2,3 million	2,3 million	0
Average selling price F CFA/kWh	53	62	-14,5

* Adjusted.

S U B - S A H A R A N A F R I C A

KENYA

Source: Kenya Power and Lighting Company Ltd (KPLC) for the year ended 30 June 1995

Source of power	Type	Nominal capacity MW	Effective capacity ^a MW
Tana (KPC)	Hydro	14,40	12,40
Wanjii (KPC)	Hydro	7,40	7,40
Kamburu (TRDC)	Hydro	91,50	84,00
Gitaru (TRDC)	Hydro	145,00	145,00
Kindaruma (TRDC)	Hydro	44,00	44,00
KPLC stations ^b	Hydro	6,20	3,70
Masinga (TARDA)	Hydro	40,00	40,00
Kiambere (TARDA) ^c	Hydro	144,00	127,00
Turkwell (KVDA)	Hydro	106,00	106,00
Kipevu (KPLC) ^d	Coal fired	93,00	50,00
Olkaria (KPC)	Geothermal	45,00	45,00
Nairobi South (KPLC)	Gas turbine	13,50	12,00
Kipevu (KPLC)	Gas turbine	30,00	30,00
Interconnected (KPLC)	Diesel	4,00	1,80
Isolated KPLC stations	Diesel	3,50	3,40
Isolated REF stations	Diesel	3,80	3,28
Ngong	Wind turbine	0,35	0,35
Total, MW		791,65	715,33
Other producers of electricity			
UEB (imports) ^e	Hydro	30,00	0
Total source of power, MW		821,65	715,33
System peak demand (simultaneous one-hour demand)	1994/95		1993/94
	Date	MW	Date
	04-08-94	605	18-01-94
	1994/95	1993/94	Change
Electricity produced	GWh	GWh	%
Thermal	217,59	139,55	55,9
Hydro	3 103,09	3 047,51	1,8
Diesel (interconnected)	1,72	0,43	300,0
Diesel (isolated)	17,39	17,08	1,8
Gas turbine	46,98	1,59	2 854,7
Geothermal	290,47	260,91	11,3
Wind turbine	1,09	0,71	53,5
Total electricity produced, GWh	3 678,33	3 467,78	6,1
Electricity imported from Uganda	187,23	264,00	-29,1
Auxiliary consumption/own use	45,04	38,00	18,5
Total available for distribution, GWh	3 820,52	3 693,78	3,4
System losses	597,77	558,78	7,0

^a Effective capacity = net maximum capacity + own use capacity.

^b Some of these small hydro power stations were undergoing overhaul for much of the year.

^c Effective capacity lower due to weak winding insulation.

^d Station was undergoing repairs for most of the year.

^e Uganda import is considered to have zero firm power for Kenya as it is not available during peak hours.

	1994/95 GWh	1993/94 GWh	Change %
Electricity sold			
Domestic, small commercial and small industrial	1 026	977	5.0
Commercial and industrial (medium and large)	1 925	1 885	2.1
Off-peak	119	125	-4.8
Street lighting	18	10	80.0
Rural electrification	134	138	-2.9
Total electricity sold, GWh	3 222	3 135	2.8
Number of customers	1994/95 GWh	1993/94 GWh	Change %
Domestic, small commercial and small industrial	365 409	346 938	5.3
Commercial and industrial (medium and large)	2 958	2 759	7.2
Off-peak	1 972	1 830	7.8
Street lighting	117	120	-2.5
Total number of customers ^f	370 456	351 647	5.3
Transmission and distribution equipment in service			
Overhead lines	1994/95 km	1993/94 km	Change km
220 kV	877	877	0
132 kV	1 980	1 980	0
66 kV	567	567	116
40 kV	126	126	0
33 kV	3 874	3 684	190
11 kV	8 760	8 368	392
Total overhead lines, km	16 184	15 602	528
Underground cables			
66 kV	6	6	0
33 kV	2	2	0
11 kV	490	470	20
Total underground cable, km	498	478	20
Total, km	16 682	16 080	602
Transformers	1994/95 MVA	1993/94 MVA	Change MVA
Step-down transformers	4 428.8	4 319.8	109
Step-up transformers	1 663.0	1 663.0	0
Total, MVA ^g	6 091.8	5 982.8	109
	1994/95	1993/94	Change %
Number of KPLC employees ^h	8 864	10 186	-13.0
GWh sold per employee	0.364	0.308	18.2
Population of Kenya, number	26.2 million	25.4 million ⁱ	3.1
Average selling price, Kenya shillings/kWh ^j	4.21	3.09	36.2

^f Includes rural electrification customers.^g Rural electrification transformer capacity included.^h A major staff retrenchment programme was carried out in 1995.ⁱ The 1989 population census result was 21.4 million. Population estimated to be 25.4 million in 1994.^j Kenya shillings 55 = US\$1.00 in mid 1995.

LESOTHO

Source: Lesotho Electricity Corporation (LEC) for the year ended 31 March 1996

Source of power	Type	Nominal capacity MW	Net maximum capacity MW
Mantsonyane	Hydro	2,000	2,000
Semonkeng	Hydro	0,180	0,180
Qacha's Nek	Hydro	0,432	0,432
Mokhotlong	Hydro	0,656	0,656
Qacha's Nek (backup)	Diesel	0,800	0,800
LEC headquarters (standby)	Diesel	0,168	0,168
33 kV LEC border substation (standby)	Diesel	0,024	0,024
Mantsonyane (backup)	Diesel	0,048	0,048
Semonkeng (backup)	Diesel	0,120	0,120
Mokhotlong (backup)	Diesel	0,400	0,400
Total, MW		4,828	4,828
Other sources – Eskom (registered peak at intake points)			
Maseru (132 kV)		46,525	46,525
Hololo (88 kV)		3,797	3,797
Total from Eskom, MW		50,322	50,322
Total source of power, MW		55,150	55,150
System peak demand (simultaneous one-hour demand)	Date	1995/96 MW	1994/95 MW
	24-07-95	80,02	22-07-94 71,5
Electricity produced		1995/96 GWh	1994/95 GWh
Hydro		0	0
Diesel		0	0
Total electricity produced, GWh		0	0
Imports from Eskom		434,5	312,2
Total available for distribution, GWh		434,5	312,2
System losses		54,6	53,0
Electricity sold		1995/96 GWh	1994/95 GWh
Domestic		95,6	52,8
Commercial		55,0	44,3
Industrial		60,0	41,7
General purposes		69,7	35,8
Lesotho Highlands Development Authority		99,6	84,6
Total electricity sold, GWh		379,9	259,2
			46,6

	1995/96	1994/95	Change %
Number of customers			
Domestic	7 833	9 025	-13,2
Commercial	86	87	-1,1
Industrial	83	103	-19,4
General purposes	2 872	2 926	-1,8
Lesotho Highlands Development Authority	18	19	-5,3
Total number of customers	10 892	12 160	-10,4
Transmission and distribution equipment in service			
Overhead lines	1995/96 km	1994/95 km	Change km
132 kV	164	144	13,9
88 kV	86	86	0
66 kV	78	78	0
33 kV	559	520	7,5
11 kV	994	946	5,1
Total overhead lines, km	1 881	1 774	6,0
Transformers	1995/96 MVA	1994/95 MVA	Change MVA
132/33 kV	160	120	33,3
132/66 kV	60	60	0
66/11 kV	45	45	0
33/11 kV	167	158	5,7
11/0,4 kV	150	136 ^a	10,3
Total, MVA	582	519	12,1
	1995/96	1994/95	Change %
Number of LEC employees	836	794	5,3
GWh sold per employee	0,454	0,326	39,3
Population of Lesotho, number	2 million	2 million	0
Average selling price, cents/kWh			
Domestic	28,00	28,00	0
Small business	41,00	41,00	0
Commercial	26,77	26,77	0
Industrial	22,80	22,80	0

MALAWI

Source: Electricity Supply Commission of Malawi (ESCOM) for year ended 31 March 1995

Source of power	Type	Nominal capacity MW	Net maximum capacity MW
Tedzani Falls	Hydro	40.00	40,00
Nkula Falls A	Hydro	24.00	24,00
Nkula Falls B	Hydro	100.00	100,00
Zomba	Hydro	0,60	0,60
Chichiri	Gas turbine	15,00	15,00
Lilongwe	Diesel	5,34 *	5,34 *
Mtunthama	Diesel	0,29	0,29
Mzuzu	Diesel	2,05	2,05
Karonga	Diesel	1,58 *	1,58 *
Chitipa	Diesel	0,30	0,30
Total source of power, MW		189,16	189,16
System peak demand (simultaneous one-hour demand)	Date and time	1994/95 MW	1993/94 Date and time MW
	25-07-95 18:00	149,4	01-08-93 11:30 140,2
Electricity produced		1994/95 GWh	1993/94 GWh
Hydro		856,11	827,66
Diesel		1,08	1,51
Gas turbine		3,33	2,72
Total electricity produced, GWh		860,52	831,89
Exports		1,04	0,83
Total available for distribution, GWh		859,48	831,06
System losses, GWh		128,08	127,45
Electricity sold		1994/95 GWh	1993/94 GWh
Domestic		157,92	143,94
General		121,30	118,97
Industrial		452,18	440,70
Total electricity sold, GWh		731,40	703,61
Number of customers	1994/95	1993/94	Change %
Domestic	44 446	41 149	8,0
General	12 195	11 415	6,8
Industrial	625	574	8,9
Total number of customers	57 266	53 138	7,8

Transmission and distribution
equipment in service

	1994/95	1993/94	Change
	km	km	km
Overhead lines			
132 kV	952,00	952,00	0
66 kV	820,00	820,00	0
33 kV	1 877,00	1 867,00	10,00
11 kV	2 132,00	2 071,00	61,00
400/230 V	2 293,00	2 245,00 *	48,00
Total overhead lines, km	8 074,00	7 955,00	119,00
Underground cable	1994/95	1993/94	Change
	km	km	km
33 kV	6,90	6,90	0
11 kV	89,60	89,60	0
400/230 V	178,00	178,00 *	0
Total underground cable, km	274,50	274,50	0
Total, km	8 345,50	8 229,50	119,00
Transformers	1994/95	1993/94	Change
	MVA	MVA	MVA
Step-down transformers	728,54	725,63	2,91
Step-up transformers	220,98	220,98	0
Total, MVA	949,52	946,61	2,91
	1994/95	1993/94	Change
			%
Number of ESCOM employees	2 494	2 241	11,3
GWh sold per employee	0,290	0,314	-7,6
Population of Malawi (1987 census), number	7,98 million	7,98 million	0
Average selling price, tambala/kWh	29,68	21,08	40,8

* Restated.

MAURITIUS

Source: Central Electricity Board (CEB) for the year ended 31 December 1995

Source of power	Type	Nominal capacity MW	Available capacity MW
Champagne	Hydro	30,00	28,00
Ferney	Hydro	10,00	10,00
Tamarin	Hydro	11,10	8,00
Le Val	Hydro	4,00	4,00
Réduit	Hydro	1,20	1,20
Cascade Cécile	Hydro	1,00	1,00
Magenta	Hydro	0,94	0,80
Le Ferme	Hydro	1,20	1,20
St Louis	Thermal	72,00	60,00
Fort Victoria	Thermal	54,00	47,60
Fort George	Thermal	47,00	47,00
Nicolay	Gas turbine	80,00	80,00
Total own sources		312,44	288,80
Other sources			
Sugar Estates (seasonal)	Thermal	52,15	43,10
Total source of power, MW		364,59	331,90
System peak demand (simultaneous one-hour demand)	Date	1995 MW	1994 MW
		15-11-95	200,5
			-
Electricity produced		1995 GWh	1994 GWh
Thermal		682,09	699,34
Sugar Estates (thermal)		125,27	122,85
Hydro		134,18	75,25
Gas turbine		105,84	47,60
Total electricity produced, GWh		1 047,38	945,04
Auxiliary consumption/own use		32,84	30,99
Total available for distribution, GWh		1 014,54	914,05
System losses		115,85	110,09
Electricity sold		1995 GWh	1994 GWh
Domestic		331,63	292,48
Commercial		229,18	205,91
Industrial – general		307,89	277,08
Industrial – irrigation		17,31	18,59
Street lighting		12,68	9,90
Total electricity sold, GWh		898,69	803,96
Number of customers	1995	1994	Change %
Domestic	237 209	225 450	5,2
Commercial	22 924	21 356	7,3

	1995	1994	Change
			%
Number of customers (continued)			
Industrial – general	6 163	5 807	6,1
Industrial – irrigation	241	231	4,3
Street lighting	230	222	3,6
Total number of customers	266 767	253 066	5,4
Transmission and distribution equipment in service			
Overhead lines	1995 km	1994 km	Change km
66 kV	151,20	151,20	0
22 kV	1 411,39	1 364,00	47,39
6,6 kV	257,36	256,00	1,36
0,415 kV	3 589,01	3 533,80	55,21
Total overhead lines, km	5 408,96	5 305,00	103,96
Underground cables	1995 km	1994 km	Change km
66 kV	10,04	10,04	0
22 kV	69,28	64,25	5,03
6,6 kV	34,31	34,36	0,05
0,415 kV	103,32	101,35	1,97
Total underground cables, km	217,05	210,00	7,05
Total, km	5 626,01	5 515,00	111,01
Transformers	1995 MVA	1994 MVA	Change MVA
Transmission and primary distribution			
11/66 kV	228,00	180,00	48,00
66/22 kV	570,00	532,00	38,00
22/6,6 kV	222,40	225,00	-2,60
6,6/66 kV	95,20	125,80	-30,60
6,6/22 kV	61,90	41,20	20,70
0,415/22 kV (CEB)	0,15	0,15	0
0,415/22 kV (Sugar Estates)	65,38	65,38	0
Not belonging to CEB	51,13	51,13	0
Secondary distribution			
6,6/0,415 kV	117,62	114,09	3,53
22/0,415 kV	578,80	543,86	34,94
Total, MVA	1 990,58	1 878,61	111,97
			Change
	1995	1994	%
Number of CEB employees	1 945	1 934	0,6
GWh sold per employee	0,46	0,42	9,5
Population of Mauritius, number	1,1 million	1,1 million	0
Average selling price, Mauritian rupees/kWh	2,20	2,19	0,5

MOZAMBIQUE

Source: Electricidade de Moçambique (EDM) for the year ended 31 December 1995

Source of power	Type	Nominal capacity MW	Net maximum capacity MW
Maputo	Coal fired	57,50	20,00
Mavuzi	Hydro	52,00	28,50 ^a
Chicamba	Hydro	38,40	34,00
Corumana	Hydro	16,60 ^a	12,00 ^a
Cuamba	Hydro	1,09	1,09
Lichinga	Hydro	0,75	0,60
Maputo	Gas turbine	78,50	35,00 ^a
Beira	Gas turbine	12,00	12,00
Angoche	Diesel	1,60	0,95
Inhambane	Diesel	4,48 ^a	2,15
Lichinga	Diesel	1,30	0,75 ^a
Lionde	Diesel	3,95	2,20 ^a
Mocuba	Diesel	0,84	0,35 ^a
Nacala	Diesel	20,74 ^a	6,00 ^a
Nampula	Diesel	6,54 ^a	3,94 ^a
Pemba	Diesel	8,04	5,80 ^a
Quelimane	Diesel	6,88 ^a	6,00 ^a
Xai-Xai	Diesel	2,67	1,55 ^a
Cuamba	Diesel	0,51	0,40
Tete	Diesel	0,80	0,30
Total, MW		315,19	173,58
Other producers of electricity – Hidroelectrica de Cahora Bassa (HCB)	Hydro	2 075,00	415,00
Total source of power, MW		2 390,19	588,58
System peak demand (simultaneous one-hour demand)	Date and time	1995 MW	1994 Date and time MW
	12-12-95 20:00	103,5	25-03-94 11:00 100
Electricity produced	1995 GWh	1994 GWh	Change %
Coal fired	0	0	0
Hydro	184,30	171,10	7,7
Gas turbine	0	0	0
Diesel	28,50	29,20 ^a	-2,4
Total electricity produced, GWh	212,80	200,30	6,2
Imports from Eskom	606,30	565,80 ^a	7,2
Purchased from HCB	151,60	141,00 ^a	7,5
Imports from Zimbabwe	0,19	0,12 ^a	58,3
Imports from Malawi	1,50	1,02 ^a	47,1
Auxiliary consumption/own use	5,70	7,40 ^a	-23,0
Exports	-	-	-
Total available for distribution, GWh	978,09	866,84	12,8
System losses	39,80	48,80 ^a	-18,4

	1995	1994	Change
	GWh	GWh	%
Electricity sold			
Domestic	281,6	259,9 ^a	8,3
General (low voltage)	147,7	125,2 ^a	18,0
Medium and high voltage	257,0	244,1 ^a	5,3
Public lighting	14,7	7,8 ^a	88,5
Total electricity sold, GWh	701,0	636,2	10,2
Number of customers			Change
	1995	1994	%
Domestic	136 074	128 636 ^a	5,8
General (low voltage)	22 733	21 870 ^a	3,9
Medium and high voltage	985	974 ^a	1,1
Total number of customers	159 792	151 480	5,5
Transmission and distribution equipment in service			
Overhead lines			Change
	1995	1994	km
275 kV	85	85	0
220 kV	1 316	1 316	0
110 kV	1 158	1 158	0
60 kV	259	259	0
33 kV	1 341	1 341	0
22 kV	293	293	0
11 kV	127	127	0
6,6 kV	353	353	0
5,5 kV	6	6	0
0,4 kV	2 285	2 285	0
Total overhead lines, km	7 223	7 223	0
Underground cable, km			
60 kV	5	5	0
33 kV	63	63	0
22 kV	54	54	0
11 kV	286	286	0
6,6 kV	131	131	0
5,5 kV	20	20	0
0,4 kV	978	978	0
Total underground cable, km	1 537	1 537	0
Total, km	8 760	8 760	0
Transformers ^b			Change
	1995	1994	MVA
Total, MVA	1 622,8	1 622,8	0
Number of EDM employees			Change
	1995	1994	%
GWh sold per employee	2 885	2 815	2,5
Population of Mozambique (1993 estimate), number	0,25	0,19 ^a	31,6
Average selling price, US\$/kWh	17,4 million	15,6 million	11,5
	0,072	0,063	14,3

^a Restated.

^b Includes MV/HV transformers ≥ 60 kV.

S U B - S A H A R A N A F R I C A

NAMIBIA

Source: SWAWEK for the year ended 30 June 1995

Source of power	Type	Nominal capacity	Net maximum capacity
		MW	MW
Van Eck	Thermal	120,0	120,0
Ruacana	Hydro	240,0	240,0
Paratus	Diesel	24,0	24,0
Katima Mulilo ^a	Diesel	3,0	3,0
Total, MW		387,0	387,0
Other sources			
Eskom – RSA interconnector		180,0	180,0
Eskom – Lower Orange River		34,7	34,7
ZESCO (Zambia) ^b		3,0	3,0
Total other sources		217,7	217,7
Total source of power, MW		604,7	604,7
System peak demand (simultaneous one-hour demand)	Date and time	1994/95 MW	1993/94 Date and time MW
	23-11-94 21:00	277	06-04-94 19:00 251
Electricity produced		1994/95 GWh	1993/94 GWh
Thermal		115,5	188,8
Hydro		1 134,1	671,7
Diesel		9,1	18,6
Total electricity produced		1 258,7	879,1
Electricity purchased from Eskom		757,6	873,9
ZESCO		9,3	8,6
Total available for distribution		2 025,6	1 761,6
Transmission losses		231,1	199,9
Electricity sold		1994/95 GWh	1993/94 GWh
Local authorities		878,7	803,0
Mining		630,8	605,8
Business/manufacturing		8,5	8,1
Government (including Caprivi)		103,1	95,2
Rural supplies		27,0	21,8
Exports to Eskom (Aggeneys)		146,4	27,8
Total electricity sold, GWh		1 794,5	1 561,7
			14,9

	1994/95	1993/94	Change %
Numbers of customers			
Local authorities	55	55	0
Mining	22	22	10,0
Business/manufacturing	18	20	-10,0
Government (including Caprivi)	407	328	24,1
Rural supplies	1 161	1 029	12,8
Exports	2	1	100,0
Total number of customers	1 665	1 453	14,6
Transmission and distribution equipment in service	1994/95 km	1993/94 km	Change km
Overhead lines			
330 kV	521	521	0
220 kV	1 645	1 480	165
132 kV	946	946	0
66 kV and lower	9 580	8 519	1 061
Total overhead lines, km	12 692	11 466	1 226
	1994/95	1993/94	Change %
Number of SWAWEK employees	751	749	0,3
GWh sold per employee	2,39	2,09	14,4
Population of Namibia (1991 census), number	1,4 million	1,4 million	0
Average selling price, cents/kWh	12,70	12,08	5,1

^a Managed by SWAWEK on behalf of Namibian Government.

^b A new 66 kV line was commissioned in September 1995 for a provisional demand of 3,0 MW.

SWAZILAND

Source: Swaziland Electricity Board (SEB) for year ended 31 March 1995

Source of power	Type	Nominal capacity	Net maximum capacity
		MW	MW
Hydro		40,5	40,5
Diesel		9,5	9,5
Total source of power, MW		50,0	50,0
System peak demand (simultaneous one-hour demand)	Date	1994/95 MW	1993/94 Date MW
	July 1995	117,5	30-06-94 115,0
Electricity produced		1994/95 GWh	1993/94 GWh
Hydro		109,0	125,0
Diesel		0,8	1,1
Total electricity produced, GWh		109,8	126,1
Electricity purchased from Eskom		597,0	546,9
Total electricity available, GWh		706,8	673,0
Own use and system losses		103,6	127,1
Electricity sold		1994/95 GWh	1993/94 GWh
Domestic		132,7	110,3
Commercial		54,3	48,0
Industrial		307,6	278,4
Irrigation		108,6	109,2
Total electricity sold, GWh		603,2	545,9
Number of customers		1994/95	1993/94
Domestic		21 643	20 889
Commercial		4 166	4 130
Industrial		678	677
Irrigation		109	111
Total number of customers		26 596	25 807
Transmission and distribution equipment in service		1994/95	1993/94
Overhead lines	km	km	km
132 kV		206	206
66 kV		912	912
33 kV		91	89
11 kV		2 669	2 513
Total overhead lines, km		3 878	3 720
			158

	1994/95 MVA	1993/94 MVA	Change MVA
Transformers			
132/66 kV	138,00	138,00	0
66/11 kV	218,50	198,50	20,0
33 or 11/0,4 kV	21,75	21,75	0
Total, MVA	378,25	358,25	20,0
	1994/95	1993/94	Change %
Number of SEB employees	609	609	0
GWh sold per employee	1,010	0,896	12,7
Population of Swaziland (1991 census), number	820 000	820 000	0
Average selling price, emalangeni/kWh	E00,350	E00,223	57,0

S U B - S A H A R A N A F R I C A

TANZANIA

Source: Tanzania Electric Supply Company Limited (TANESCO) for the year ended 31 December 1995

Source of power		Nominal capacity MW	Net maximum capacity MW
Interconnected system			
Hale	Hydro	21,0	21,0
Kidatu	Hydro	204,0	200,0
Mtera	Hydro	80,0	80,0
Kikuletwa	Hydro	1,2	0
Mbalizi	Hydro	0,3	0
Nyumba ya Mungu	Hydro	8,0	8,0
Pangani system	Hydro	66,0	66,0
Tosamaganga	Hydro	1,2	0
	Diesel	117,1	41,2
Ubungu	Gas turbine	112,0	98,0
Total source of power, MW		610,8	514,2
Electricity produced	1995 GWh	1994 GWh	Change %
Hydro	1 539	1 499	2,6
Diesel	252	223 ^a	13,0
Total electricity produced	1 791	1 722	4,0
Imports	11	15	-26,7
Auxiliary consumption/own use	13	15 ^a	-13,3
Total available for distribution, GWh	1 789	1 722	3,9
System losses	236	261	-
Electricity sold ^b	1995 GWh	1994 GWh	Change %
Domestic	572,6	544,9	5,1
Agricultural	71,2	67,0	6,3
Commercial	201,9	193,8	4,2
Light industrial	78,6	73,8	6,5
Low-voltage industrial and commercial	141,5	135,3	4,6
High-voltage industrial	151,2	143,3	5,5
Energy-intensive consumers	157,8	149,5	5,6
Public lighting	12,8	13,2	-3,0
National Urban Water Authority	88,6	86,9	2,0
Bulk sales to Zanzibar	76,5	54,0	41,7
Total electricity sold, GWh	1 522,7	1 461,7	6,2
Number of customers ^c	1995	1994	Change %
Domestic	-	176 110	-
Agricultural	-	145	-
Commercial	-	47 086	-
Light industrial	-	6 257	-
Low-voltage industrial and commercial	-	585	-
High-voltage industrial	-	102	-
Energy-intensive consumers	-	9	-

	1995	1994	Change %
Number of customers ^c (continued)			
Public lighting	—	2 250	—
National Urban Water Authority	—	50	—
Bulk sales to Zanzibar	—	1	—
Total number of customers	—	232 595	—
Transmission and distribution equipment in service			
Overhead lines	1995 km	1994 km	Change km
220 kV	2 225	1 906	319
132 kV	1 502	1 422	80
66 kV	118	131 ^a	-13
33 kV	5 131	4 903	228
11 kV	3 199	3 143	56
0,4 kV	10 633	10 372	261
Total overhead lines, km	22 808	21 877	931
Submarine cable	1995 km	1994 km	Change km
132 kV	41	41	0
Total submarine cable, km	41	41	0
Total, km	22 849	21 918	931
Transformers	1995 MVA	1994 MVA	Change MVA
220/132 kV	360,0	360,0	0
220/33 kV	127,5	127,5	0
132/66 kV	20,0	20,0	0
132/33 kV	171,6	171,6	0
66/33 kV	5,0	5,0	0
33/0,4 kV and 11/0,4 kV	854,0	821,0 ^a	15,7
Total, MVA	1 538,1	1 505,1	33,0
			Change %
Number of TANESCO employees	1995	1994	
GWh sold per employee	7 500	7 405 ^a	1,3
Population of Tanzania, number	0,207 ^b	0,197 ^a	5,1
Average selling price, TSh ^d /kWh	26,4 million	25,8 million ^a	2,3
	62,00	54,00	14,8

^a Restated.

^b Provisional.

^c 1995 figures not available at time of publication.

^d Tanzanian shillings.

ZAIRE

Source: Societe Nationale d'Electricite (SNEL) for year ended 31 December 1994

Source of power (SNEL)	Type	Nominal capacity MW	Net maximum capacity MW
Western system:			
Inga I	Hydro	350,00	350,00
Inga II	Hydro	1 424,00	1 424,00
Zongo	Hydro	75,00	75,00
Sanga	Hydro	11,50	11,50
Mpozo (isolated)	Hydro	2,20	2,20
Southern system:			
Mwandingusha	Hydro	68,00	68,00
Koni	Hydro	42,10	42,10
Nzilo	Hydro	108,00	108,00
Nseke	Hydro	248,00	248,00
Kiyimbi (isolated)	Hydro	17,20	17,20
Kilubi (isolated)	Hydro	9,90	9,90
Lungudi (isolated)	Hydro	1,56	1,56
Eastern system:			
Ruzizi I	Hydro	28,20	28,20
Ruzizi II (SINELAC power station)	Hydro	26,60	26,60
Northern system:			
Tshopo (isolated)	Hydro	18,80	18,80
Mobayi (isolated)		11,10	11,10
Total hydro, MW		2 442,16	2 442,16
One power station	Natural gas	2,80	2,80
28 power stations	Diesel	35,00	35,00
Total source of power (SNEL), MW		2 479,96	2 479,96
Other producers of electricity	Type	Nominal capacity MW	Net maximum capacity MW
Budana	Hydro	13,50	13,50
Soleniama I	Hydro	13,80	13,80
Soleniama II	Hydro	1,60	1,60
Nzoro	Hydro	1,40	1,40
Ambwe/Kailo	Hydro	2,20	2,20
Lutshurukuru	Hydro	5,10	5,10
Moga	Hydro	0,40	0,40
Belia	Hydro	2,20	2,20
Lulingu	Hydro	0,70	0,70
Mangembe	Hydro	1,80	1,80
Tshala and Lubilanji I	Hydro	8,60	8,60
Zaire Etain	Hydro	29,50	29,50
Total, MW		80,80	80,80
Total source of power (Zaire), MW		2 560,76	2 560,76

	1994 GWh	1993 GWh	Change %
Electricity produced (interconnected system) *			
Hydro	—	5 373,6	—
Natural gas power station	—	0	—
Diesel power stations	—	5,4	—
Total interconnected production, GWh		5 379,0	—
Consumed by auxiliaries	—	45,3	—
Net energy generated	—	5 333,7	—
Own consumption	—	1,9	—
Energy sold locally	—	—	—
Energy sent into the grid	—	5 331,8	—
Energy imported/purchased			
From Congo	—	6,5	—
From Zambia	—	3,0	—
From SINELAC	—	43,0	—
Exports			
To Congo	—	162,1	—
To Angola	—	0,3	—
To Rwanda	—	12,1	—
To Burundi	—	11,8	—
To Zambia	—	216,0	—
To SINELAC	—	—	—
To Zimbabwe	—	876,0	—
Total available for distribution, GWh	—	4 106,0	—
System losses	—	318,0	—
Energy sold *	1994 GWh	1993 GWh	Change %
Low voltage	—	1 514,0	—
Medium voltage	—	1 242,0	—
High voltage	—	158,0	—
Mining	—	874,0	—
Total electricity sold, GWh	—	3 788,0	—
Number of customers *	1994	1993	Change %
Low voltage	—	248 766	—
Medium voltage	—	1 224	—
High voltage	—	9	—
Mining	—	1	—
Total number of customers	—	250 000	—

ZAIRE – CONTINUED

Source: Societe Nationale d'Electricite (SNEL) for year ended 31 December 1994

Transmission and distribution equipment in service

	1994	1993	Change
	km	km	km
Overhead lines			
500 kV	1 700.0	1 700.0	0
220 kV	1 474.3	1 474.3	0
132 kV	185.3	185.3	0
120 kV	1 198.8	1 198.8	0
70 kV	504.5	504.5	0
50 kV	144.4	144.4	0
Total overhead lines, km	5 207.3	5 207.3	0
Underground cable			
30 kV	173.4	173.42	0
20 kV	51.00	51.00	0
15 kV	342.16	342.16	0
6.6 kV	1 555.45	1 555.45	0
0.4 kV	9 341.20	9 341.20	0
Total underground cable, km	11 463.23	11 463.23	0
Total, km	16 670.53	16 670.53	0
Step-down transformers			
Highest voltage			
Transmission system			
220 kV	1 361.0	1 361.0	0
132 kV	242.5	242.5	0
120 kV	203.0	203.0	0
70 kV	119.3	119.3	0
66 kV	15.0	15.0	0
50 kV	19.0	19.0	0
Total, MVA	1 959.8	1 959.8	0
			Change
	1994	1993	%
Number of employees at SNEL	–	5 544	–
GWh sold per employee	–	0.914	–
Population of Zaire (1984 census), number	–	37.8 million	–
Average selling price, Z/kWh	–	632,602	–

* 1994 statistics were not available at time of publication.

S U B - S A H A R A N A F R I C A

ZAMBIA

Source: Zambia Electricity Supply Corporation Limited (ZESCO) for the year ended 31 March 1995

Source of power		Nominal	Effective
		capacity MW	capacity MW
Hydro		1 648	1 632
Diesel		8	4
Total, MW		1 656	1 636
Other producers of electricity (mines)			
Hydro		38	38
Gas turbine		80	80
Geothermal		20	20
Total source of power, MW		1 794	1 774
System peak demand (simultaneous one-hour demand)	Date	1994/95 MW	1993/94 Date MW
	31-05-94	1 108	21-05-93 1 003
Electricity produced		1994/95 GWh	1993/94 GWh Change %
Hydro		8 102	8 069 0.4
Diesel		14	13 7.7
Total electricity produced, GWh ^a		8 116	8 082 0.4
Electricity imports		-	-
Exports (including Botswana)		1 067	855 24.8
Auxiliary consumption/own use		12	23 -47.8
Total available for distribution, GWh		7 037	7 204 -2.3
System losses		866	727 19.1
Electricity sold		1994/95 GWh	1993/94 GWh Change %
Domestic		844	802 5.2
Agricultural		206	201 2.5
Industrial		962	1 011 -4.8
Mining		4 134	4 313 -4.2
Other		25	150 -83.3
Total electricity sold ^b , GWh		6 171	6 477 -4.7
Number of customers		1994/95	1993/94 Change %
Domestic		118 009	110 058 7.2
Agricultural		1 322	1 331 -0.7
Industrial		16 910	13 061 29.5
Other		6 938	9 122 -23.9
Total number of customers ^c		143 179	133 572 7.2

ZAMBIA – CONTINUED

Source: Zambia Electricity Supply Corporation Limited (ZESCO) for the year ended 31 March 1995

Transmission and distribution equipment in service

	1994/95	1993/95	Change
	km	km	km
Overhead lines			
330 kV	2 118	2 000	118
220 kV	555 ^d	555	0
132 kV	164 ^d	164	0
88 kV	700 ^d	700	0
66 kV	5 720 ^d	5 720	0
33 kV	598 ^d	598	0
Total overhead lines, km	9 855	9 737	118
Transformers	1994/95	1993/94	Change
	MVA	MVA	MVA
330/220 kV	240	240	0
330/132 kV	125	125	0
330/88 kV	210	210	0
330/66 kV	60	60	0
220/88 kV	86	80	6
220/66 kV	365	365	0
220/33 kV	60	60	0
220/11 kV	50	50	0
88/33 kV	45	45	0
66/33 kV	5	5	0
Total, MVA	1 246	1 240	6
	1994/95	1993/94	Change
			%
Number of ZESCO employees	4 464	5 060	-11,8
GWh sold per employee	1,382	1,280 ^e	8,0
Population of Zambia (1990 census), number	9,2 million ^f	8,9 million ^f	3,4
Average selling price, Zambian kwacha/kWh	13,35	8,40	58,9

^a Energy generated by mine power stations not included.

^b Electricity sales refer to retail sales.

^c Does not include customers in mining townships.

^d Final figures not available at time of publication.

^e Adjusted.

^f Estimate based on 3% growth.

S U B - S A H A R A N A F R I C A

ZIMBABWE

Source: Zimbabwe Electricity Supply Authority (ZESA) for the year ended 30 June 1995

Source of power	Type	Nominal capacity MW	Effective capacity MW
Hwange Stage I	Coal fired	480	456
Hwange Stage II	Coal fired	440	400
Munyati	Coal fired	120	60
Harare II and III	Coal fired	135	80
Bulawayo	Coal fired	120	60
Kariba South	Hydro	666	666
Total source of power, MW		1 961	1 722
System peak demand (simultaneous one-hour demand)	Date	1994/95 MW	1993/94 MW
	19-06-95	1 617	19-07-94 1 590
Electricity produced	1994/95 GWh	1993/94 GWh	Change %
Coal fired	5 526,3	5 439,4	1,6
Hydro	2 284,7	2 095,6	9,0
Total electricity produced, GWh	7 811,0	7 535,0	3,7
Bulk imports from			
Botswana Power Corporation	—	—	—
Electricidade de Moçambique	0,8	—	—
Eskom	162,8	144,8	12,4
SNEL	1 055,8	913,2	15,6
ZESCO	1 093,0	949,4	15,1
Bulk exports (wheeling)	(45,5)	—	—
Auxiliary consumption/own use	440,6	446,4	-1,3
Total available for distribution, GWh	9 728,3	9 096,0	7,0
System losses, GWh	692,3	673,0	2,9
Electricity sold	1994/95 GWh	1993/94 GWh	Change %
Domestic	1 658,0	1 672,0	-0,8
Agricultural	903,0	805,0	12,2
Commercial	1 383,0	1 199,0	15,3
Industrial	3 507,0	3 296,0	6,4
Mining	1 571,0	1 441,0	9,0
ZESA	14,0	10,0	40,0
Total electricity sold, GWh	9 036,0	8 423,0	7,3

ZIMBABWE – CONTINUED

Source: Zimbabwe Electricity Supply Authority (ZESA) for the year ended 30 June 1995

	1994/95	1993/94	Change %
Number of customers			
Domestic	321 267	309 810	3,7
Agricultural	9 917	9 693	2,3
Commercial	35 020	34 415	1,8
Industrial	1 815	1 829	-0,8
Mining	668	648	3,1
ZESA	375	305	23,0
Total number of customers	369 062	356 700	3,5
Transmission and distribution equipment			
Overhead lines	1994/95 km	1993/94 km	Change km
330 kV	3 540	3 500	40,0
220 kV	150	150	0
132 kV	1 330	1 280	50,0
110 kV	5	5	0
88 kV	2 082	2 082	0
66 kV	184	184	0
33 kV and lower	8 215	8 197	18,0
22 kV	214	214	0
11 kV	30 974	30 974	0
Low voltage	12 502	12 402	100,0
Total overhead lines, km	59 196	58 988	208,0
Transformers	1994/95 MVA	1993/94 MVA	Change MVA
330/132 kV	1 495	1 295	200,0
330/88 kV	1 630	1 283	347,0
330/33 kV	480	480	0
132/33 kV	1 653	1 653	0
132/88 kV	60	60	0
132/11 kV	120	120	0
88/66 kV	40	40	0
88/33 kV	340	340	0
88/11 kV	812	812	0
66/11 kV	639	639	0
Total, MVA *	7 269	6 722	547,0
	1994/95	1993/94	Change %
Number of ZESA employees	7 903	7 800	1,3
GWh sold per employee	1,143	1,080	5,8
Population of Zimbabwe (estimate), number	10,4 million	10,4 million	0
Average selling price, Zimbabwe cents/kWh	31,0	24,61	26,0

* Does not include distribution transformers, transformers feeding interconnectors and generation transformers.

SOUTHERN AFRICAN POWER POOL (SAPP)

Countries and utilities which have signed the three SAPP agreements

Inter-Government Memorandum of Understanding	Inter-Utility Memorandum of Understanding	Agreement between Operating Members
Angola	Empresa Nacional de Electricidade (ENE)	ENE
Botswana	Botswana Power Corporation (BPC)	BPC
Lesotho		
Malawi	Electricity Supply Commission (ESCOM)	
Mozambique	Electricidade de Moçambique (EdM)	EdM
Namibia	NAMPOWER	NAMPOWER
South Africa	Eskom	Eskom
Swaziland	Swaziland Electricity Board (SEB)	
Tanzania	Tanzania Electric Supply Company (TANESCO)	
Zaire	Société Nationale d'Electricité (SNEL)	SNEL
Zimbabwe	Zimbabwe Electricity Supply Authority (ZESA)	ZESA

Objective of the Memorandum of Understanding

To facilitate the establishment of the SAPP, which in turn has the objective to provide reliable and economical electric supply to the consumers of each of the SAPP members consistent with reasonable utilisation of natural resources and effect on the environment

Purpose of the Memorandum of Understanding

To establish the basic principles under which the SAPP will operate, inter alia:

- The co-ordination of and the co-operation in the planning and operation of the various systems to minimise costs while maintaining reliability
- The full recovery of costs and the equitable sharing of the resulting benefits

Among the benefits that will be achieved, are reductions in required generating capacity, reductions in fuel costs and improved use of hydroelectric energy.

Alphabetical order

Algeria	42
Angola	8
Benin	29
Botswana	5
Burkina Faso	32
Cameroon	20
Central African Republic	21
Chad	33
Congo	15
Côte d'Ivoire	26
Djibouti	23
Egypt	44
Equatorial Guinea	13
Eritrea	35
Ethiopia	22
Gabon	14
Ghana	27
Guinea	31
Guinea-Bissau	36
Kenya	18
Lesotho	2
Liberia	25
Libya	43
Malawi	10
Mali	38
Mauritania	40
Morocco	45
Mozambique	7
Namibia	4
Niger	39
Nigeria	30
Rwanda	16
Senegal	37
Sierra Leone	24
Somalia	19
South Africa	1
Sudan	34
Swaziland	3
Tanzania	12
Togo	28
Tunisia	46
Uganda	17
Western Sahara	41
Zaire	11
Zambia	9
Zimbabwe	6

Numerical order

1 South Africa
2 Lesotho
3 Swaziland
4 Namibia
5 Botswana
6 Zimbabwe
7 Mozambique
8 Angola
9 Zambia
10 Malawi
11 Zaire
12 Tanzania
13 Equatorial Guinea
14 Gabon
15 Congo
16 Rwanda
17 Uganda
18 Kenya
19 Somalia
20 Cameroon
21 Central African Republic
22 Ethiopia
23 Djibouti
24 Sierra Leone
25 Liberia
26 Côte d'Ivoire
27 Ghana
28 Togo
29 Benin
30 Nigeria
31 Guinea
32 Burkina Faso
33 Chad
34 Sudan
35 Eritrea
36 Guinea-Bissau
37 Senegal
38 Mali
39 Niger
40 Mauritania
41 Western Sahara
42 Algeria
43 Libya
44 Egypt
45 Morocco
46 Tunisia



ELECTRICITY SUPPLY STATISTICS

Source: United Nations Energy Statistics Yearbook (1993) and information obtained from utilities

Country	Financial year end	Net maximum capacity of generating plant (self-producers and public), MW					Total	% of total
		Thermal	Hydro	Nuclear	Geothermal			
Algeria		5 539	274	—	—	—	5 813	7,1
Angola	12/95	125	201	—	—	—	326 ^b	0,4
Benin		15	—	—	—	—	15	0
Botswana	3/96	172	—	—	—	—	172	0,2
Burkina Faso		65	—	—	—	—	65	0,1
Burundi		11	32	—	—	—	43	0,1
Cameroon		97	530	—	—	—	627	0,8
Cape Verde		7	—	—	—	—	7	0
Central African Republic		21	22	—	—	—	43	0,1
Chad		29	—	—	—	—	29	0
Comoros		4	1	—	—	—	5	0
Congo	12/95	18	89	—	—	—	107	0,1
Côte d'Ivoire		278	895	—	—	—	1 173	1,4
Djibouti		85	—	—	—	—	85	0,1
Egypt		9 029	2 825	—	—	—	11 854	14,5
Equatorial Guinea		4	1	—	—	—	5	0
Ethiopia		62	372	—	—	30	464	0,6
Gabon		144	166	—	—	—	310	0,4
Gambia		29	—	—	—	—	29	0
Ghana		115	1 072	—	—	—	1 187	1,5
Guinea		129	47	—	—	—	176	0,2
Guinea-Bissau		11	—	—	—	—	11	0
Kenya	6/95	100	570	—	—	45	716 ^d	0,9
Lesotho	3/96	2	3	—	—	—	5	0
Liberia		251	81	—	—	—	332	0,4
Libyan Arab Jamah.		4 600	—	—	—	—	4 600	5,4
Madagascar		114	106	—	—	—	220	0,3
Malawi	3/95	25	165	—	—	—	189	0,2
Mali		42	45	—	—	—	87	0,1
Mauritania		44	61	—	—	—	105	0,1
Mauritius	12/95	278	54	—	—	—	332	0,4
Morocco		2 029	693	—	—	—	2 722	3,3
Mozambique	12/95	97	491	—	—	—	589 ^e	0,7
Namibia	6/95	147	240	—	—	—	387	0,5
Niger		63	—	—	—	—	63	0,1
Nigeria		3 274	1 300	—	—	—	4 574	5,6
Réunion		180	119	—	—	—	299	0,4
Rwanda		4	60	—	—	—	64	0,1
St Helena & Depend.		4	—	—	—	—	4	0
Sao Tome – Principe		4	2	—	—	—	6	0
Senegal		231	—	—	—	—	231	0,3
Seychelles		28	—	—	—	—	28	0
Sierra Leone		124	2	—	—	—	126	0,2
Somalia		70	—	—	—	—	70	0,1
South Africa, Republic of	12/95	30 612 ^f	2 249 ^g	1 840	—	—	34 701	42,4
Sudan		275	225	—	—	—	500	0,6
Swaziland	3/95	10	41	—	—	—	50	0,1

Production of electricity (self-producers and public), GWh						Trade of electricity, GWh			
Thermal	Hydro	Nuclear	Geo-thermal	Total	% of total	Imports	Exports	Available GWh	kWh per capita ^a
19 062	353	—	—	19 415	5,7	83	1 324	18 174	680
165	877	—	—	1 042	0,3	—	—	1 042	99
5	—	—	—	5	0	240 ^c	—	245	48
1 017	—	—	—	1 017	0,3	382	—	1 399	999
196	—	—	—	196	0,1	—	—	196	20
2	115	—	—	117	0	24 ^c	—	141	23
78	2 648	—	—	2 726	0,8	—	—	2 726	218
37	—	—	—	37	0	—	—	37	100
19	78	—	—	97	0	—	—	97	31
87	—	—	—	87	0	—	—	87	14
14	2	—	—	16	0	—	—	16	26
2	352	—	—	354	0,1	166	—	520	226
812	1 098	—	—	1 910	0,6	—	—	1 910	143
182	—	—	—	182	0,1	—	—	182	327
38 950	8 520	—	—	47 470	13,9	—	—	47 470	787
17	2	—	—	19	0	—	—	19	50
90	1 135	—	68	1 293	0,4	—	—	1 293	25
212	710	—	—	922	0,3	—	—	922	739
73	—	—	—	73	0	—	—	73	70
39	6 115	—	—	6 154	1,8	4 ^c	288 ^c	5 870	357
348	188	—	—	536	0,2	—	—	536	85
42	—	—	—	42	0	—	—	42	41
284	3 103	—	292	3 678	1,1	187	—	3 866	148
0	0	—	—	0	0	435	—	435	217
305	175	—	—	480	0,1	—	—	480	169
17 000	—	—	—	17 000	5,0	—	—	17 000	3 368
252	347	—	—	599	0,2	—	—	599	43
4	856	—	—	861	0,3	—	1	860	108
118	212	—	—	330	0,1	—	—	330	33
120	26	—	—	146	0	—	—	146	68
913	134	—	—	1 047	0,3	—	—	1 047	842
9 474	443	—	—	9 917	2,9	1 000 ^c	—	10 917	421
29	336	—	—	364	0,1	608	—	972	56
125	1 134	—	—	1 259	0,4	767	—	2 026	1 447
173	—	—	—	173	0,1	193 ^c	—	366	43
8 600	3 200	—	—	11 800	3,5	—	100 ^c	11 700	111
632	498	—	—	1 130	0,3	—	—	1 130	1 782
4	230	—	—	234	0,1	12 ^c	3 ^c	243	32
5	—	—	—	5	0	—	—	5	833
7	8	—	—	15	0	—	—	15	118
765	—	—	—	765	0,2	—	—	765	97
110	—	—	—	110	0	—	—	110	1 528
233	—	—	—	233	0,1	—	—	233	54
258	—	—	—	258	0,1	—	—	258	29
161 324	2 090	11 301	—	174 715	51,3	172	3 047	171 840	4 373
389	939	—	—	1 328	0,4	—	—	1 328	50
1	109	—	—	110	0	597	—	707	862

ELECTRICITY SUPPLY STATISTICS – CONTINUED

Source: United Nations Energy Statistics Yearbook (1993) and information obtained from utilities

Country	Financial year end	Net maximum capacity of generating plant (self-producers and public), MW					Total	% of total
		Thermal	Hydro	Nuclear	Geothermal			
Tanzania, United Republic of	19/95	139	375	–	–	–	514	0,6
Togo		30	4	–	–	–	34	0
Tunisia		1 350	64	–	–	–	1 414	1,7
Uganda		7	155	–	–	–	162	0,2
Western Sahara		56	–	–	–	–	56	0,1
Zaire	12/93	38	2 442	–	–	–	2 480	3,0
Zambia	3/95	84	1 670	–	–	20,0	1 774 ^d	2,2
Zimbabwe	6/95	1 191	666	–	–	–	1 857 ^d	2,3
Africa		61 492	18 410	1 840	95	95	81 837	
World		1 888 370	719 438	358 203	10 000	10 000	2 976 001	

^a Based on estimated population in 1992.

^b Available capacity.

^c Estimate by the Statistical Division of the United Nations.

^d Effective capacity.

^e Includes Cahora Bassa.

^f Excludes Eskom's 4 531 MW in reserve storage.

^g Includes pumped storage.

^h Interconnected system only.

Production of electricity (self-producers and public), GWh						Trade of electricity, GWh			
Thermal	Hydro	Nuclear	Geo-thermal	Total	% of total	Imports	Exports	Available GWh	kWh per capita ^a
252	1 539	—	—	1 791	0,5	11	—	1 802	68
86	5	—	—	91	0	312 ^c	—	403	104
6 352	64	—	—	6 416	1,9	130	140	6 406	747
7	781	—	—	788	0,2	—	114 ^c	674	34
85	—	—	—	85	0	—	—	85	326
5	5 374	—	—	5 379 ^h	1,6	52	1 278	4 153	110
14	8 102	—	—	8 116	2,4	—	1 067	7 049	766
5 439	2 096	—	—	7 535	2,2	2 007	—	9 542	918
274 814	53 994	11 301	360	340 468		7 383	7 362	340 489	501
7 663 254	2 379 569	2 171 616	47 151	12 261 589		425 972	424 897	12 262 664	2 206

SELECTED ELECTRICITY SUPPLY STATISTICS

Source: United Nations Energy Statistics Yearbook 1993 and information obtained from utilities

Area	Net maximum capacity of generating plant (self-producers and public), MW					
	Total	Thermal	Hydro	Nuclear	Geo-thermal	Ranking
World	2 976 011	1 888 370	719 438	358 203	10 000	
Africa	81 837	61 492	18 410	1 840	95	5
Asia	763 090	546 352	160 548	54 732	1 458	3
Europe	1 037 910	585 019	266 550	184 783	1 558	1
North America	922 241	628 767	171 673	115 173	6 628	2
Oceania	46 213	33 173	12 779	—	261	6
South America	124 720	33 567	89 478	1 675	—	4
Country						
Argentina	18 035	10 026	6 991	1 018	—	27
Australia	37 206	29 817	7 389	—	—	14
Austria	33 016	6 080	11 274	15 662	—	18
Belgium	14 053	7 161	1 402	5 485	5	33
Brazil	56 212	6 955	48 600	657	—	11
Bulgaria	12 087	7 148	1 401	3 538	—	35
Canada	110 554	32 990	62 101	15 437	26	7
China	175 194	130 000	44 000	1 194	—	4
Czech Republic	14 227	11 065	1 402	1 760	—	31
Denmark	10 355	9 853	10	—	492	39
Egypt	11 854	9 029	2 825	—	—	36
Finland	14 077	8 986	2 731	2 360	—	32
France incl. Monaco	143 559	23 460	60 839	59 020	240	5
Germany	114 294	82 834	8 803	22 657	—	6
India	85 304	63 270	19 904	2 100	30	8
Indonesia	15 915	12 477	3 298	—	140	29
Iran (Islamic Rep. of)	20 874	18 921	1 953	—	—	23
Italy and San Marino	63 486	43 346	19 669	—	471	10
Japan	212 913	134 100	39 965	38 541	307	3
Korea, Republic of	30 519	20 399	2 504	7 616	—	19
Mexico	33 228	23 754	8 079	675	720	17
Netherlands	17 599	16 922	37	505	135	28
Norway, Svlbd, J. Myn 1	27 333	251	27 082	—	—	21
Pakistan	10 550	7 516	2 897	137	—	37
Poland	29 187	27 143	2 044	—	—	20
Romania	22 262	16 389	5 872	—	1	22
Russian Federation	213 421	148 736	43 432	21 242	11	2
South African Customs Union	35 315	30 942	2 533	1 840	0	16
Spain	43 892	20 447	16 395	7 020	30	13
Sweden	37 179	8 813	18 425	9 912	29	15
Switzerland, Lichtenstein	15 550	800	11 760	2 990	—	30
S. Arabia, pt. Ntral. Zn.	18 436	18 436	—	—	—	26
Thailand	13 861	11 391	2 470	—	—	34
Turkey	20 335	10 638	9 682	—	15	24
Ukraine	54 261	36 737	4 706	12 818	—	12
United Kingdom	68 455	52 289	4 220	11 894	52	9
United States	760 427	557 035	98 629	99 061	5 702	1
Venezuela	18 775	8 100	10 675	—	—	25
Yugoslavia	10 424	6 766	3 658	—	—	38

Net maximum capacity is measured at the terminals of the station, i.e. after deduction of the power absorbed by the auxiliary installations and the losses in the station transformers, if any. Electricity production refers to gross production, which includes the consumption by station auxiliaries and any losses in the transformers that are considered integral parts of the station. Included also is total electric energy produced by pumping installations without deduction of electric energy absorbed by pumping.

* Estimate by the Statistical Division of the United Nations Secretariat.

Production of electricity (self-producers and public), GWh					Trade of electricity, GWh			
Total	Thermal	Hydro	Nuclear	Geo-thermal	Imports	Exports	Available GWh	kWh per capita
12 261 589	7 663 254	2 379 569	2 171 616	47 151	425 972	424 897	12 262 664	2 206
340 468	274 814	53 994	11 301	360	383	7 362	340 489	501
3 290 127	2 403 166	526 107	351 498	9 356	84 095	74 149	3 300 073	980
4 042 151	2 237 226	708 654	1 090 631	5 640	259 710	267 278	4 034 583	5 560
3 873 043	2 491 646	641 208	709 994	30 195	45 728	45 322	3 873 449	8 747
199 838	159 111	39 127	—	1 600	—	—	199 838	7 215
515 962	97 291	410 479	8 192	—	29 179	30 786	514 355	1 664
63 038	31 140	24 148	7 750	—	1 265	23	64 280	1 903
163 557	147 018	16 539	—	0	—	—	163 557	9 284
52 675	14 655	38 020	—	—	8 072	8 805	51 942	6 606
69 845	26 890	1 020	41 927	8	7 590	5 359	72 076	7 175
251 484	16 283	234 759	442	—	27 570	11	279 043	1 783
37 997	22 082	1 942	13 973	—	1 630	1 520	38 107	4 296
527 316	108 775	323 690	94 823	28	7 551	34 967	499 900	17 347
839 453	685 153	151 800	2 500	—	5 200 *	0 *	844 653	719
58 882	44 659	1 596	12 627	—	5 952	8 056	56 778	5 515
33 738	32 683	27	—	1 028	6 280	5 095	34 923	6 761
47 470	38 950	8 520	—	—	—	—	47 470	787
61 172	27 682	13 599	19 891	—	8 013	429	68 756	13 594
471 448	35 366	67 894	368 188	—	3 663	65 093	410 018	7 126
525 721	350 656	21 465	153 476	124	33 628	32 758	526 591	6 513
356 519	279 000	70 667	6 800	52	1 400 *	160 *	357 759	397
58 888	45 716	12 085	—	1 087	—	—	58 888	307
17 980	60 980	11 000	—	—	—	—	71 980	1 122
222 788	174 638	44 483	0	3 668	40 109	677	262 220	4 588
906 705	550 181	105 470	249 256	1 798	—	—	906 705	7 281
163 449	99 305	6 006	58 138	—	—	—	163 449	3 704
134 925	97 529	26 014	4 806	6 576	909	2 015	133 819	1 486
76 992	72 774	92	3 948	178	10 572	269	87 295	5 711
120 001	487	119 511	—	3	595	8 379	112 217	26 079
55 311	33 350	21 511	450	—	—	—	55 311	416
133 867	130 291	3 576	—	—	5 600	8 011	131 456	3 432
55 476	42 708	12 768	—	0	2 991	1 118	57 349	2 491
956 587	662 199	175 174	119 186	28	24 681	44 138	937 130	6 432
177 100	162 466	3 333	11 301	—	2 352	3 047	176 406	3 927
156 529	74 690	25 779	56 060	—	4 606	3 339	157 796	3 994
144 311	7 488	75 380	61 395	48	7 977	8 566	143 722	16 531
61 070	1 103	36 616	23 351	—	19 520	26 719	53 871	7 602
63 331	63 331	—	—	—	—	—	63 331	3 699
66 305	62 605	3 700	—	—	645	49	66 901	1 162
73 808	39 779	33 951	—	78	213	589	73 432	1 232
229 907	143 427	11 237	75 243	—	15 773	17 317	228 363	4 430
323 029	227 771	5 686	89 353	219	16 721	5	339 745	5 843
3 145 892	2 236 388	276 463	610 365	22 676	36 892	8 146	3 174 638	12 308
71 388	23 916	47 472	—	—	0 *	300 *	71 088	3 399
34 156	24 142	10 014	—	—	500 *	100 *	34 556	3 253

GLOSSARY AND ABBREVIATIONS

STATISTICAL MEASURES

Measurements are given in terms of units. The international system of units, SI, is used in this publication.

Power

Watt (W) is a unit of electrical power, where

$$1\ 000\ W = 1\ kW \text{ (kilowatt)}$$

$$1\ 000\ kW = 1\ MW \text{ (megawatt)}$$

Energy

Watt-hour (Wh) is a unit of electrical energy. However, energy consumption is usually expressed in kilowatt-hours, where

$$1\ 000\ Wh = 1\ kWh$$

$$1\ 000\ kWh = 1\ MWh \text{ (megawatt-hour)}$$

$$1\ 000\ MWh = 1\ GWh \text{ (gigawatt-hour)}$$

Generating capacity

- Nominal capacity – MW

This is the maximum capacity obtainable under continuous operation and is usually determined by the manufacturer's specification and often appears on the "nameplate" of the equipment. It need not relate to any operational reality.

- Net maximum capacity – MW

This is the maximum power which could be produced, transmitted or distributed continuously throughout a prolonged period of operation. All the equipment is assumed to be fully operational. The power is measured **after** deducting the power supplies for the power station auxiliaries and allowing for the losses in generator transformers.

PERFORMANCE INDICATORS

Power generation plant

- Availability – %

Unit capability factor (UCF) – %

Calculated as:

Available energy generation expressed as a percentage of reference (maximum) energy generation

Available energy generation is the energy that could have been produced, considering only limitations within control of plant management.

A high UCF indicates effective plant management programmes and practices to minimise unplanned energy losses and to optimise planned outages, maximising available electrical generation.

- Reliability

Plant reliability reflects the probability that a unit will perform as required for a given period of time and gives an indication of the frequency of unexpected failure.

Unplanned automatic grid separations per 7 000 operating hours per unit

This tracks the average grid separation (trip) rate per 7 000 operating hours (approximately one year of operation), including only trips of internal origin. Trips caused by the physical condition of the grid are not included unless they were incorrectly controlled.

Calculated as:

Number of grid separations (trips) multiplied by 7 000, divided by total number of operating hours

Power system plant

- Reliability

Low-frequency incidents – number

A low-frequency incident is recorded whenever the frequency drops to below 49,7 hertz (Hz).

System interruption time – system minutes lost

A measurement of the transmission (bulk) system reliability. Loss of energy is expressed in MW minutes.

Calculated as:

Energy not supplied (in MW minutes) divided by system maximum demand (in MW)

CONVERSION FACTORS AND EQUIVALENTS

Energy/power

1 kWh	= 3,6 MJ = 859,845 kcal = 3 412,14 Btu
1 GJ	= 277,778 kWh = 238,846 Mcal
1 cal	= 4,1868 J
1 quad	= 10^{15} Btu
745,7 W	= 1 imperial horsepower (hp)
735,5 W	= 1 metric horsepower (ch)

Calorific value

1 kJ/kg	= 0,429923 Btu/lb
1 kJ/m ³	= 0,026839 Btu/ft ³

Pressure

1 kPa	= 1 kN/m ² = 0,010 2 kg/cm ² = 0,145 038 lb/in ²
100 kPa	= 1 bar = 14,503 8 lb/in ²

Other

1 kg	= 2,20462 lb
1 000 kg	= 1 metric ton (t) = 0,984 long ton (lt) = 1,1023 short ton (st)
1 m ³	= 1 000 litres (l) = 264,2 gal (US) = 220 gal (UK) = 6,289 barrels
1 m ³ /s (cumec)	= 35,3147 ft ³ /s (cusec)
1 km	= 0,62137 miles

Average equivalence coefficients for fuels

1 000 m ³ natural gas	equals 39,02 GJ or 6,5 barrels oil
1 t LPG ^a	equals 45,55 GJ or 11,65 barrels oil
1 t gas-diesel oil	equals 42,50 GJ or 7,23 barrels oil
1 t crude oil	equals 42,62 GJ or 7,32 barrels oil
1 t residual fuel oil	equals 41,51 GJ or 6,62 barrels oil
1 t hard coal ^b	equals 25,31 GJ or 4,9 barrels oil
1 t lignite	equals 11,28 GJ or 2,5 barrels oil
1 t peat	equals 9,53 GJ or 2,3 barrels oil

Power station equivalents

475 tons of hard coal (21,5 GJ/t) or 240 tons of crude oil will produce about 1 GWh electrical energy in a typical modern power station. One ton of enriched uranium, when used in a power station with a pressurised water reactor, will produce about 300 GWh electrical energy.

^a LPG = liquid petroleum gas

^b For typical South African power stations:

Tutuka: 1 ton coal equals 21,5 GJ and will produce 2,1 MWh
Lethabo: 1 ton coal equals 15,3 GJ and will produce 1,5 MWh

GENERAL

Symbols and abbreviations used

— = not applicable/not available

km = kilometre

kW = kilowatt

MW = megawatt

kWh = kilowatt-hour

MWh = megawatt-hour

GWh = gigawatt-hour

V = volt

kV = kilovolt

J = joule

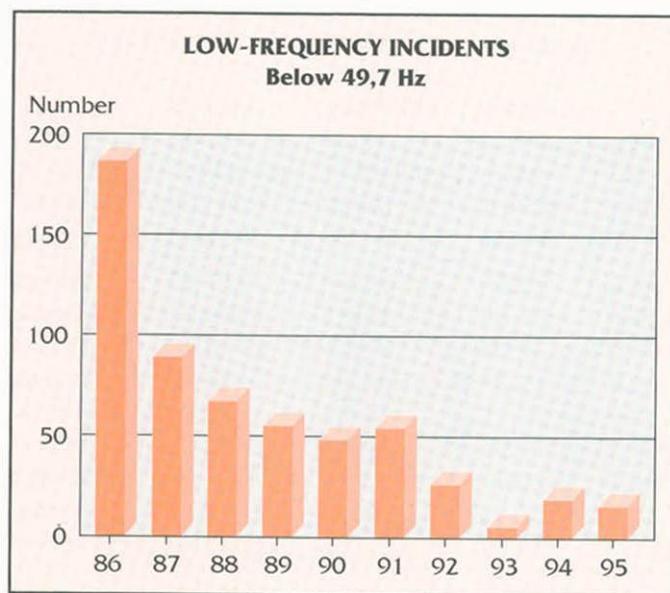
kJ = kilojoule

MVA = megavolt-ampere

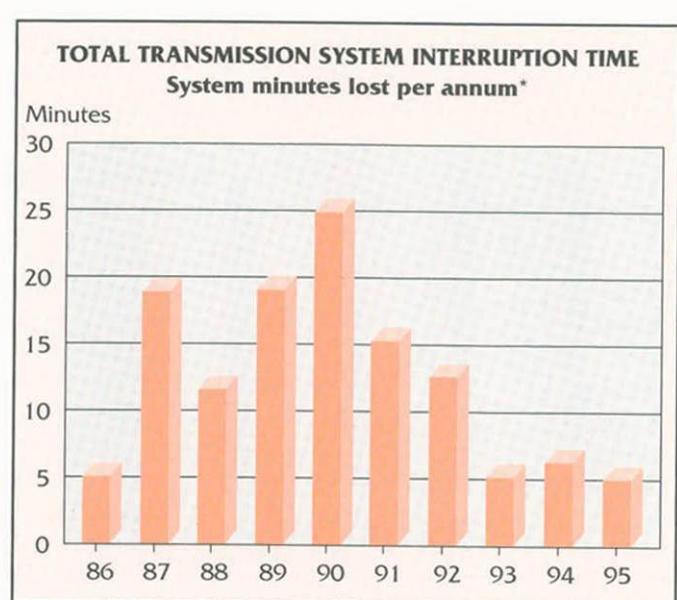
t = ton

kt = kiloton

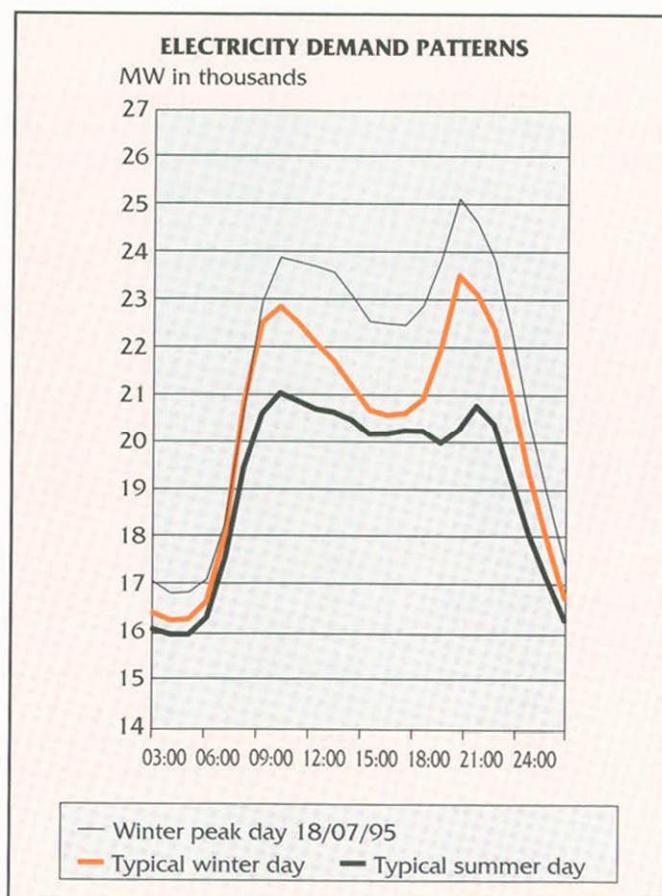
AT A GLANCE – TRANSMISSION



Low frequency is an indicator of imbalance of instantaneous supply and demand due to unexpected unit trips and/or immediate shortages on the electrical system.



* System minutes = $\frac{\text{Energy not supplied in MWh} \times 60}{\text{Eskom maximum demand in MW}}$
This graph excludes the effect of load shedding.



SOUTH AFRICAN PROVINCIAL BOUNDARIES

