



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

and supply electricity to industries on the Witwatersrand and in Southern Rhodesia, now Zimbabwe. For technical and financial reasons the project was abandoned and the VFP concentrated on the exploitation of Transvaal coal. By 1915 it operated four power stations under the name of The Victoria Falls and Transvaal Power Company and at one stage was the largest utility in the British Empire.

1923

The need for a national power system which could meet the demands of the entire country led to the Electricity Act of 1922 and the establishment of the Electricity Supply Commission in 1923.

The Commission's first chairman was Dr H.J. van der Bijl, an internationally recognised scientist who also founded Iscor and the 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 250 000 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 Eskom, controlled and

managed by the Electricity Council and Management Board. In 1987, the Eskom Act and the Electricity Act were promulgated and Eskom's name was changed to Eskom. Eskom commits itself to being a professionally managed, customer-orientated business.

1996

Generation performance exceeded all expectations when the goal of a unit capability factor of 90% by the year 2000 was achieved. Matimba Power Station set a new world record for continuous performance

of a coal-fired plant, achieving 80 days of continuous running of all six units. Eskom achieved a productivity improvement worth R488 million during 1996.

ELECTRICITY COUNCIL

As at 31 October 1997

R Khoza (*Chairman*)

F Baleni

P L Campher

T G Dale

I P Deetlefs

A B Dickman

S E Funde

K J Hlongwane

B A Khumalo

Dr W J Kok

Prof I J Lambrechts

Ms N Majija

M Mkwanzu

L Mngomezulu

A J Morgan (*Chief Executive of Eskom*)

D B Mostert

M Ngwenda

Ms J N P Seroke

C G van Veijeren

MANAGEMENT BOARD

As at 31 October 1997

A J Morgan *Chief Executive (Chairman)*

B T Crookes *Executive Director: Generation*

R S Dabengwa *Executive Director: Distribution*

J A de Beer *Executive Director: Technology*

P A Faling *Executive Director: Transmission*

B A Khumalo *Executive Director: Human Resources*

Dr W J Kok *Executive Director: Finance*

L J Messerschmidt *Executive Director: New Business Development*

Ms D D Mokgatle *Executive Director: Corporate Affairs*

M S Mosikili *Executive Director: Corporate Marketing and Communication*

V T L Ngubeni *Executive Director: Services*

HEAD OFFICE

Megawatt Park, Maxwell Drive,
Sunninghill, Sandton
Telephone (011) 800-8111

Postal address
PO Box 1091,
2000 Johannesburg
South Africa

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Available in English only.

FOREWORD

As South Africa's national electricity utility, Eskom has, since 1986, published statistical information about the generation, transmission and distribution of electricity in Eskom, South Africa, Southern Africa and selected countries across the world.

The National Electricity Regulator (NER) was established in 1995 and given the task of rationalising the electricity supply industry. As part of their function they publish the annual *Electricity Supply Statistics for South Africa*. This contains some of the information published by Eskom.

We believe our customers and stakeholders find the information in the Eskom Statistical Yearbook to be valuable and Eskom is still prepared to provide up-to-date electricity statistical information which will be supplementary to the NER's published information. However, as printing and mailing costs continue to escalate, we have decided to provide the information on the Internet. Unfortunately, some material to update the Africa and World tables was not available at the time of publication. As soon as the material is received, those tables will be updated on the Internet.

From the response to our questionnaire, sent out earlier this year, it is clear that a large number of our readers still do not have access to Internet and prefer the printed version. We have therefore decided to print a limited number of copies for regular users of our publication.

Allen Morgan
Chief Executive

17 November 1997

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Copies of this Statistical Yearbook are distributed world-wide to utilities, business undertakings, banks, management consultants, consulting engineers, research institutions as well as industry and consumer associations. It is also available on the Internet at <http://www.eskom.co.za>

SOUTH AFRICAN PROVINCIAL BOUNDARIES



STATISTICAL OVERVIEW

	1996	1995	1994
Financial, Rm			
Revenue	18 687	17 114	15 417
Net income	3 072	2 716	2 268
Property, plant and equipment in commission, at cost	58 007	51 686	48 247
Works under construction ^a	6 395	7 051	4 816
Net expenditure on property, plant and equipment	5 364	5 168	4 192
Net interest-bearing debt	27 298	27 278	27 884
Plant performance			
Total power station nominal capacity, MW	38 497	37 840	37 840
Total power station net maximum capacity, MW	36 563	35 951	35 926
Peak demand on integrated Eskom system, MW	27 967	25 133	24 798
Average energy availability (unit capability factor), % ^b	89,6 (90,6)	81,6 (84,3)	77,1 (79,9)
Generation load factor (after excess capacity management), % ^c	55,7 (63,9)	52,3 (59,0)	50,9 (58,3)
Integrated Eskom system load factor, %	71,5	74,1	72,8
Water consumed by Eskom power stations, Mℓ	215 199	214 329	213 220
Coal burnt, kt	85 401	76 376,9	76 883,0
Coal consumption, kg/kWh net	0,522	0,523	0,520
Average heat rate of coal-fired stations, MJ/kWh net	10,43	10,45	10,46
Average gross calorific value of coal (as received), MJ/kg	19,87	19,95	20,09
Overall thermal efficiency, net generation, %	34,5	34,4	34,4
Weighted average cost of coal burnt, R/t	35,05	31,99	29,98
Weighted average cost of coal burnt, c/kW	1,8303	1,6735	1,5572
Electricity output			
Total electricity production in South Africa, GWh (net) ^d	184 500 ^e	172 655 ^f	167 609
Total electricity available as a percentage of South African net production	95,3	94,5	94,4
Total electricity for Eskom system (Eskom stations and purchased), GWh (net) ^g	178 884	165 006	160 351
Total produced by Eskom stations, GWh (net)	178 855	164 834	160 293
Subtotal from coal-fired stations, GWh (net)	163 541	151 730	148 003
Subtotal from hydroelectric stations, GWh (net)	1 319	529	1 074
Subtotal from pumped storage stations, GWh (net)	2 220	1 274	1 517
Subtotal from gas-turbine stations, GWh (net)	0	0	2
Subtotal from nuclear power station, GWh (net)	11 775	11 301	9 697
Total purchased for Eskom system, GWh	29	172	58
Total consumed by Eskom power stations, GWh ^h	3 130	1 866	2 113
Total available for distribution, GWh	175 754	163 140	158 238
Electricity sold, GWh ⁱ	165 370	153 547	149 443
Growth in GWh sales, %	7,7	2,7	3,9
Power station net maximum capacity, MW			
Subtotal coal fired (13 stations) ^j	32 381	31 769	31 744
Subtotal gas turbine (2 stations) ^k	342	342	342
Subtotal hydroelectric (2 stations) ^l	600	600	600
Subtotal pumped storage (2 stations) ^m	1 400	1 400	1 400
Subtotal nuclear (1 station)	1 840	1 840	1 840
Total power station net maximum capacity, MW	36 563	35 951	35 926
Employees			
Total number at 31 December ⁿ	39 857 ^o	39 952	39 760
GWh sold per employee	4,149	3,843	3,759

^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 which generate all or part of their electricity requirements. ^e Source: NER 1996 Electricity Supply Statistics. ^f Source: NER. ^g Includes Eskom electricity produced for neighbouring countries. ^h In respect of pumped storage facilities and synchronous condenser mode of operation. See note l. ⁱ Difference between electricity available for distribution and sales is due to transmission losses. Since 1993, energy consumption for water pumped for

1993	1992	1991	1990	1989	1988	1987
13 793	12 649	11 726	10 736	9 271	8 159	7 046
1 646	1 489	988	845	728	816	702
45 623	42 688	39 990	35 753	31 199	28 680	24 986
3 552	3 115	3 668	5 771	6 638	5 512	6 075
3 591	3 242	3 335	3 662	3 993	3 969	3 895
28 027	27 616	27 266	26 590	24 630	22 779	21 475
39 746	39 060	38 396	35 673	34 141	33 176	31 261
37 636	36 846	36 228	33 843	32 403	31 465	29 618
23 169	22 640	22 342	21 863	21 871	20 589	20 001
80,5 (81,7)	76,7	76,1	75,0	78,1	79,1	79,2
46,8 (56,4)	46,9 (54,6)	49,8 (58,5)	50,5 (57,3)	51,1	52,3	54,3
75,1	73,5	74,6	74,9	73,7	75,5	73,9
223 650	226 240	237 660	257 000	260 154	262 804	274 804
75 926,4	71 037,9	70 523,2	70 861,2	67 529,3	64 489,6	65 787,0
0,522	0,519	0,520	0,526	0,521	0,521	0,535
10,47	10,54	10,49	10,66	10,72	10,71	11,00
20,05	20,25	20,21	20,26	20,20	20,44	20,48
34,4	34,2	34,3	33,7	33,6	33,6	32,7
28,48	27,47	25,70	23,91	20,94	18,67	17,11
1,4860	1,4263	1,3354	1,2575	1,1023	0,9727	0,9155
155 812	149 427	148 919	147 069	146 162	140 802	134 751
97,9	97,9	98,0	97,5	96,7	97,0	96,1
154 361	148 556	148 934	146 320	143 548	139 197	132 774
154 260	148 207	148 671	146 047	143 204	138 837	132 507
145 514	136 830	135 743	134 744	128 304	123 777	122 947
146	752	1 980	1 010	2 759	3 162	1 617
1 345	1 333	1 804	1 841	1 039	1 403	1 774
0	4	0	3	3	2	2
7 255	9 288	9 144	8 449	11 099	10 493	6 167
101	349	263	273	344	360	267
1 898	2 295	2 933	2 953	2 265	2 567	3 229
152 463	146 261	146 001	143 367	141 283	136 630	129 545
143 800	138 126	138 687	136 168	134 347	129 493	122 524
4,1	-0,4	1,8	1,4	3,7	5,7	4,4
33 488	32 698	32 058	29 673	28 233	27 295	25 848
368	368	390	390	390	390	390
540	540	540	540	540	540	540
1 400	1 400	1 400	1 400	1 400	1 400	1 000
1 840	1 840	1 840	1 840	1 840	1 840	1 840
37 636	36 846	36 228	33 843	32 403	31 465	29 618
40 128	42 223	46 637	50 000	51 554	56 726	56 830
3,584	3,271	2,974	2,723	2,606	2,283	2,156

Department of Water Affairs and Forestry has been excluded from this total. ^jBase-load stations, except in the case of older, uneconomical plant that is used only for peak demands or in emergencies. ^kUsed only for peaking or in emergencies. ^lUse restricted to peaking and emergencies and availability of water in Gariep and Vanderkloof dams. ^mPumped storage are net users of electricity and are used for peaking. Water is pumped during off-peak periods to generate electricity during peak periods. ⁿExcludes employees of subsidiary companies. ^oIncludes 398 employees taken over from Venda Electricity Corporation.

HIGHLIGHTS OF THE YEAR

	1996	1995	Change 1995-96 %	Average yearly change 1992-96 %
Financial				
Revenue, Rm	18 687	17 114	9,2	9,8
Net income, Rm	3 072	2 716	13,1	25,5
Property, plant and equipment in commission, at cost, Rm	58 007	51 686	12,2	7,7
Works under construction, Rm ^a	6 395	7 051	-9,3	11,8
Net expenditure on property, plant and equipment, Rm	5 364	5 168	3,8	12,2
Net interest-bearing debt, Rm	27 298	27 278	0,1	0,0
Average price per kWh sold, cents	11,30	11,15	1,4	6,0
Average total cost per kWh sold, cents	9,46	9,40	0,6	4,1
Operations				
Total electricity sold, GWh ^b	165 370	153 547	7,7	3,6
Coal burnt in power stations, Mt	85,4	79,4	7,6	3,9
Water consumed by power stations, Mℓ	215 199	214 329	0,4	-2,0
Peak demand on integrated system, MW	27 967	25 133	11,3	4,6
	24 July	18 July		
Assets in commission at 31 December				
Nominal capacity, MW	38 497	37 840	1,7	0,1
Net maximum capacity, MW	36 563	35 951	1,7	0,2
Power lines (all voltages), km	255 745	241 802	5,8	2,4
Staff employed at 31 December, number ^c				
	39 857 ^d	39 952	-0,2	-3,1
Customers at 31 December, number (million)				
	1,877	1,568	19,7	46,5

^a Includes construction materials.

^b Includes internal sales of 281 GWh.

^c Excludes employees of subsidiary companies.

^d Includes 398 employees taken over from Venda Electricity Corporation.

FINANCIAL STATISTICS

	1996	1995	1994	1993	1992
Revenue, Rm	18 687	17 114	15 417	13 793	12 649
Annual increase, %	9,2	11,0	11,8	9,0	7,9
Cents per kWh, cents	11,30	11,15	10,32	9,59	9,16
Annual increase, %	1,3	8,0	7,6	4,7	8,3
Charges against revenue					
Total operating expenditure, Rm	12 421	11 315	9 963	9 000	8 173
Annual increase, %	9,8	13,6	10,7	10,1	9,7
Depreciation, Rm	2 679	2 322	2 105	1 884	1 762
Annual increase, %	15,4	10,3	11,7	6,9	8,1
Net interest and finance charges, Rm	3 194	3 083	3 186	3 147	2 987
Annual increase, %	3,6	-3,2	1,2	5,4	-7,8
Retained income for the year, Rm	3 072	2 666	2 168	1 852	1 397
Assets					
Property, plant and equipment (at book value), Rm	46 334	43 593	40 711	38 605	36 895
Fixed assets in commission (net – after depreciation), Rm	38 736	35 005 ^a	33 715 ^a	33 017 ^a	31 746 ^a
Works under construction and construction materials, Rm	6 395	7 051	4 816	3 552	3 115
Non-current assets, Rm	4 697	4 498	4 074	3 762	3 501
Inventories, Rm	834	794	758	731	851
Accounts receivable, Rm	1 905	1 740	1 821	1 299	1 208
Financing					
Net interest-bearing debt, Rm	27 298	27 278	27 884	28 027	27 616
Interest-free liabilities, Rm	3 040	3 349	2 586	2 137	2 340
Reserves, Rm	21 893	18 821	16 105	13 837	12 191
Debt-equity ratio	1,25	1,44	1,73	2,03	2,27

^a Excluding plant at mothballed stations.

SUMMARY OF OPERATIONS

Year	Coal-fired power stations					Cost of coal burnt		Specific water consumption
	Coal burnt					Weighted average R/t	c/kWh net	€/kWh net
	kt	Average gross calorific value (as received) MJ/kg	Consumption kg/kWh net	Average heat rate MJ/kWh net	Overall thermal efficiency %			
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	10,72	33,6	20,90	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
1996	85 400,6	19,87	0,522	10,43	34,5	35,05	1,8303	1,32

^a As from 1994, only gas-turbine stations.

^b MWh net x 100 / (average net maximum capacity x hours in year).

^c After excess capacity management.

Power station output – net									gross
Coal-fired stations GWh	Hydro-electric stations GWh	Pumped storage stations GWh	Diesel and gas-turbine stations ^a GWh	Nuclear station GWh	Total power station output GWh	Total power station net maximum capacity MW	Average station load factor net basis ^b %	Total power station nominal capacity MW	
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	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	
163 541	1 319	2 220	0	11 775	178 855	36 563	63,9 ^c	38 497	

POWER STATIONS IN SERVICE

at 31 December 1996

Name of station	Location	Number and capacity of generator sets MW	Total nominal capacity MW	Total net maximum capacity MW ^a	Capacity in reserve storage MW
Coal fired					
Arnot ^b	Middelburg, Mpumalanga	6 x 350	2 100	1 980	990
Camden ^d	Ermelo	8 x 200	1 600	1 520	1 520
Duvha ^b	Witbank	6 x 600	3 600	3 450	–
Grootvlei ^d	Balfour	6 x 200	1 200	1 130	1 130
Hendrina ^b	Hendrina	10 x 200	2 000	1 900	–
Kendal ^{b d}	Witbank	6 x 686	4 116	3 840	–
Komati ^d	Middelburg, Mpumalanga	5 x 100; 4 x 125	1 000	891	891
Kriel ^b	Bethal	6 x 500	3 000	2 850	–
Lethabo ^b	Sasolburg	6 x 618	3 708	3 558	–
Majuba ^e	Volksrust	1 x 657	657	612	–
Matimba ^{b d}	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 (13)			34 225	32 381	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	–
Gariiep	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)			600	600	–
Pumped storageⁱ					
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 (20)			38 497	36 563	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 In long-term reserve storage (mothballed).

^d Dry-cooled unit specifications are based on design back-pressure and ambient air temperature.

^e Unit 2 commissioned in April 1997.

^f Stations used for peaking or emergency supplies.

^g Use restricted to peaking, emergencies and availability of water in Gariiep and Vanderkloof dams.

^h Not an Eskom asset, but during 1995, Eskom was licensed to generate electricity at this generating unit. Generating capacity is not included in Eskom total generating capacity.

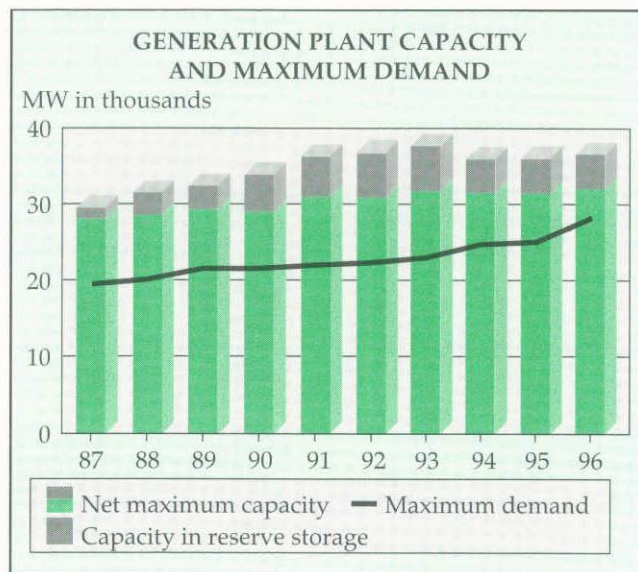
ⁱ Pumped storage facilities are net users of electricity and are used for peaking. Water is pumped during off-peak periods to generate electricity during peak periods.

GENERATING SETS ON ORDER

at 31 December 1996

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						
Volkstrust	3 x 713	3 x 669	4 110	3 843	1 (5)	3 453	3 231	1996 (2001)
Total generating sets on order, MW						3 453	3 231	

* 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 1996

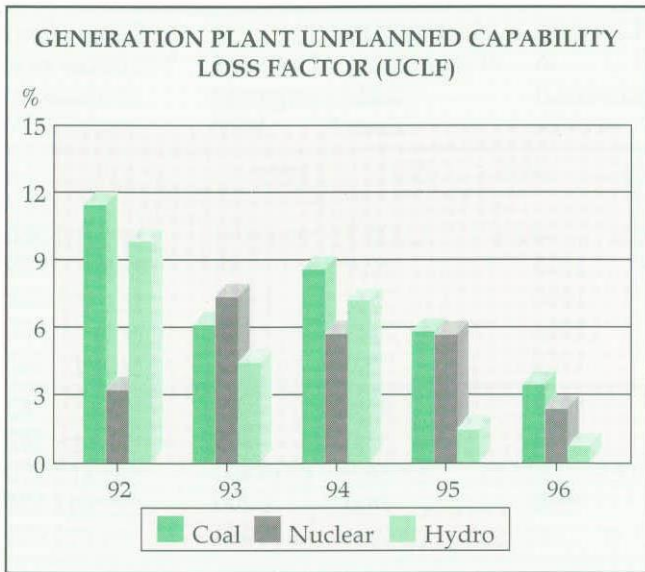
Power station	Net maximum capacity MW	Net electricity generation GWh	Net maximum power produced MW	Generation load factor ^a %
Coal fired				
Arnot	990	5 099	1 079	58,6
Duvha	3 450	23 173	3 492	76,5
Hendrina	1 900	13 068	1 895	78,3
Kendal	3 840	22 053	3 977	65,4
Kriel	2 850	15 061	2 816	60,2
Lethabo	3 558	20 607	3 538	65,9
Majuba ^a	1 224	1 916	1 027	47,4
Matimba	3 690	24 737	3 683	76,3
Matla	3 450	23 338	3 491	77,0
Tutuka	3 510	14 488	3 551	47,0
Subtotal coal fired	28 462	163 541		67,2
Gas turbine				
Acacia	171	0	67	0,0
Port Rex	171	-1	124	0,0
Subtotal gas turbine	342	-1		0,0
Hydroelectric				
Gariiep	360	631	382	19,9
Vanderkloof	240	482	249	22,9
Subtotal hydroelectric	600	1 113		21,1
Pumped storage				
Drakensberg	1 000	1 500	1 127	17,1
Palmiet	400	720	421	20,5
Subtotal pumped storage	1 400	2 220		18,1
Nuclear				
Koeberg	1 840	11 775	1 804	72,9
Subtotal nuclear	1 840	11 775		72,9
Other power stations^c		207		
Total/weighted average all Eskom stations	32 644	178 855		63,9
External purchases	–	29	156	
Total/weighted average		178 884		63,9

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

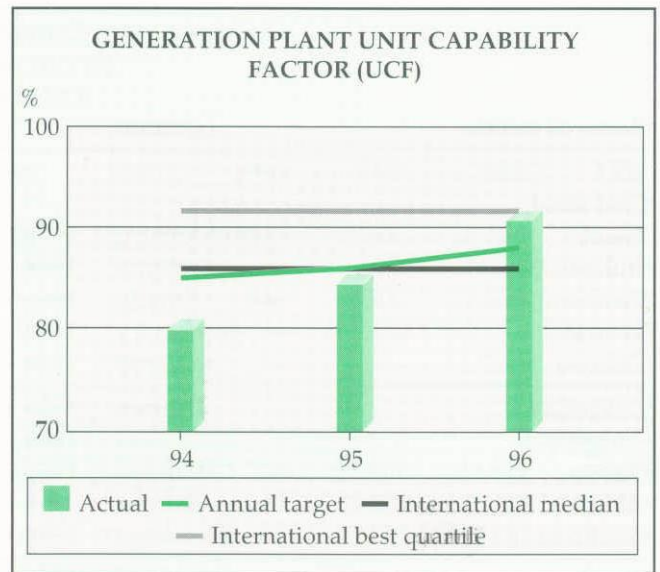
^b Unit 2 commissioned in April 1997.

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

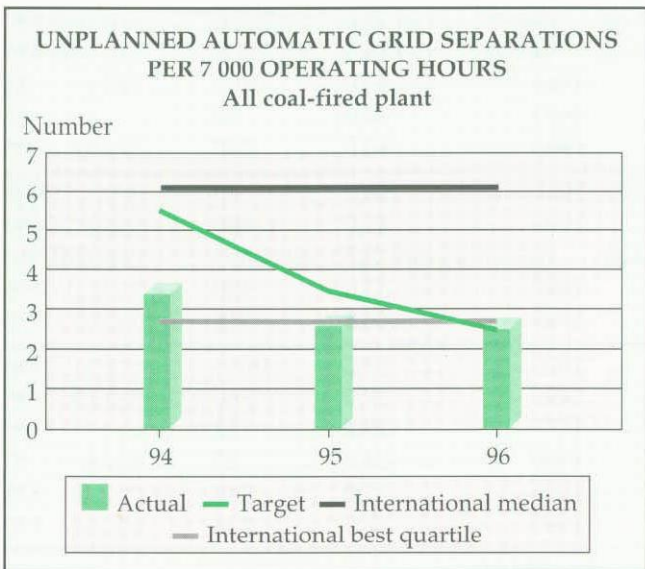
AT A GLANCE – GENERATION



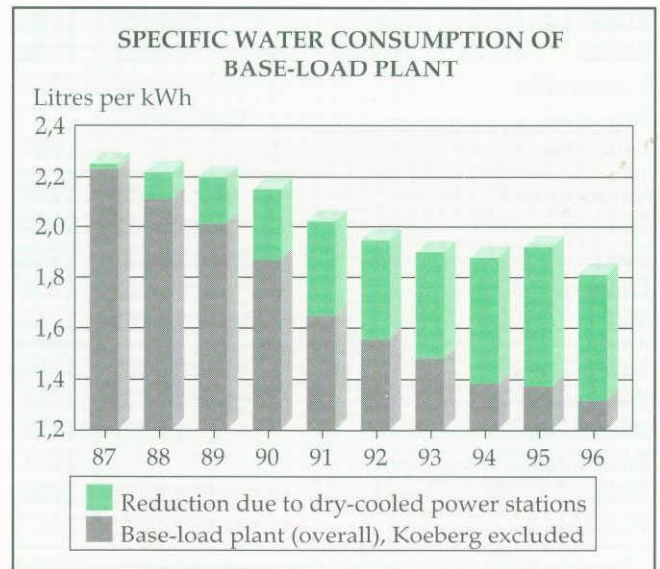
A UNIPEDA/WEC/WANO generation plant performance indicator. UCLF represents the percentage of maximum energy generation that a plant is **not** capable of supplying to the electrical grid because of unplanned shutdowns, outage extensions or load reductions. International achievements (median) lie within the 5% zone.



A UNIPEDA/WANO generation plant performance indicator. UCF gives the true energy capability of the plant whereby energy loss, due to constraints not under plant management control, is excluded from its calculation. International achievements (median) lie within the 85% zone.



A UNIPEDA fossil-fired plant indicator that is a measure of the reliability of service provided to the electrical grid. International achievements (median) lie within the 6,1 zone.



PRODUCTION DATA OF ESKOM POWER STATIONS

Sources: Eskom Annual Report (1924 – 1984; 1996) and Eskom Statistical Yearbook (1986 – 1995)

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	–	23,7	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	–	14,9	3 600	3 450
Grootvlei ^e	Balfour	1969 – 1977	1990	24,0	1 200	1 130
Hendrina	Hendrina	1970 – 1977	–	23,6	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	–	5,2	4 116	3 840
King William's Town ^g	King William's Town	1948	1972	24,0	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	–	18,8	3 000	2 850
Lethabo	Sasolburg	1985 – 1990	–	8,0	3 708	3 558
Majuba ^h	Volksrust	1996 – 2001	–	0,8	657 ⁱ	612
Matimba	Ellisras	1987 – 1991	–	7,6	3 990	3 690
Matla	Bethal	1979 – 1983	–	15,5	3 600	3 450
Rosherville	Germiston	1911 – 1914	1966	55,0	60,5	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	–	9,5	3 654	3 510
Umgeni	Pinetown	1954 – 1961	1987	33,0	480	444
Vaal	Viljoensdrif	1945 – 1954	1989	44,0	318	270
Vereeniging ^d	Vereeniging	1912 – 1954	1970	58,0	157,5	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: number of years in service since commissioning of first unit.

^b Where sent-out figures were not reported, gross production or sales figures were used. Zero or less than zero indicates that auxiliary consumption exceeded energy generated.

^c Three units in reserve storage; one to be returned to service this year by January 1999.

^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. Shut down in 1957 and kept as emergency reserve.

^h Unit 2 commissioned in April 1997.

ⁱ Correction.

^j Auxiliary consumption exceeded energy generated.

^k Used during World War II to supplement generating capacity.

^l Sold to NamPower (previously known as SWAWEK) in Namibia.

^m First Eskom hydroelectric unit built in 1925. Shut down in 1927.

ⁿ Eskom's first power station and its only hydroelectric station until Gariep (then Hendrik Verwoerd) Power Station's first unit was commissioned in 1971.

Total energy sent out by 31-12-96 GWh	Energy sent out ^b GWh									
	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987
235 703	5 099	3 863	4 558	4 089	7 426	10 839	10 845	11 601	10 806	11 699
1 495	-	-	-	-	-	-	-	-	-	-
177 129	-	-	-	-	-	-	1 846	2 971	3 529	6 489
936	-	-	-	-	-	-	-	-	-	-
21 043	-	-	-	-	-	-	-	-	-	-
22 297	-	-	-	-	-	-	-	-	-	-
316 850	23 173	19 945	21 974	18 000	21 061	20 220	21 364	20 377	20 811	23 335
104 322	-	-	-	-	-	-	2 043	2 276	2 225	5 096
271 656	13 068	11 012	11 871	11 310	10 840	10 196	10 308	10 127	9 450	11 939
9 129	-	-	-	-	-	-	-	-	-	13
62 859	-	-	-	-	-	-	13	9	53	435
58 917	-	-	-	-	-	-	534	596	1 069	1 690
103 794	22 053	21 249	19 397	14 021	10 658	7 986	4 701	2 563	1 166	-
85	-	-	-	-	-	-	-	-	-	-
100 936	-	-	-	-	-	-	-	-	-	-
148 105	-	-	-	-	-	-	1 746	2 864	3 219	4 703
289 300	15 061	15 955	13 395	15 080	12 716	13 408	15 312	15 773	17 666	16 014
169 496	20 607	19 257	17 863	21 102	16 957	16 684	15 059	13 116	12 879	10 475
1 953	1 916	37	-	-	-	-	-	-	-	-
167 029	24 737	24 162	22 685	20 564	19 763	19 964	15 767	10 985 ⁱ	8 234	1 678
315 217	23 338	19 152	18 737	22 634	20 807	20 408	18 565	19 859	19 616	18 816
1 747	-	-	-	-	-	-	-	-	-	-
29 797	-	-	-	12	4	7	10	21	- ^j	20
739	-	-	-	-	-	-	-	-	-	-
76 984	-	-	-	-	-	-	-	13	101	507
162 943	14 488	17 098	17 523	18 699	16 605	16 033	16 458	14 665	12 032	7 690
23 039	-	-	-	-	-	-	-	-	- ^j	17
69 060	-	-	-	-	-	-	-	- ^j	36	426
15 177	-	-	-	-	-	-	-	-	-	-
53 600	-	-	-	-	-	-	27	62	59	396
8 404	-	-	-	-	-	-	-	-	1	9
45 973	-	-	-	3	59	69	146	428	831	1 498
28 694	-	-	-	-	-	-	-	-	-	-

PRODUCTION DATA OF ESKOM POWER STATIONS CONTINUED

Sources: Eskom Annual Report (1924 – 1984; 1996) and Eskom Statistical Yearbook (1986 – 1995)

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	–	20,6	171	171
Alice ^{g,k}	Alice	1948	1954	6,0	0,54	0,54
Caledon ^k	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	1
Margate ^k	Margate	1938	1944	6,0	0,17	0,17
Paratus ^l	Walvis Bay	1986	1993	13,0	48	48
Port Rex	East London	1976	–	20,2	171	171
Port Shepstone	Port Shepstone	1944	1969	25,0	3,40	3,40
Volkstrust ^k	Volkstrust	1939	1957	18,0	0,50	0,50
Hydroelectric						
Gariep	Norvalspont	1971 – 1976	–	23,1	360	360
Ixopo	Ixopo	1956	1958	2,0	0,17	0,17
Malieveld ^m	Sabie	1925	1927	2,0	0,35	0,35
Sabie Gorge ⁿ	Sabie	1927	1970	43,0	1,35	1,35
Vanderkloof	Petrusville	1977	–	19,9	240	240
Pumped storage						
Drakensberg	Bergville	1981 – 1982	–	15,1	1 000	1 000
Palmiet	Grabouw	1988	–	8,6	400	400
Nuclear						
Koeberg	Cape Town	1984 – 1985	–	11,8	1 930	1 840

^a For power stations decommissioned/disposed of: number of years in service since commissioning of first unit.

^b Where sent-out figures were not reported, gross production or sales figures were used. Zero or less than zero indicates that auxiliary consumption exceeded energy generated.

^c Three units in reserve storage; one to be returned to service this year by January 1999.

^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. Shut down in 1957 and kept as emergency reserve.

^h Unit 2 commissioned in April 1997.

ⁱ Correction.

^j Auxiliary consumption exceeded energy generated.

^k Used during World War II to supplement generating capacity.

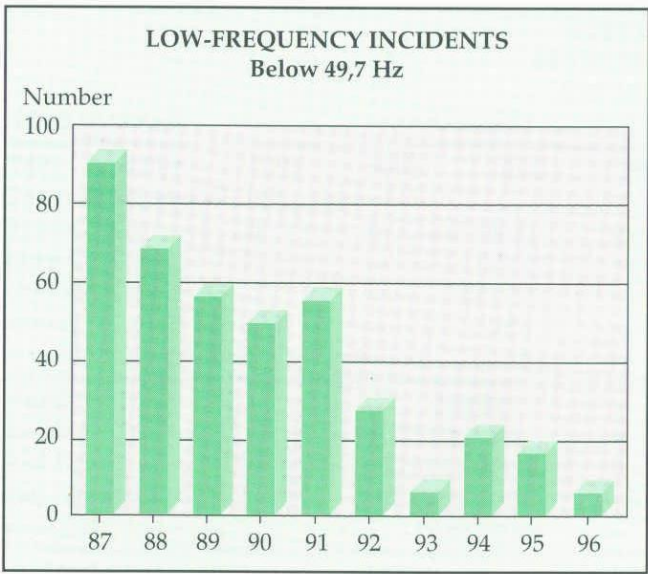
^l Sold to NamPower (previously known as SWAWEK) in Namibia.

^m First Eskom hydroelectric unit built in 1925. Shut down in 1927.

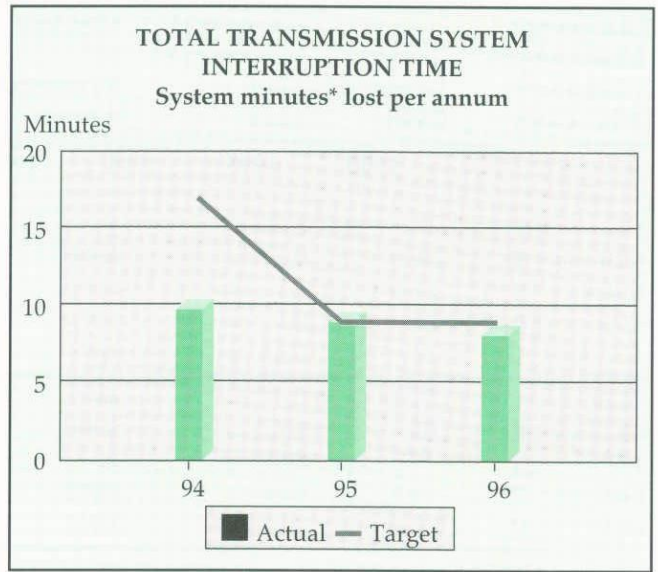
ⁿ Eskom's first power station and its only hydroelectric station until Gariep (then Hendrik Verwoerd) Power Station's first unit was commissioned in 1971.

Total energy sent out by 31-12-95 GWh	Energy sent out ^b GWh									
	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987
101	0	0	1	0	0	0	0	0	1	1
4	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	4	1	4	3	1	-
84	-1j	0	1	0	0	-1j	-1j	0	-j	1
7	-	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-	-
17 197	631	135	575	123	251	952	441	1 328	1 472	735
1	-	-	-	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-	-	-
217	-	-	-	-	-	-	-	-	-	-
14 016	482	288	499	23	501	1 028	569	1 431	1 690	882
19 363	1 500	843	1 023	837	883	1 098	1 160	888	1 177	1 774
4 141	720	431	494	508	450	706	681	151	226	-
107 161	11 775	11 301	9 697	7 255	9 288	9 144	8 449	11 099	10 493	6 167

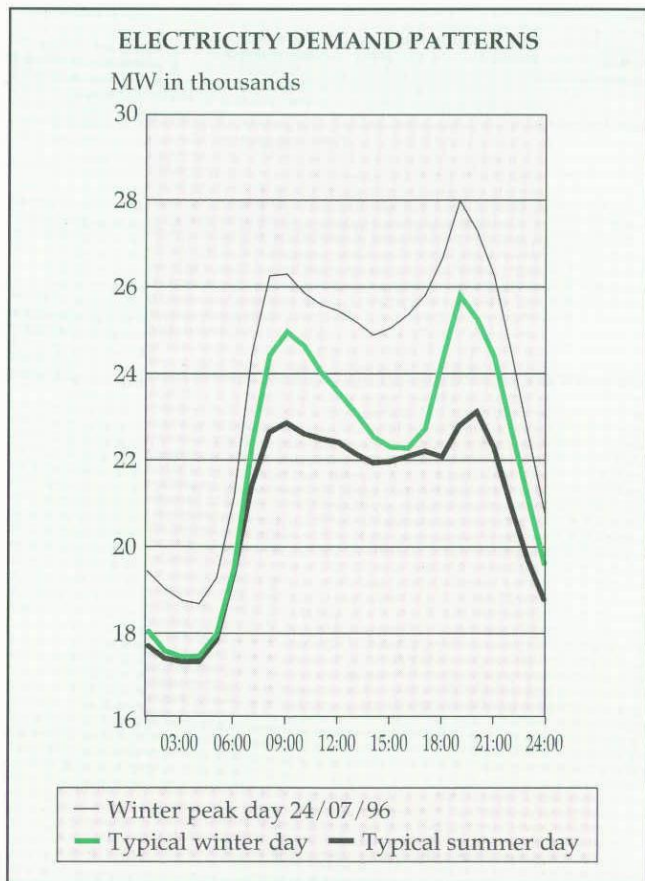
AT A GLANCE – TRANSMISSION



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 = $\frac{\text{Energy not supplied in MWh} \times 60}{\text{Eskom maximum demand in MW}}$
 As from 1996, system minutes reflect all transmission voltages. Before 1996, system minutes reflect only voltages of 132 kV and above.



TRANSMISSION AND DISTRIBUTION EQUIPMENT IN SERVICE

as at 31 December

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

		1996	1995	Change
Main transmission system, km	765 kV	1 153 ^a	1 153 ^a	0
	533 kV DC (monopolar)	1 035	1 031	4
	400 kV	14 216	13 981	235
	275 kV	7 130	7 148	-18
	220 kV	1 239	1 243	-4
	132 kV	653	632	21
Total transmission lines ^b , km		25 426	25 188	238
Distribution lines, km	165-132 kV	18 730	16 632	2 098
	88-33 kV	20 597	20 230	367
Total distribution lines, km		39 327	36 862	2 465
Reticulation lines, km	22 kV and lower	190 992	179 752	11 240
Total all lines, km		255 745	241 802	13 943
Cables, km	165-132 kV	47	47	0
	88-33 kV	243	206	37
	22 kV and lower	5 767	4 838	929
Total all cables, km		6 057	5 091	966
Transformers	Transmission, MVA ^c	124 790	124 790	0
	Distribution and reticulation, MVA	71 382	68 681	2 701
Total transformer capacity, MVA		196 172	193 471	2 701
Transformers	Transmission, number	455	453	2
	Distribution and reticulation, number	224 724	213 099	11 625
Total transformers, number		225 179	213 552	11 627

^a 282 km of 765 kV construction line presently operating at 400 kV.

^b Transmission line lengths as per GIS (Geographic Information System) distances.

^c Base of definition: transformers rated ≥ 30 MVA and primary voltage ≥ 132 kV.

MAXIMUM ONE-HOUR DEMAND

	1996	1995	1994	1993	1992	Increase 1995-96 %	Average yearly increase 1992-96 %
Maximum simultaneous one-hour demand on total Eskom system, MW	27 967	25 133	24 798	23 169	22 640	11,3	4,6
Date	24 July	18 July	26 July	22 June	8 July		

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
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	95,1	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	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	160 293	58	2 113	158 238	24 798
1995	172 655 ^f	94,5	164 834	172	1 866	163 140	25 133
1996	184 500 ^g	95,3	178 855	29	3 130	175 754	27 967

^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.

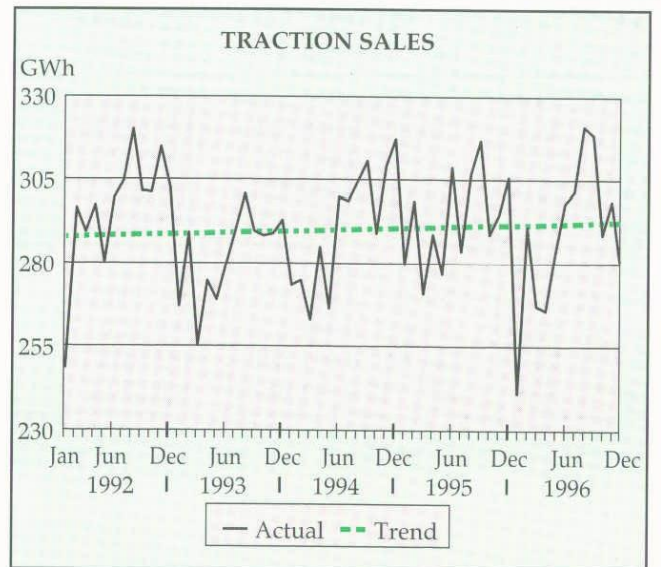
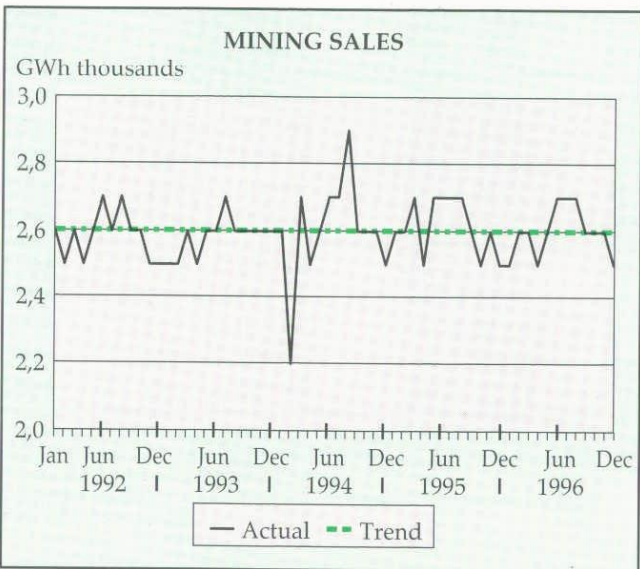
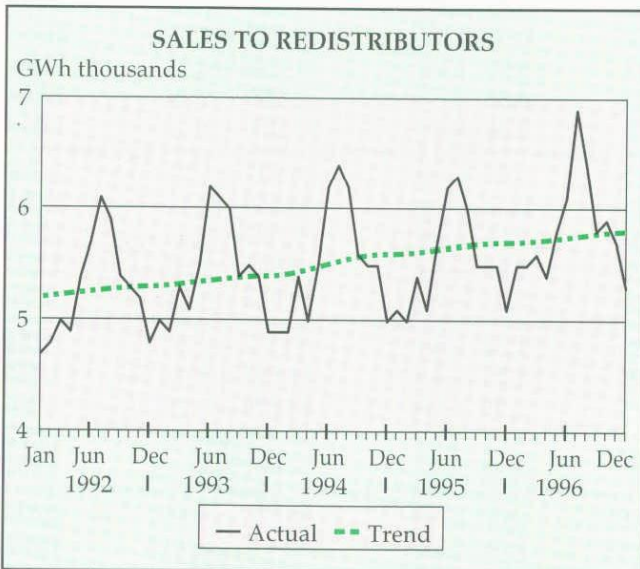
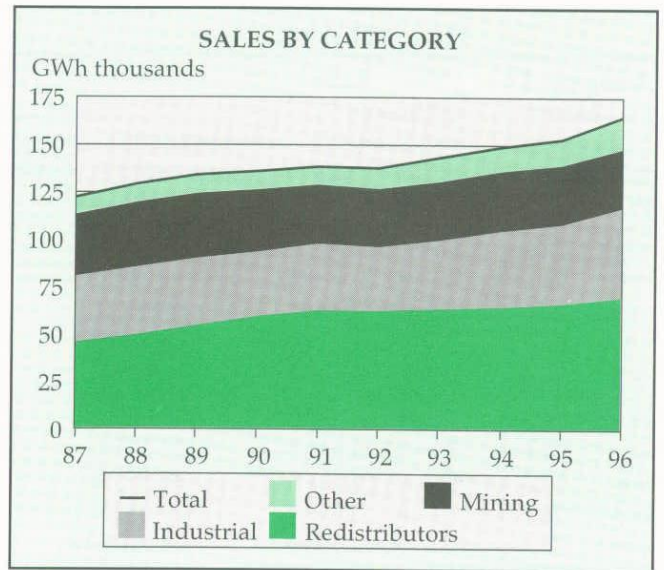
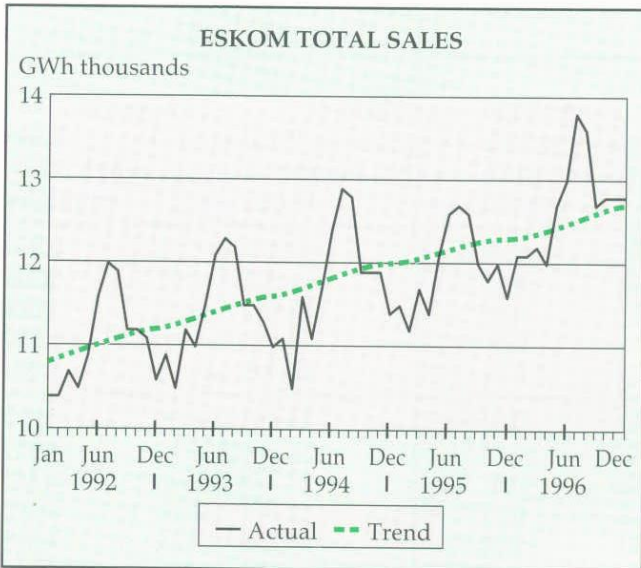
^e Air and steam production excluded.

^f Source: NER 1995 Electricity Supply Statistics.

^g Source: NER 1996 Electricity Supply Statistics.

	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	
73,3	0,913 ^e	12 604 ^e	6,6 ^e	0,44 ^e	13 421	0,939 ^e	
74,5	0,916 ^e	13 4489 ^e	6,7 ^e	0,47 ^e	14 312	0,940 ^e	
74,6	0,919 ^e	14 586 ^e	8,5 ^e	0,49 ^e	13 947	1,046 ^e	
75,7	0,922 ^e	15 968 ^e	9,5 ^e	0,50 ^e	14 654	1,090 ^e	
76,4	0,923 ^e	16 889 ^e	5,8 ^e	0,51 ^e	15 441	1,094 ^e	
75,3	0,927 ^e	18 005 ^e	6,6 ^e	0,51 ^e	16 467	1,093 ^e	
74,6	0,931 ^e	19 385 ^e	7,7 ^e	0,51 ^e	16 804	1,154 ^e	
74,6	0,933 ^e	21 153 ^e	9,1 ^e	0,51 ^e	17 172	1,232 ^e	
76,9	0,933 ^e	23 056 ^e	9,0 ^e	0,51 ^e	17 851	1,292 ^e	
76,4	0,938 ^e	24 515 ^e	6,3 ^e	0,52 ^e	18 579	1,319 ^e	
76,8	0,937 ^e	26 657 ^e	8,7 ^e	0,55 ^e	19 817	1,345 ^e	
75,4	0,936	28 885	8,4	0,56	20 893	1,383	
75,9	0,937	31 506	9,1	0,56	21 644	1,456	
75,8	0,935	34 891	10,7	0,55	22 700	1,537	
76,1	0,934	38 040	9,0	0,58	25 050	1,519	
76,4	0,936	41 649	9,5	0,61	26 937	1,546	
77,3	0,936	46 578	11,8	0,65	28 559	1,631	
75,1	0,935	52 585	12,9	0,68	29 891	1,759	
76,5	0,940	57 869	10,0	0,80	33 999	1,702	
76,1	0,940	63 356	9,5	1,04	36 915	1,716	
75,8	0,942	67 125	6,0	1,54	39 112	1,716	
77,3	0,936	72 780	8,4	1,79	41 040	1,773	
76,4	0,937	80 583	10,7	1,90	43 690	1,844	
77,5	0,942	87 539	8,6	2,02	47 490	1,843	
77,6	0,941	93 844	7,2	2,28	52 080	1,802	
75,3	0,938	96 136	2,4	2,80	58 850	1,634	
76,9	0,932	98 251	2,2	3,36	62 420	1,574	
75,0	0,939	106 904	8,8	3,58	64 560	1,656	
76,2	0,942	112 306	5,1	4,12	66 000	1,702	
77,3	0,948	117 353	4,5	4,98	60 800	1,930	
73,9	0,946	122 524	4,4	5,75	56 830	2,156	
75,5	0,948	129 493	5,7	6,29	56 726	2,283	
73,7	0,951	134 347	3,7	6,90	51 554	2,606	
74,9	0,950	136 168	1,4	7,88	50 000	2,723	
74,6	0,950	138 687	1,8	8,46	46 637	2,974	
73,5	0,944	138 126	-0,4	9,16	42 223	3,271	
75,1	0,943	143 800	4,1	9,59	40 128	3,584	
72,8	0,944	149 443	3,9	10,32	39 760	3,759	
74,1	0,941	153 547	2,7	11,15	39 952	3,843	
71,5	0,941	165 370	7,7	11,30	39 857	4 149	

AT A GLANCE - ELECTRICITY SALES



NUMBER OF EXTERNAL CUSTOMERS

Year	Re-distributors	Domestic and street lighting	Commercial ^a	Industrial	Mining	Rural/farming ^a	Traction	Inter-national ^b	Total	Change %
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	5,4
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	38,4
1995	704	1 407 117	23 098	6 326	661	129 590	38	4	1 567 538	29,9
1996	752	1 712 958	23 869	7 199	731	131 541	155	4	1 877 209	19,8

^a Prior to 1988 included under Industrial.

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

^c Reclassification of customer codes.

TOTAL ELECTRICITY SOLD

Year	Sales per category, GWh								
	Redis-tributors	Domestic and street lighting	Commercial ^a	Industrial	Mining	Rural/farming ^a	Traction	Inter-national ^b	Own usage
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
1996	69 905 ^d	4 753	654	47 451 ^e	31 188	3 239 ^f	3 458	4 441	281

^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.

^d Platinum mines now included under Mining only.

^e Large power user rural/ farming customers included.

^f Large power users excluded.

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
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
165 370	42,3	2,9	0,4	28,7	18,9	2,0	2,1	2,7	0,2

REVENUE PER kWh BY CUSTOMER CATEGORY

Year	Actual price in c/kWh									Change %
	Bulk	Domestic and street lighting	Commercial ^a	Industrial	Mining	Rural/farming ^a	Traction	Inter-national ^b	Average for all categories	
1972	0,64	1,42		0,60	0,51		0,79		0,61	5,8
1973	0,67	1,50		0,64	0,54		0,84		0,65	6,2
1974	0,70	1,55		0,71	0,56		0,88		0,68	5,2
1975	0,81	1,71		0,82	0,66		1,02		0,80	16,5
1976	1,05	2,09		1,06	0,87		1,33		1,04	30,3
1977	1,58	3,18		1,56	1,29		2,00		1,54	48,2
1978	1,78	3,79		1,80	1,60		2,39		1,79	16,5
1979	1,87	3,98		1,89	1,73		2,60		1,90	6,1
1980	2,00	4,28		2,03	1,85		2,68		2,02	6,6
1981	2,27	4,73		2,28	2,08		2,99		2,28	12,7
1982	2,81	5,42		2,83	2,54		3,65		2,80	22,9
1983	3,37	6,23		3,38	3,05		4,55		3,36	19,9
1984	3,59	6,66		3,60	3,27		4,70		3,58	6,7
1985	4,12	7,51		4,12	3,79		5,37		4,12	14,9
1986	4,87	9,20		5,03	4,72		6,24		4,98	20,9
1987	5,58	10,95		5,47	5,54	10,44	7,61		5,75	15,5
1988	6,12	11,86	10,91	5,88	6,03	11,67	8,18		6,29	9,4
1989	6,69	12,32	11,22	6,47	6,67	12,60	9,08		6,90	9,6
1990	7,65	14,51	12,80	7,33	7,59	14,49	10,41		7,88	14,3
1991	8,25	15,78	14,28	7,78	8,13	15,86	11,42		8,47	7,4
1992	8,98	15,27	15,57	8,17	8,79	17,14	12,44	8,63	9,16	8,1
1993	9,49	12,68	16,46	8,35	9,52	19,84	13,70	7,65	10,14	10,7
1994	10,18	16,76	17,43	8,91	10,11	21,13	14,31	7,88	10,26	7,6
1995	10,77	18,15	18,65	10,40	10,62	21,99	14,65	6,93	11,15	8,0 ^c
1996	11,14	19,45	19,49	10,10	11,02	23,39	15,31	6,80	11,30	1,4 ^d

^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 Restated.

^d Official price increase 4%; actual 1,4%, due to change in mix of sales, lower 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-distrib- utors	Domestic and street lighting	Commercial ^a	Industrial	Mining	Rural/ farming ^a	Traction	Inter- national ^b	Average for all categories	Change %
6,0	10,61	23,59	-	10,01	8,51	-	13,19	-	10,18	-1,2
6,9	9,77	21,81	-	9,24	7,85	-	12,21	-	9,40	-7,7
8,1	8,69	19,11	-	8,71	6,88	-	10,90	-	8,42	-10,4
9,4	8,59	18,17	-	8,74	7,01	-	10,81	-	8,46	0,4
10,9	9,66	19,19	-	9,76	8,01	-	12,17	-	9,50	12,4
12,3	12,83	25,84	-	12,72	10,53	-	16,29	-	12,48	31,3
13,5	13,18	28,06	-	13,33	11,88	-	17,68	-	13,25	6,1
15,6	12,00	25,53	-	12,13	11,10	-	16,68	-	12,17	-8,2
18,1	11,06	23,62	-	11,19	10,24	-	14,79	-	11,18	-8,1
20,6	11,02	22,97	-	11,09	10,09	-	14,51	-	11,07	-1,0
23,5	11,95	23,06	-	12,02	10,81	-	15,53	-	11,93	7,7
26,0	12,95	23,97	-	12,99	11,72	-	17,50	-	12,93	8,3
28,1	12,79	23,71	-	12,79	11,63	-	16,71	-	12,76	-1,3
32,9	12,54	22,82	-	12,52	11,52	-	16,33	-	12,52	-1,9
39,3	12,39	23,40	-	12,79	12,01	-	15,87	-	12,67	1,2
44,8	12,45	24,45	-	12,21	12,37	23,30	16,99	-	12,84	1,3
50,7	12,07	23,39	21,51	11,59	11,89	23,01	16,13	-	12,41	-3,3
58,4	11,45	21,09	19,22	11,07	11,42	21,58	15,55	-	11,81	-4,8
65,4	11,70	22,19	19,57	11,21	11,60	22,15	15,91	-	12,05	2,0
72,9	11,32	21,65	19,59	10,68	11,15	21,75	15,66	-	11,62	-3,6
78,9	11,39	19,36	19,73	10,36	11,14	21,72	15,77	10,94	11,61	-0,1
84,1	11,28	15,08	19,57	9,92	11,32	23,59	16,29	9,10	12,06	3,9
91,0	11,18	18,41	19,16	9,79	11,11	23,22	15,73	8,66	11,34	-6,0
99,7	10,80	18,21	18,71	10,43	10,65	22,06	14,70	6,95	11,18	-1,4
106,6	10,45	18,25	18,28	9,47	10,34	21,94	14,36	6,38	10,60	-5,2

SALES TO MINING SECTOR, GWh

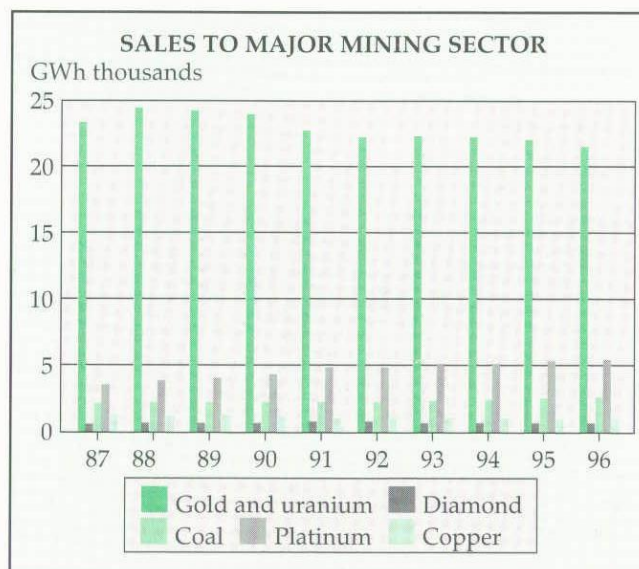
Year	Gold and uranium	Diamond	Coal	Platinum	Copper	Chrome
1972	11 773	325	589	990	422	31
1973	12 263	334	620	1 581	565	33
1974	12 803	338	648	1 978	653	52
1975	13 108	346	705	2 001	679	42
1976	13 918	343	812	2 184	728	61
1977	14 708	342	941	2 287	874	84
1978	16 241	497	1 078	2 388	1 023	106
1979	17 201	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	151 ^c
1991	22 780	791	2 336	4 659	1 117	159 ^c
1992	22 268	821	2 349	4 897	1 136	115 ^c
1993	22 370	665	2 402	5 124 ^b	1 104	109 ^c
1994	22 255	685	2 523	5 201 ^b	1 105	113 ^c
1995	22 121 ^c	676	2 566	5 369 ^b	1 100	131 ^c
1996	21 565	707	2 732	5 541 ^d	1 111	146

^a Combined figure for iron and manganese.

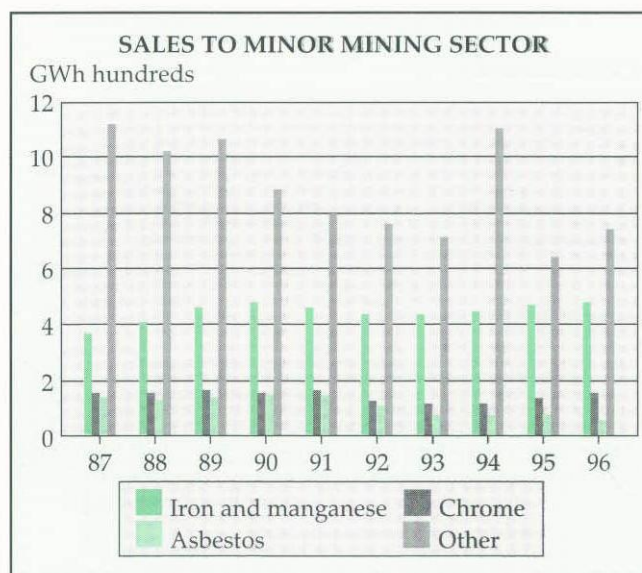
^b Platinum mines also included under Redistributors in Total electricity sold.

^c Restated.

^d Platinum refineries previously included; now under SIC 352 (Sales to industry). As from 1996, Platinum no longer included under Redistributors in Total electricity sold.



Asbestos	Iron	Manganese	Other	Total	Growth %
161		101 ^a	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	882 ^c	34 344	-0,1 ^c
143	315	131	801 ^c	33 233	-3,2
98	313	121	756 ^c	32 874	-1,1
74	326	108	714 ^c	32 996	0,4
70	327	117	1 096 ^c	33 492	1,5
69	339	123	643 ^c	33 137 ^b	-1,1 ^c
53	343	131	742	33 071	-0,2



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	7 966 ^d	1 194	114	14 298	6 040 ^d	7 295 ^d	38 938	-1,8
1991	329	365	1 346	8 959	1 074	94 ^d	13 946	6 452 ^d	7 525 ^d	40 091	3,0
1992	793	372	1 431 ^d	9 702 ^d	986	96 ^d	11 276	6 439 ^d	7 825 ^d	38 921	-2,9
1993	1 465	391	1 360 ^d	10 914	974 ^d	97 ^d	12 608	6 406 ^d	7 288 ^d	41 503	6,6
1994	1 839	416	1 348	10 995 ^d	1 051	99 ^d	14 604	6 119 ^d	8 032 ^d	44 503	7,2
1995	1 839	475	1 509	9 907	1 143	110 ^d	15 775	7 664 ^d	8 151 ^d	46 573	4,7
1996	1 850	490	1 559	9 358	1 144	125	15 613	13 244	8 241	51 624	10,8

Standard Industrial Classification Divisions

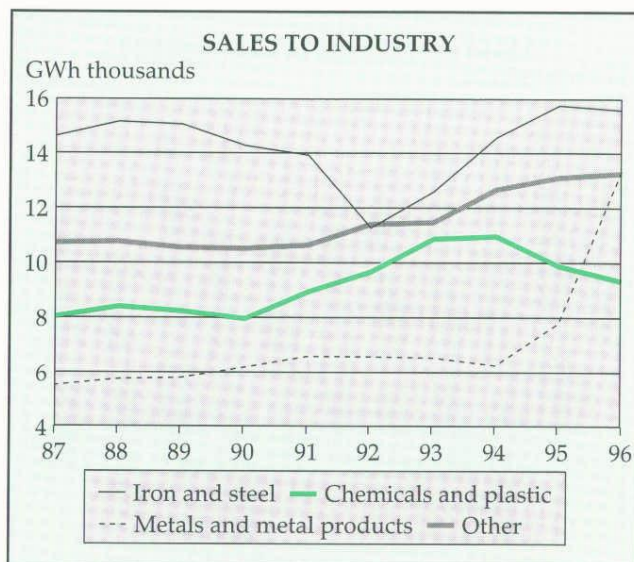
- 11 Agriculture, hunting and related services.
- 31 Manufacture of textiles, clothing and leather goods.
- 32 Manufacture of wood and of products of wood and cork, manufacture of paper and paper products.
- 33 Manufacture of coke, refined petroleum products and nuclear fuel, manufacture of chemicals 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.

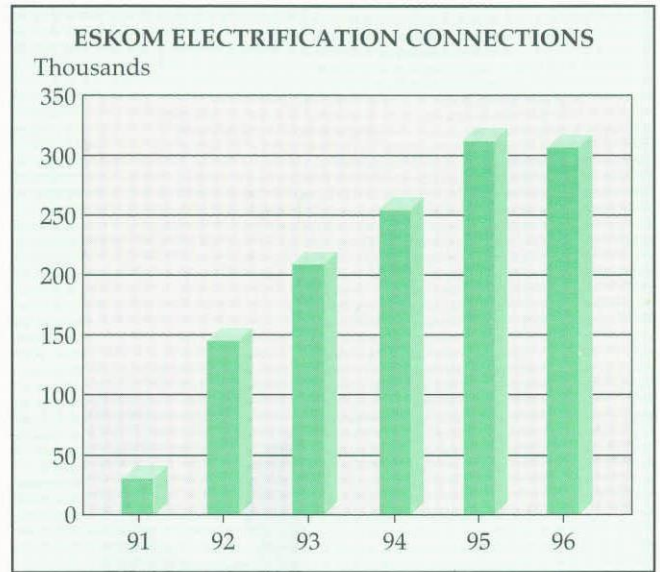
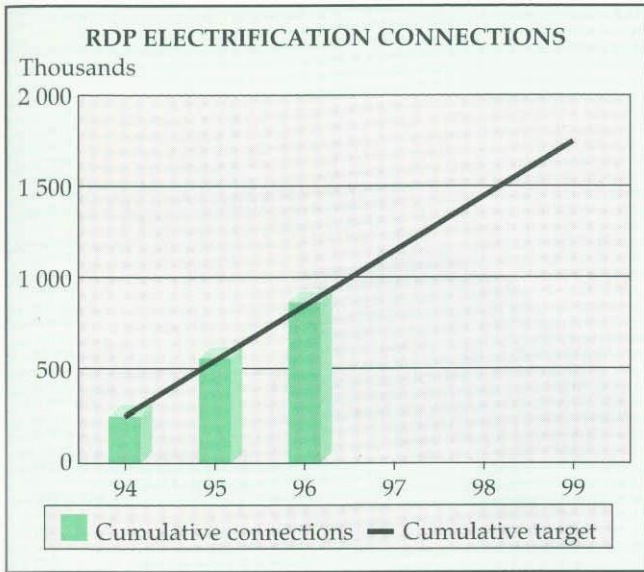
^b These figures reflect the usage by small power customers. Prior to 1992, these figures were included under Other.

^c This reflects the balance of SIC35 after deduction of SIC351 and SIC352.

^d Revised.



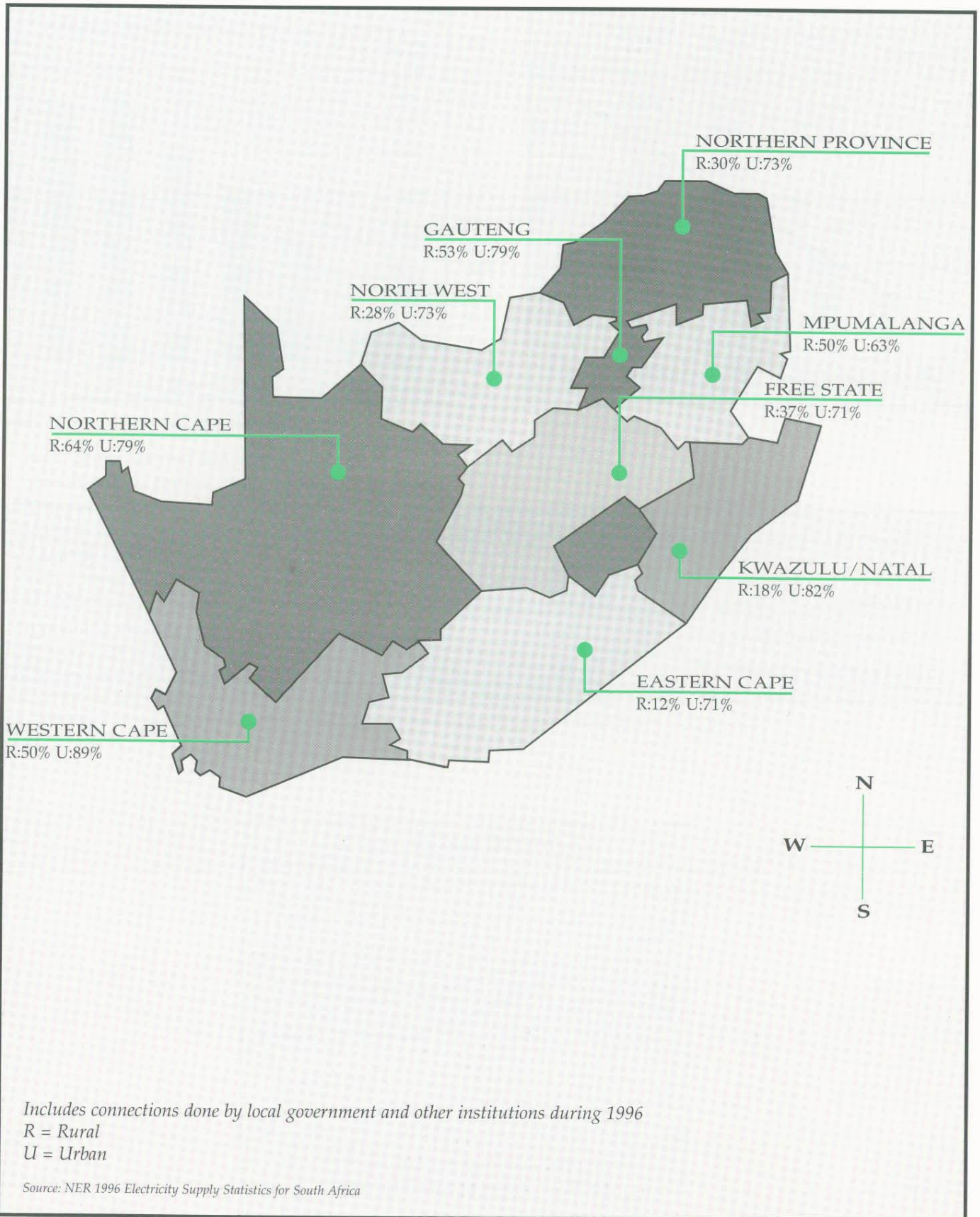
AT A GLANCE – ELECTRIFICATION



ESKOM ELECTRIFICATION PROGRESS

	1991 – 1993	1994	1995	1996	Total
Connections	384 911	254 383	313 179	307 047	1 259 520
Capital expenditure, Rm	1 148	808	1 055	1 049	4 060
Capital cost per connection, R	2 983	3 176	3 370	3 417	3 223

PERCENTAGE HOUSES ELECTRIFIED AS AT END 1996



ELECTRIFICATION STATISTICS

In 1994, Eskom committed to electrify 1,75 million homes between 1994 and the year 2000. Since the start of its electrification programme in 1991, Eskom has electrified 1 259 520 homes in previously unelectrified areas.

Area	Number of connections made in 1994	Number of connections made in 1995	Number of connections made in 1996	Total number of connections 1994 – 1996
Eastern Cape				
Aberdeen	0	714	55	769
Addo	387	253	0	640
Albany	1 257	713	412	2 382
Alexandria	19	8	11	38
Alicedale	7	28	0	35
Aliwal North	0	112	1 977	2 089
Barkly East	0	955	14	969
Bathurst	226	528	247	1 001
Bizana	0	445	0	445
Burgersdorp	1 176	210	0	1 386
Butterworth	0	1 880	1 067	2 947
Cathcart	541	1 777	3 935	6 253
Chalumna	2	50	0	52
Clearview	38	0	0	38
Cofimvaba/St Marks	0	303	4 279	4 582
Cradock	162	47	28	237
Deetlefsville	254	0	0	254
East London	0	1 153	4 082	5 235
Elliot	1 339	1 434	110	2 883
Elliotdale	728	181	92	1 001
Engcobo	0	3 863	1 245	5 108
Fort Beaufort	0	1 602	518	2 120
Glen Garry	0	496	3 189	3 685
Graaff-Reinet	0	780	137	917
Hankey	350	39	64	453
Herschel	21	2 679	2 815	5 515
Hewu	0	3 045	8 214	11 259
Hofmeyr	0	348	13	361
Humansdorp	59	76	4	139
Idutywa	0	191	3 468	3 659
Jamestown	70	0	0	70
Jansenville	338	45	22	405
Joubertina	0	0	33	33
Kareedouw	1	1	0	2
Kenton on Sea	471	27	0	498
Keiskammahoek	0	0	2 266	2 266
King William's Town	63	9	1 843	1 915
Kirkwood	179	75	64	318
Kuyasa	336	0	0	336
Kwezi	10	0	0	10
Lady Grey	265	17	5	287
Lusikisiki	0	0	630	630

ELECTRIFICATION STATISTICS CONTINUED

Area	Number of connections made in 1994	Number of connections made in 1995	Number of connections made in 1996	Total number of connections 1994 – 1996
Maclear	421	212	34	667
Mafulatshepe	680	0	0	680
Matatiele	0	654	0	654
Mavuya	542	0	0	542
Maxesibeni	0	184	0	184
Mdantsane	0	315	491	806
Molteno	402	649	67	1 118
Mqanduli	0	244	274	518
Ngqeleni	0	1 882	3 306	5 188
Nqamakwe	0	251	471	722
Patensie	95	5	0	100
Paterson	96	161	0	257
Peddie	0	5 610	5 602	11 212
Port Alfred	1 377	669	0	2 046
Port Elizabeth	300	454	374	1 128
Queenstown	0	0	480	480
Sterkspruit	1 764	202	0	1 966
Sterkstroom	98	209	42	349
Steynsburg	248	137	13	398
Steytlerville	137	9	6	152
Stutterheim	435	941	256	1 632
Tabankulu	0	676	0	676
Transkei	1 834	0	0	1 834
Tsolo	0	252	1 870	2 122
Tsomo	0	103	0	103
Ugie	250	287	0	537
Umasizakhe	444	0	0	444
Umtata	0	6 245	2 288	8 533
Venterstad	337	435	15	787
Willowvale	0	85	1 662	1 747
Zwelitsha	0	2 010	5 113	7 123
Subtotal	17 759	46 965	63 203	127 927
Free State				
Bethlehem	573	1 219	774	2 566
Bethulie	712	195	166	1 073
Bloemfontein	0	5 406	0	5 406
Boshof	328	12	73	413
Botshabelo	0	0	7 902	7 902
Brandfort	146	287	273	706
Bultfontein	1 070	384	363	1 817
Clarens	49	35	0	84
Dewetsdorp	67	10	16	93
Excelsior	95	1 244	99	1 438
Fauresmith	227	19	8	254

Area	Number of connections made in 1994	Number of connections made in 1995	Number of connections made in 1996	Total number of connections 1994 – 1996
Ficksburg	982	1 044	795	2 821
Fouriesburg	261	88	68	417
Frankfort	25	912	379	1 316
Harrismith	131	92	38	261
Heilbron	791	1 254	131	2 176
Hennenman	1 257	1 004	440	2 701
Hertzogville	168	45	0	213
Hoopstad	603	282	56	941
Jacobsdal	34	0	21	55
Ladybrand	440	251	50	741
Lindley ^a	54	633	178	865
Marquard	1 101	266	0	1 367
Odendaalsrus	2 659	1 651	492	4 802
Petrus Steyn	768	128	0	896
Petrusburg	718	23	34	775
Philippolis	535	17	4	556
Reddersburg	222	64	225	511
Reitz	366	290	413	1 069
Rouxville	440	47	31	518
Senekal	99	50	181	330
Smithfield	0	97	12	109
Springfontein	17	32	0	49
Steynsrus	691	261	0	952
Theunissen	1 799	312	331	2 442
Trompsburg	397	48	27	472
Ventersburg	569	909	168	1 646
Viljoenskroon	1 159	334	198	1 691
Virginia	2 478	775	486	3 739
Vrede	685	239	138	1 062
Welkom	7 841	1 406	872	10 119
Wepener	480	180	127	787
Wesselsbron	935	439	241	1 615
Winburg	3	1 316	265	1 584
Zastron	720	771	68	1 559
Subtotal	32 695	24 071	16 143	72 909

^a Previously under Arlington, which is part of the Lindley district.

Gauteng

Benoni	6 955	9 151	4 471	20 577
Boksburg	923	102	224	1 249
Brakpan	4 916	3 934	1 520	10 370
Carletonville	1 344	2 641	0	3 985
Germiston	74	3 308	1 520	4 902
Heidelberg	983	192	779	1 954
Johannesburg	813	205	1 350	2 368

ELECTRIFICATION STATISTICS CONTINUED

Area	Number of connections made in 1994	Number of connections made in 1995	Number of connections made in 1996	Total number of connections 1994 – 1996
Kempton Park	3 419	587	869	4 875
Krugersdorp	1 311	2 349	2 802	6 462
Nigel	925	5 787	2 432	9 144
Pretoria	0	893	161	1 054
Randfontein	5 244	0	38	5 282
Roodepoort	784	1 377	443	2 604
Sandton	830	0	0	830
Vanderbijlpark	13 684	8 958	3 747	26 389
Vereeniging	3 398	2 761	842	7 001
Westonaria	128	2 884	1 121	4 133
Subtotal	45 731	45 129	22 319	113 179
KwaZulu-Natal				
Alfred	0	1 005	371	1 376
Bergville	755	999	1 116	2 870
Cato Ridge	683	0	0	683
Dundee	158	364	0	522
Embumbulu	357	267	1 839	2 463
Emnambithi	0	0	2 236	2 236
Empangeni	1 834	0	0	1 834
Emzileni	389	783	356	1 528
Emzumbe	0	0	726	726
Eshowe	2 842	1 622	125	4 589
Estcourt	5 318	1 745	837	7 900
Ezingolweni	2 428	1 259	1 901	5 588
Hlabisa	2 146	2 087	652	4 885
Hlanganani	0	1 191	796	1 987
Imbali	5 600	0	0	5 600
Impendle	0	0	389	389
Inkanyezi	18	100	204	322
Kliprivier	306	335	2 565	3 206
Ladysmith	682	0	0	682
Louwsburg	148	0	0	148
Lower Tugela	0	0	459	459
Lower Umfolozi	2 466	3 110	2 889	8 465
Madadeni	1 498	2 541	1 801	5 840
Mahlabatini	0	0	248	248
Mapumulu	345	2 103	1 625	4 073
Margate	85	0	0	85
Mooi River	0	361	0	361
Mount Currie	0	100	169	269
Mpumalanga	863	1 017	137	2 017
Msinga	0	0	574	574
Mtonjaneni	0	83	0	83
Mtunzini	0	907	261	1 168

Area	Number of connections made in 1994	Number of connections made in 1995	Number of connections made in 1996	Total number of connections 1994 – 1996
Ncotshane	1 112	719	0	1 831
Ndwedwe	451	1 197	0	1 648
New Hanover	357	60	0	417
Newcastle	3 946	2 477	5 028	11 451
Ngotshe	74	279	0	353
Nongoma	100	469	0	569
Nqutu	0	613	0	613
Okhahlamba	0	0	1 215	1 215
Ongoye	0	179	907	1 086
Pietermaritzburg	981	4 289	6 484	11 754
Pinetown	1 557	858	510	2 925
Polela	746	808	0	1 554
Port Shepstone	2 589	5 427	8 343	16 359
Richmond	654	2 008	0	2 662
Umzinto	85	1 068	1 323	2 476
Vryheid	124	2 120	247	2 491
Vulindlela	878	1 374	3 039	5 291
Weenen	254	0	0	254
Subtotal	42 829	45 924	49 372	138 125
Mpumalanga				
Amersfoort	99	134	0	233
Balfour	476	1 585	1 158	3 219
Delmas	161	1 646	257	2 064
Ermelo	290	0	0	290
Groblersdal	25 980	34 057	37 303	97 340
KwaMhlanga	660	99	2 013	2 772
KwaNdebele	425	0	0	425
Mkobola	662	541	539	1 742
Piet Retief	679	60	0	739
Volksrust	0	1 076	0	1 076
Wakkerstroom	76	0	0	76
Subtotal	29 508	39 198	41 270	109 976
Northern Cape				
Askham	4	0	0	4
Barkly West	305	344	232	881
Calvinia	0	55	36	91
Carnarvon	621	0	5	626
Colesberg	799	933	219	1 951
Gordonia	514	295	341	1 150
Griekwastad	31	0	0	31
Groblershoop	381	0	0	381
Hanover	9	17	12	38
Hartswater	426	2 507	2 703	5 636
Herbert	606	33	49	688

ELECTRIFICATION STATISTICS CONTINUED

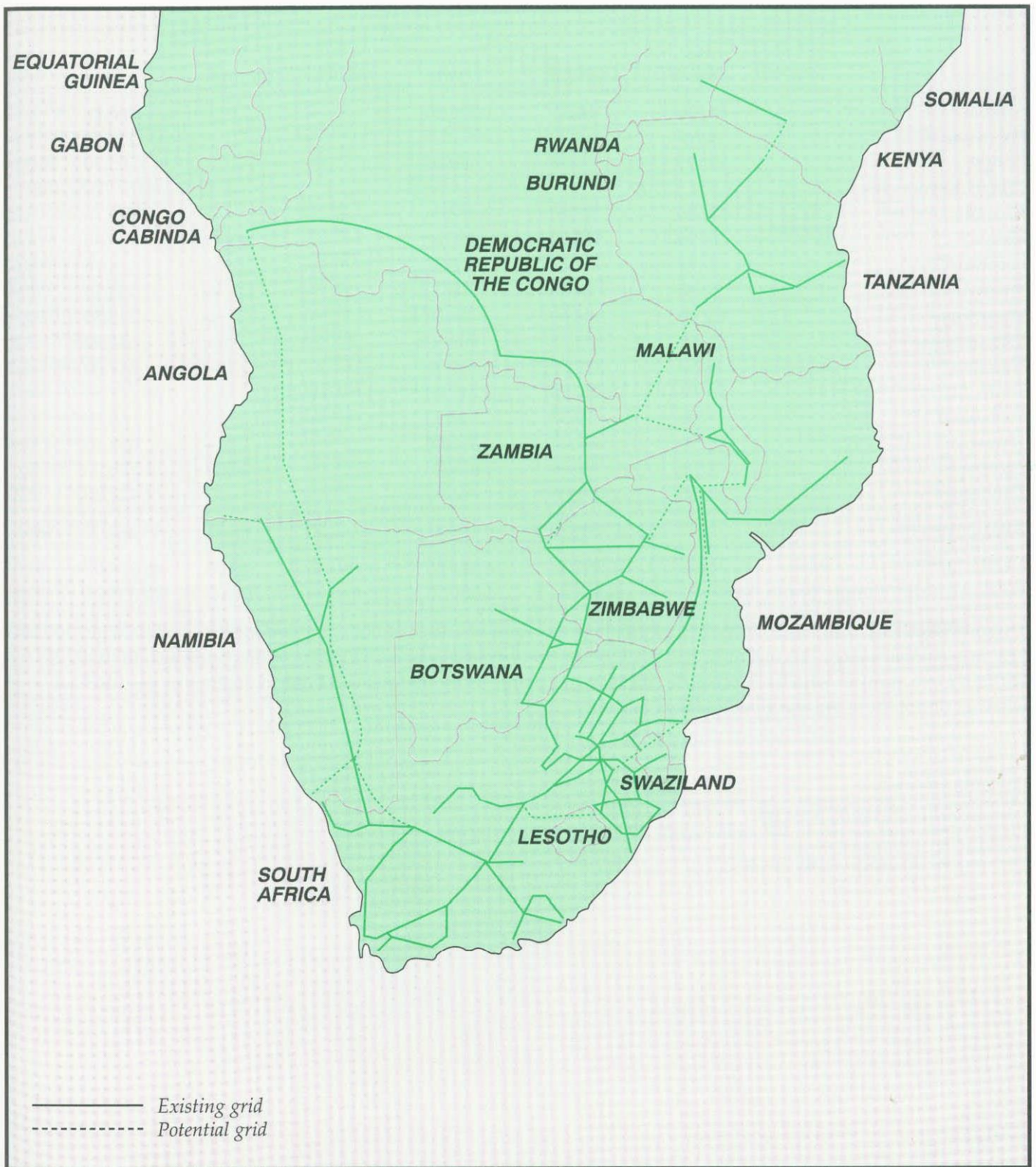
Area	Number of connections made in 1994	Number of connections made in 1995	Number of connections made in 1996	Total number of connections 1994 – 1996
Hopetown	18	2	147	167
Kakamas	38	0	0	38
Kanoneiland	2	0	0	2
Kathu	264	0	0	264
Kenhardt	0	157	1	158
Kimberley	183	1 246	23	1 452
Kuruman	525	1 306	4 721	6 552
Loxton	100	0	0	100
Marydale	325	0	0	325
Namakwaland	1 559	365	85	2 009
Naudésfontein	1	0	0	1
Niekerkshoop	41	0	0	41
Noupoort	393	41	23	457
Olifantshoek	525	0	0	525
Petrusville	37	17	0	54
Philipstown	185	17	5	207
Postmasburg	628	0	226	854
Prieska	292	5	78	375
Reivilo	2	0	0	2
Richmond	0	616	12	628
Richtersveld	92	199	0	291
Ritchie	90	128	0	218
Smithskraal	1	0	0	1
Van Aswegenshoek	1	0	0	1
Van Zylsrus	9	0	0	9
Victoria West	435	16	4	455
Vryburg	89	251	0	340
Vryheid	17	0	0	17
Warrenton	786	10	47	843
Windsorton	312	0	0	312
Subtotal	10 646	8 560	8 969	28 175
Northern Province				
Bochum	0	1 603	756	2 359
Bolobedu	341	820	1 147	2 308
Ellisras	27	265	124	416
Gazankulu	4 181	0	4 371	8 552
Giyani	5 197	203	5 644	11 044
Lulekani	0	0	1 589	1 589
Malumulele	699	250	3 457	4 406
Mapulaneng	658	3 037	4 666	8 361
Mhala	5 007	4 223	2 941	12 171
Mokerong	576	5 053	5 699	11 328
Namakgale	0	1 083	1 877	2 960
Naphuno	593	3 128	0	3 721

Area	Number of connections made in 1994	Number of connections made in 1995	Number of connections made in 1996	Total number of connections 1994 – 1996
Nebo	300	5 474	0	5 774
Pietersburg	17 248	24 369	17 147	58 764
Potgietersrus	520	3 582	117	4 219
Sekgosese	0	2 269	2 247	4 516
Sekhukhuneland	0	6 542	3 950	10 492
Seshego	2 654	4 120	4 571	11 345
Thabamooopo	2 577	3 892	8 373	14 842
Thabazimbi	184	1 294	2 304	3 782
Thohoyandou	0	170	799	969
Warmbaths	118	672	2 503	3 293
Subtotal	40 880	72 049	74 282	187 211
North West				
Bafokeng	0	0	3 128	3 128
Bloemhof	310	421	231	962
Brits	834	498	5 847	7 179
Coligny	261	333	12	606
Delareyville	91	0	0	91
Hartbeesfontein	215	246	0	461
Klerksdorp	0	72	2 993	3 065
Koster	246	355	61	662
Leeudoringstad	387	156	0	543
Lichtenburg	398	52	1 776	2 226
Madikwe	1 330	1 613	8 140	11 083
Makwassie	233	276	0	509
Moretele	581	6 508	2 922	10 011
Orkney	929	482	0	1 411
Ottosdal	22	289	0	311
Rustenburg	704	2 717	3 470	6 891
Sannieshof	235	117	0	352
Schweizer-Reneke	628	2 090	379	3 097
Stilfontein	849	259	0	1 108
Swartruggens	13	1	7	21
Wolmaransstad	517	1 155	521	2 193
Zeerust	180	6	0	186
Subtotal	8 963	17 646	29 487	56 096
Western Cape				
Beaufort West	0	6	1	7
Bellville	42	188	17	247
Bredasdorp	0	98	3	101
Caledon	149	122	157	428
Ceres	0	58	83	141
George	0	1	0	1
Goodwood	0	157	8	165
Gouda	15	6	0	21

ELECTRIFICATION STATISTICS CONTINUED

Area	Number of connections made in 1994	Number of connections made in 1995	Number of connections made in 1996	Total number of connections 1994 – 1996
Grabouw	113	8	0	121
Heidelberg	14	0	0	14
Hermanus	0	13	13	26
Khayelitsha	21 334	9 940	0	31 274
Knysna	0	80	28	108
Kraaifontein	177	0	0	177
Kuils River	1 613	213	482	2 308
Ladismith	22	934	0	956
Laingsburg	0	2	0	2
Malmesbury	38	83	182	303
Mitchells Plain	216	372	297	885
Oudtshoorn	0	53	1	54
Piketberg	2	20	14	36
Porterville	105	0	0	105
Riversdale	0	33	0	33
Somerset West	114	141	16	271
Stellenbosch	87	94	66	247
Strand	535	725	382	1 642
Swellendam	22	90	30	142
Tulbagh	10	31	22	63
Vanrhynsdorp	0	122	6	128
Vredenburg	380	17	108	505
Vredendal	295	16	61	372
Worcester	0	14	25	39
Wynberg	89	0	0	89
Subtotal	25 372	13 637	2 002	41 011
Total	254 383	313 179	307 047	874 609

EXISTING AND POTENTIAL ELECTRICAL POWER GRID



sub-saharan africa

NET MAXIMUM GENERATING CAPACITY

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

MW

Country	Year ended	Thermal	Hydro	Nuclear	Geo-thermal	Total	% of total
Angola ^{a c}	12/96	158,27	208,00	–	–	366,27	0,74
Botswana ^{a b}	3/97	118,00	–	–	–	118,00	0,24
Congo	12/95	9,70	89,00	–	–	98,70	0,20
Congo, Democratic Republic of the ^d	12/96	37,80	2 522,96	–	–	2 560,76	5,20
Kenya ^e	6/96	110,90	567,20	–	45,35 ^f	723,45	1,47
Lesotho ^{a b}	3/97	1,51	3,25	–	–	4,76	0,01
Malawi ^a	3/96	24,56	216,20	–	–	240,76	0,49
Mauritius ^a	12/96	264,60	54,20	–	–	318,80	0,65
Mozambique ^a	12/96	125,42	509,50 ^g	–	–	634,92	1,29
Namibia ^{a b}	6/96	147,00	240,00	–	–	387,00	0,79
South Africa ^{a b h}	12/96	35 690,50	2 247,00 ⁱ	1 840,00	–	39 777,50	80,75
Swaziland ^{a b}	3/96	9,50	40,50	–	–	50,00	0,10
Tanzania ^a	12/96	107,00	375,00	–	–	482,00	0,98
Zambia ^a	3/96	86,00	1 670,00	–	20,00	1 776,00	3,61
Zimbabwe ^a	6/96	1 056,00	666,00	–	–	1 722,00	3,50
Total, MW		37 946,76	9 408,81	1 840,00	65,35	49 260,92	100,00
SADC, MW		37 788,36	6 229,65	1 840,00	20,00	45 878,01	93,13
South African Customs Union, MW		35 966,51	2 530,75	1 840,00	0,00	40 337,26	81,88

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 Previously known as Zaire.

^e Effective capacity = sent-out capacity + own use capacity.

^f Includes wind turbine capacity of 0,35 MW.

^g Includes Cahora Bassa with only 415 MW effective capacity (2 075 MW net maximum capacity).

^h Includes 5 442 MW in reserve storage.

ⁱ Includes 1 580 MW pumped storage capacity.

TOTAL PRODUCTION OF ELECTRICITY

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

GWh net

Country	Year ended	Thermal	Hydro	Nuclear	Geo-thermal	Total	% of total
Angola ^a	12/96	200,70	845,87	–	–	1 046,57	0,48
Botswana ^{a b}	3/97	724,00	–	–	–	724,00	0,33
Congo	12/95	1,86	352,01	–	–	353,87	0,16
Congo, Democratic Republic of the ^c	12/96	0,00	5 739,65	–	–	5 739,65	2,64
Kenya	6/96	416,63	3 163,03	–	390,73 ^d	3 970,39	1,83
Lesotho ^{a b}	3/97	6,30	5,83	–	–	12,13	0,01
Malawi ^a	3/96	2,40	857,50	–	–	859,90	0,40
Mauritius ^a	12/96	1 047,16	103,65	–	–	1 150,81	0,53
Mozambique ^a	12/96	30,14	579,42 ^e	–	–	609,56	0,28
Namibia ^{a b}	6/96	19,30	854,00	–	–	873,30	0,40
South Africa ^{a b}	12/96	172 234,13	491,16 ^f	11 775,00	–	184 500,29	84,94
Swaziland ^{a b}	3/96	0,70	196,80	–	–	197,50	0,09
Tanzania ^a	12/96	255,40	1 747,80	–	–	2 003,20	0,92
Zambia ^a	3/96	15,00	7 821,00	–	–	7 836,00	3,61
Zimbabwe ^a	6/96	5 160,20	2 163,10	–	–	7 323,30	3,37
Total, GWh		180 113,91	24 920,82	11 775,00	390,73	217 200,46	100,00
SADC, GWh		179 695,42	15 666,13	11 775,00	0,00	205 985,74	94,84
South African Customs Unions, GWh		172 984,43	1 547,79	11 775,00	0,00	186 307,22	85,78

Excludes electricity produced by auto-producers (undertakings which, in addition to their main activities, generate electrical energy wholly or partially for their own use) for their own use.

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

^b Member of the South African Customs Union.

^c Previously known as Zaire.

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

^e Includes Cahora Bassa.

^f Excludes power for pumping at pumped storage stations.

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	12/96	1 268	4 067	–	–	2 857
Botswana ^{a b}	3/97	6 136	–	–	–	6 136
Congo	12/95	192	3 955	–	–	3 585
Congo, Democratic Republic of the ^c	12/96	0	2 275	–	–	2 241
Kenya	6/96	3 757	5 577	–	8 616	5 488
Lesotho ^{a b}	3/97	0	1 795	–	–	2 547
Malawi ^a	3/96	98	3 966	–	–	3 572
Mauritius ^a	12/96	3 958	1 912	–	–	3 610
Mozambique ^a	12/96	240	1 137	–	–	960
Namibia ^{a b}	6/96	131	3 558	–	–	2 257
South Africa ^{a b}	12/96	4 826	219 ^d	6 399	–	4 638
Swaziland ^{a b}	3/96	74	4 859	–	–	3 950
Tanzania ^a	12/96	2 387	4 661	–	–	4 156
Zambia ^a	3/96	174	4 683	–	0	4 412
Zimbabwe ^a	6/96	4 887	3 248	–	–	4 253
Total		4 746	2 649	6 399	5 979	4 409
SADC, MW		4 755	2 515	6 399	0	4 490
South African Customs Union, MW		4 810	612	6 399	0	4 619

^a Member of the Southern African Development Community (SADC).^b Member of the South African Customs Union.^c Previously known as Zaire.^d Power for pumping at pumped storage stations not included.

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PRODUCTION, TRADE AND CONSUMPTION 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	Total production	Imports	Exports	Total available	% of total	kWh per capita
Angola ^a	12/96	1 046,6	–	–	1 046,6	0,5	100
Botswana ^{a b}	3/97	724,0	753,0	–	1 477,0	0,7	1 055
Congo	12/95	353,9	166,2	–	520,1	0,2	226
Congo, Democratic Republic of the ^c	12/96	5 739,7	41,4	1 456,0	4 325,0	2,0	114
Kenya	6/96	3 970,4	148,8	–	4 119,1	1,9	146
Lesotho ^{a b}	3/97	12,1	330,0	–	342,1	0,2	162
Malawi ^a	3/96	859,9	–	1,7	858,3	0,4	79
Mauritius ^a	12/96	1 150,8	–	–	1 150,8	0,5	1 046
Mozambique ^{a d}	12/96	609,6	598,6	2,0	1 206,2	0,6	67
Namibia ^{a b}	6/96	873,3	1 090,3	29,5	1 934,1	0,9	1 209
South Africa ^{a b}	12/96	184 500,3	29,0	5 554,0	178 975,3	82,6	4 419
Swaziland ^{a b}	3/96	197,5	598,7	–	796,2	0,4	971
Tanzania ^a	12/96	2 003,2	18,7	–	2 021,9	0,9	70
Zambia ^a	3/96	7 836,0	573,0	975,0	7 434,0	3,4	783
Zimbabwe ^a	6/96	7 323,3	3 171,5	–	10 494,8	4,8	945
Total, GWh		217 200,5	7 519,2	8 018,1	216 701,5	100,0	1 058
SADC, GWh		207 136,6	7 162,8	6 562,1	207 737,3	95,8	2 190
South African Customs Union, GWh		186 307,2	2 801,0	5 583,5	183 524,7	84,3	3 953

Details of imports and exports are available in tables of different countries.

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

^b Member of the South African Customs Union.

^c Previously known as Zaire.

^d Includes Cahora Bassa.

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ANGOLA

Source: Empresa Nacional de Electricidade (ENE) for the year ended 31 December 1996 and Eskom Africa Grid Planning

Source of power	Type	Nominal capacity MW	Available capacity MW	
Independent electricity systems				
Northern system:				
Kwanza Norte	Hydro	180,0	180,0	
Bengo	Hydro	17,8	0	
Luanda	Gas turbine	92,6	24,4	
	Diesel	56,6	56,6 ^a	
Malange	Diesel	1,9	1,0	
Kwanza Sul	Diesel	9,3	5,2 ^b	
Central system:				
Benguela	Hydro	49,4	7,2	
	Gas turbine	22,8	0	
	Diesel	26,3	22,7 ^c	
Huambo	Hydro	3,1	0	
	Gas turbine	10,0	0	
	Diesel	9,1	4,2 ^d	
Eastern system				
Lunda Norte	Hydro	9,6	7,2	
	Diesel	7,9	1,5	
	Diesel	1,5	1,5	
Southern system:				
Huila	Hydro	41,1	13,6	
	Diesel	11,9	2,8	
Namibe	Diesel	16,1	12,6	
Isolated power stations				
Cabinda	Gas turbine	10,0	10,0	
	Diesel	11,6	4,2 ^e	
Uige	Hydro	1,1	0	
	Diesel	3,6	1,7 ^f	
Bié	Hydro	1,9	0	
	Diesel	3,6	0,9 ^g	
Moxico	Diesel	2,7	1,0	
Total ENE, MW		601,4	358,3	
Other producers of electricity				
Refinaria (Luanda)	Gas turbine	10,0	8,0	
Total source of power, MW		611,4	366,3	
System peak demand (simultaneous one-hour demand)^h				
	Date and time	1996 MW	Date and time	1995 MW
Northern system	13-12-96 19:00	132,0	24-11-95 19:45	138,0
Central system	08-03-96 20:00	19,9	16-02-95 20:15	20,4
Southern system	24-01-96 19:00	14,9	26-02-95 21:00	13,8
Cabinda	31-12-96 19:00	8,5	18-10-95 19:30	6,7
Kwanza Sul	23-12-96 22:30	2,3	21-12-95 11:00	2,1

Electricity produced by ENE power stations (net) ⁱ	1996 GWh	1995 GWh	Change %
Hydro (net)	846	877	-3,5
Thermal (net)	201	165	21,6
Total electricity produced (net), GWh	1 047	1 042	0,4
Electricity sold	1996 GWh	1995 GWh	Change %
Domestic	208	184	13,0
Agriculture	37	48	-22,9
Industrial	108	136	-20,6
Street lighting and other	3	6	-50,0
Distribution utility	634	528	20,1
Total electricity sold, GWh	990	902	9,8
Number of customers	1996	1995	Change %
High voltage	5	5	0
Medium voltage	1 059	1 138	-6,9
Low voltage	93 241	80 988	15,1
Street lighting	15	14	7,1
Total number of customers	94 320	82 415	14,8
Transmission and distribution equipment in service	1996 km	1995 km	Change 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	227	0
Total overhead lines, km	2 113	2 113	0
	1996	1995	Change %
Number of ENE employees	3 367	3 342	0,7
GWh sold per employee	0,294	0,270	8,9
Population of Angola ^j , number (million)	10,5	10,5	0
Average selling price, Kzr ^k /kWh			
High voltage	9 070,00	0,90	1 007 677,8
Medium voltage	10 280,00	1,10	934 445,5
Low voltage (industry, duty, trade)	12 100,00	2,80	432 042,9
Low voltage (domestic)	4 840,00	2,80	172 757,1
Low voltage (social domestic)	1 060,00	2,80	37 757,1
Street lighting	4 840,00	1,40	345 614,3

^a Two emergency units of 12 MW each have been installed.

^b Three diesel groups of 0,4 MW, 0,65 MW and 0,64 MW have been dismantled.

^c One more unit of 5 MW at Lobito Power Station has been rehabilitated and one unit of 0,65 MW has been out of order.

^d One emergency diesel group of 1,4 MW has been rehabilitated.

^e Two diesel groups of 1,0 MW and 0,28 MW have been out of order.

^f Three diesel groups of 1,2 MW, 0,32 MW and 0,184 MW have been installed.

^g One emergency diesel group of 0,48 MW has been rehabilitated.

^h Information about Eastern System not available.

ⁱ Excludes Eastern System.

^j 1996 estimate.

^k 1 US\$ = Kzr 210 000.

Source: Botswana Power Corporation (BPC) for the year ended 31 March 1997

Source of power	Type	Nominal capacity MW	Net maximum capacity MW
Morupule	Coal fired	132	118
Selebi-Phikwe ^a	Coal fired	0	0
Total own source		132	118
Other sources			
Eskom		205	205
Zimbabwe		120	120
Total other sources		325	325
Total source of power, MW		457	443
System peak demand (simultaneous one-hour demand) ^b			
	Date and time	1996/97 MW	1995/96 MW
	25-07-96 08:58	222,4	21-07-95 10:09 204,9
Electricity produced			
		1996/97 GWh	1995/96 GWh
Coal fired		724	1 017
Total electricity produced, GWh		724	1 017
Electricity imported, GWh		753	382
Station usage		87	124
Total available for distribution, GWh		1 390	1 275
System losses		83	67
Electricity sold			
		1996/97 GWh	1995/96 GWh
Commercial		380	349
Domestic		174	161
Government		85	79
Mining		668	619
Total electricity sold, GWh		1 307	1 208
Number of customers			
		1996/97	1995/96
Commercial		6 313	5 800 ^c
Domestic		45 837	41 464 ^c
Government		2 286	2 227 ^c
Mining		4	4
Total number of customers		54 440	49 495
			Change %
			8,8
			10,5
			2,6
			0,0
			10,0

Transmission and distribution equipment in service

	1996/97	1995/96	Change
Overhead lines	km	km	km
220 kV	902,0	902,0	0
132 kV	817,8	817,8	0
66 kV	374,1	374,1	0
33 kV	680,0	623,8	56,2
11 kV	1 320,4	1 200,5	119,9
0,4 kV	1 407,0	1 198,9	208,1
Total overhead lines, km	5 501,3	5 117,1	384,2
Underground cable	km	km	km
11 kV	267,3	257,3	10,0
0,4 kV	304,0	284,4	19,6
Total underground cable, km	571,3	541,7	29,6
Total, km	678,1	658,5	19,6
Transformers	MVA	MVA	Change MVA
220/132 kV	240,0	240,0	0
220/66 kV	80,0	80,0	0
220/33 kV	80,0	80,0	0
220/11 kV	315,0	315,0	0
132/33 kV	110,0	90,0	20,0
132/11 kV	260,0	260,0	0
132/6,6 kV	40,0	40,0	0
66/33 kV	20,0	20,0	0
66/11 kV	43,0	43,0	0
33/11 kV and 33/0,4 kV	77,9	75,8	2,2
11/0,4 kV	406,6	382,7	23,9
Total, MVA	1 672,5	1 626,4	46,1
	1996/97	1995/96	Change %
Number of BPC employees	1 549	1 680	-7,8
GWh sold per employee	0,844	0,719	17,3
Population of Botswana (1991 census), number (million)	1,4	1,4	0
Average selling price, thebe/kWh	20,07	20,19	-0,6

^a Decommissioned.

^b BPC now uses net maximum demand.

^c Adjusted.

sub-saharan africa

CONGO

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

Source of power	Type	Nominal capacity MW	Net maximum capacity MW	
Moukouloulou	Hydro	74,0	74,0	
Djoué	Hydro	15,0	15,0	
Pointe Noire	Diesel	20,4	9,3	
Dolisie	Diesel	1,5	0,4	
Total source of power, MW		110,9	98,7	
Electricity produced	1995 GWh	1994 GWh	Change %	
Hydro	352,01	322,07	9,3	
Diesel	1,86	0	-	
Total electricity produced, GWh		353,87	322,07	9,9
Imports from Zaire, GWh		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	3,0
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 (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	0,352	-24,7
Population of Congo, number (million)	2,3	2,3	0
Average selling price, F CFA/kWh	53	62	-14,5

^a Information for 1996 not available at time of publication.

DEMOCRATIC REPUBLIC OF THE CONGO

Source: Societe Nationale d'Electricite (SNEL) for year ended 31 December 1996

Source of power	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)	Hydro	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 (DRC), MW		2 560,76	2 560,76

	1996	1995	Change
	GWh	GWh	%
Electricity produced (interconnected system)			
Hydro	5 739,7	5 844,2	-1,8
Total interconnected production, GWh	5 739,7	5 844,2	-1,8
Consumed by auxiliaries	19,2	18,0	6,3
Net energy generated, GWh	5 720,5	5 826,1	-1,8
Own consumption	1,2	1,3	-6,1
Energy sold locally	0,5	0,4	22,5
Energy sent into grid	5 718,8	5 824,4	-1,8
Energy imported/purchased			
From Congo	0,0	0,0	0,0
From Zambia	0,5	0,1	581,8
From SINELAC	41,0	42,7	-4,0
Total imported/purchased, GWh	41,5	42,7	-3,1
Exports			
To Congo	96,3	168,9	-43,0
To Angola	0,1	0,1	0,0
To Rwanda	6,8	7,7	-10,9
To Burundi	2,4	14,8	-83,6
To Zambia	779,9	356,6	118,7
To SINELAC	40,9	42,7	-4,1
To Zimbabwe	529,5	1 110,3	-52,3
Total exports, GWh	1 456,0	1 701,1	-14,4
Total available for distribution, GWh	4 304,1	4 166,0	3,3
System losses	200,79	-	-
	1996	1995	Change
	GWh	GWh	%
Energy sold			
Low voltage	1 301,46	1 182,80	10,0
Medium voltage	990,17	1 307,10	-24,2
High voltage	985,40	947,90	4,0
Mining	826,30	847,00	-2,4
Total electricity sold, GWh	4 103,33	4 284,80	-4,2
	1996	1995	Change
			%
Number of customers			
Low voltage	256 151	238 610	7,4
Medium voltage	1 255	1 239	1,3
High voltage	8	9	-11,1
Mining	1	1	0,0
Total number of customers	257 415	239 859	7,3

DEMOCRATIC REPUBLIC OF THE CONGO	CONTINUED
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Source: Societe Nationale d'Electricite (SNEL) for year ended 31 December 1996

Transmission and distribution equipment in service			
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	1996 km	1995 km	Change km
Overhead lines			
500 kV	3 548,0	3 548,0	0,0
220 kV	1 385,0	1 385,0	0,0
132 kV	185,3	185,3	0,0
120 kV	1 203,7	1 203,7	0,0
70 kV	504,5	504,5	0,0
50 kV	128,8	128,8	0,0
Total overhead lines, km	6 955,3	6 955,3	0,0
Underground cable	1996 km	1995 km	Change km
30 kV	148,7	148,7	0,0
20 kV	103,0	-	-
15 kV	792,2	784,8	7,5
6,6 kV	1 299,5	1 298,8	0,8
0,4 kV	9 227,0	9 260,7	16,3
Total underground cable, km	11 620,5	11 493,0	127,6
Total, km	18 575,8	18 448,3	127,6
Transformers (step-down) highest voltage	1996 MVA	1995 MVA	Change MVA
Transmission system			
220 kV	2 817,0	2 817,0	0,0
132 kV	135,0	135,0	0,0
120 kV	660,5	660,5	0,0
70 kV	146,1	146,1	0,0
66 kV	15,0	15,0	0,0
50 kV	46,0	46,0	0,0
Total, MVA	3 819,6	3 819,6	0,0
	1996	1995	Change %
Number of SNEL employees	5 572	5 541	2,2
GWh sold per employee	0,736	0,786	-6,3
Population of Dem Republic of the Congo (1984 census), number (million)	37,8	37,8	0,0
Average selling price, US\$/kWh	0,032	0,047	-31,9

sub-saharan africa

KENYA

Source: Kenya Power and Lighting Company Ltd (KPLC) for the year ended 30 June 1996

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	40,00 ^b	40,00 ^b	
KPLC stations ^c	Hydro	6,20	5,40	
Masinga (TARDA)	Hydro	40,00	40,00	
Kiambere (TARDA) ^d	Hydro	144,00	127,00	
Turkwell (KVDA)	Hydro	106,00	106,00	
Kipevu (KPLC) ^e	Thermal (oil fired)	93,00	62,00	
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	1,00 ^f	
Isolated KPLC stations	Diesel	3,50	3,30 ^g	
Isolated REF stations	Diesel	3,80	2,60 ^h	
Ngong (REF)	Wind turbine	0,35	0,35	
Total own source, MW		787,65	723,45	
Other producers of electricity				
UEB (imports) ⁱ	Hydro	30,00	0	
Total source of power, MW		817,65	723,45	
System peak demand ^j (simultaneous one-hour demand)	Date	1995/96 MW	Date	1994/95 MW
	28-03-96	648	04-08-94	605
Electricity produced		1995/96 GWh	1994/95 GWh	Change %
Thermal		224,37	217,59	3,1
Hydro		3 163,03	3 103,09	1,9
Diesel (interconnected)		2,30	1,72	33,7
Diesel (isolated)		18,80	17,39	8,1
Gas turbine		171,16	46,98	264,3
Geothermal		389,65	290,47	34,1
Wind turbine		1,08	1,09	-0,9
Total electricity produced, GWh		3 970,39	3 678,33	7,9
Electricity imported from Uganda, GWh		148,75	187,23	-20,6
Auxiliary consumption/own use		51,96	45,04	15,4
Total available for distribution, GWh		4 067,18	3 820,52	6,5
System losses		659,86	598,52 ^k	10,2

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

^b Installed capacity is 40 MW but station can achieve a maximum output of 44 MW.

^c Increase due to completion of rehabilitation work on one of the stations.

^d Effective capacity lower due to weak winding insulation.

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

^f Effective capacity decreased as a result of Nairobi South diesel generator ceasing operations during 1995/96. Officially decommissioned in 1997.

^g Effective capacity decreased as a result of several machines having been decommissioned. A few new machines have been installed during the year.

^h Effective capacity decreased due to repairs on some of the stations.

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

^j Restricted demand due to inadequate generation.

KPC - The Kenya Power Company Limited, KPLC - The Kenya Power and Lighting Company Limited, KVDA - Kerio Valley Development Authority, REF - Rural Electrification Fund, TARDA - Tana and Athi Rivers Development Authority, TRDC - Tana River Development Company Limited, UEB - Uganda Electricity Board.

sub-saharan africa

KENYA CONTINUED

Source: Kenya Power and Lighting Company Ltd (KPLC) for the year ended 30 June 1996

	1995/96	1994/95	Change
Electricity sold	GWh	GWh	%
Domestic, small commercial and small industrial	1 049	1 026	2,2
Commercial and industrial (medium and large)	2 109	1 925	9,5
Off-peak	100	119	-16,2
Street lighting	12	18	-31,3
Rural electrification	138	134	2,9
Total electricity sold, GWh	3 407	3 222	5,8
Number of customers	1995/96	1994/95	Change
			%
Domestic, small commercial and small industrial	401 217	365 409	9,8
Commercial and industrial (medium and large)	3 035	2 958	2,6
Off-peak	2 131	1 972	8,1
Street lighting	140	117	19,7
Total number of customers ⁱ	406 523	370 456	9,7
Transmission and distribution equipment in service			
	1995/96	1994/95	Change
	km	km	km
Overhead lines			
220 kV	877	877	0
132 kV	1 980	1 980	0
66 kV	567	567	0
40 kV	126	126	0
33 kV	3 967	3 874	93
11 kV	8 882	8 760	122
Total overhead lines, km	16 399	16 184	215
Underground cables ^m			
66 kV	6	6	0
33 kV	2	2	0
11 kV	490	490	0
Total underground cable, km	498	498	0
Total, km	16 897	16 682	215
Transformers	1995/96	1994/95	Change
	MVA	MVA	MVA
Step-down transformers	4 489	4 429	60
Step-up transformers	1 663	1 663	0
Total, MVA	6 152	6 092	60
	1995/96	1994/95	Change
			%
Number of KPLC employees	8 193	8 864	-7,6
GWh sold per employee	0,416	0,363 ^k	14,4
Population of Kenya, number (million)	28,3 ⁿ	26,2	8,0
Average selling price, thebe/kWh	5,04 ^o	4,21 ^k	19,7

^k Adjusted.

^l Includes rural electrification customers.

^m Values for 1995/96 are estimated.

ⁿ As at 31 December 1996 (provisional).

^o Effective from 1 October 1996.

Source: Lesotho Electricity Corporation (LEC) for the year ended 31 March 1997

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	0,400 ^a	0,400 ^a	
Mokhotlong	Hydro	0,670 ^a	0,670 ^a	
Qacha's Nek (backup)	Diesel	0,550 ^a	0,550 ^a	
LEC headquarters (standby)	Diesel	0,168	0,168	
33 kV LEC border substation (standby)	Diesel	0,000 ^a	0,000 ^a	
Mantsonyane (backup)	Diesel	0,064 ^a	0,064 ^a	
Semonkeng (backup)	Diesel	0,130 ^a	0,130 ^a	
Mokhotlong (backup)	Diesel	0,600 ^a	0,600 ^a	
Total own source, MW		4,762	4,762	
Other sources – Eskom (registered peak at intake points)				
Maseru (132 kV)		73,563 ^a	73,563 ^a	
Hololo (88 kV)		6,560 ^a	6,560 ^a	
Total from Eskom, MW		80,123	80,123	
Total source of power, MW		84,885	84,885	
System peak demand (simultaneous one-hour demand)*				
	Date	1996/97 MW	Date	1995/96 MW
Maseru system	23-07-96	73,5	–	–
Hololo system	July 1996	6,8 ^b	–	–
Electricity produced		1996/97 GWh	1995/96 GWh	Change %
Hydro		5,8	0	–
Diesel		6,3	0	–
Total electricity produced, GWh		12,1	0	–
Imports from Eskom		330,0	330,4 ^a	-0,1
Total available for distribution, GWh		342,1	330,4	3,5
System losses		69,5	27,6 ^a	151,9
Electricity sold		1996/97 GWh	1995/96 GWh	Change %
Domestic		64,4 ^c	72,9 ^a	-11,7
Commercial		51,4	45,4 ^a	13,2
Industrial		50,7	51,6 ^a	-1,7
General purposes		40,8 ^c	47,7 ^a	-14,5
Lesotho Highlands Development Authority		65,3 ^d	85,2 ^a	-23,4
Total electricity sold, GWh		272,6	302,8	-10,0

^a Revised.

^b Not possible to capture data for peak demand as meter is visited only once a month.

^c Decrease due to many customers who belong to this category, having switched to the prepaid metering system.

^d Consumption decreased because the construction work on first phase has been completed. Next phase will start during fiscal year 1998/99.

Source: Lesotho Electricity Corporation (LEC) for the year ended 31 March 1997

	1996/97	1995/96	Change %
Number of customers			
Domestic	7 227	7 833	-7,7
Commercial	101	86	17,4
Industrial	89	83	7,2
General purposes	2 437	2 872	-15,1
Lesotho Highlands Development Authority	13	18	-27,8
Total number of customers	9 867	10 892	-9,4
Transmission and distribution equipment in service			
	1996/97 km	1995/96 km	Change km
Overhead lines			
132 kV	196	164	32
88 kV	86	86	0
66 kV	78	78	0
33 kV	645	559	86
11 kV	1 057	994	63
Total overhead lines, km	2 062	1 881	181
	1996/97 MVA	1995/96 MVA	Change MVA
Transformers			
132/33 kV	120	160	-40
132/66 kV	60	60	0
88/33 kV	40	-	-
66/11 kV	45	45	0
33/11 kV	167	167	0
11/0,4 kV	170	150	20
Total, MVA	602	582	20
	1996/97	1995/96	Change %
Number of LEC employees	756	836	-9,6
GWh sold per employee	0,361	0,362	-0,4
Population of Lesotho, number (million)	2,1	2,0	5,6
Average selling price, cents/kWh			
Conventional metering			
Domestic	32,00	28,00	14,3
Small business	32,00	41,00	-22,0
Commercial	43,00	26,77	60,6
Industrial	25,00	22,80	9,6
Prepaid metering			
Domestic	32,00	-	-
Small business	33,00	-	-
Commercial	50,40	-	-

Source: Electricity Supply Commission of Malawi (ESCOM) for year ended 31 March 1996

Source of power	Type	Nominal capacity MW	Net maximum capacity ^a MW
Tedzani Falls ^a	Hydro	91,60	91,60
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		240,76	240,76
System peak demand (simultaneous one-hour demand)	1995/96	1994/95	
	Date and time 18-07-96 18:30	MW 164,1	Date and time 25-07-95 18:00
Electricity produced	1995/96	1994/95	Change %
	GWh	GWh	
Hydro	857,50	856,11	0,2
Diesel	2,30	1,08	113,0
Gas turbine	0,10	3,33	-97,0
Total electricity produced, GWh	859,90	860,52	-0,1
Exports	1,65	1,04	58,7
Total available for distribution, GWh	858,25	859,48	-0,1
System losses, GWh	132,10	128,08	3,1
Electricity sold	1995/96	1994/95	Change %
	GWh	GWh	
Domestic	170,35	157,92	7,9
General	120,84	121,30	-0,4
Industrial	434,96	452,18	-3,8
Total electricity sold, GWh	726,15	731,40	-0,7
Number of customers	1995/96	1994/95	Change %
Domestic	47 691	44 446	7,3
General	13 078	12 195	7,2
Industrial	680	625	8,8
Total number of customers	61 449	57 266	7,3

Source: Electricity Supply Commission of Malawi (ESCOM) for year ended 31 March 1996

 Transmission and distribution equipment in service

	1995/96	1994/95	Change
Overhead lines	km	km	km
132 kV	952	952	0
66 kV	820	820	0
33 kV	1 918	1 877	41
11 kV	2 168	2 132	36
400/230 V	2 385	2 293	92
Total overhead lines, km	8 243	8 074	169
Underground cable	km	km	km
33 kV	7	7	0
11 kV	90	90	0
400/230 V	181	178	3
Total underground cable, km	278	275	3
Total, km	8 521	8 349	172
Transformers	MVA	MVA	Change MVA
Step-down transformers	769,60	728,54	41,06
Step-up transformers	220,98	220,98	0,00
Total, MVA	990,58	949,52	41,06
	1995/96	1994/95	Change %
Number of ESCOM employees	2 414	2 494	-3,2
GWh sold per employee	0,301	0,293	2,6
Population of Malawi, number (million)	10,9	7,98	36,6
Average selling price, tambala/kWh	48,72	29,68	64,2

^a Two 25,8 MW units were commissioned in December 1995.

sub-saharan africa

MAURITIUS

Source: Central Electricity Board (CEB) for the year ended 31 December 1996

Source of power	Type	Nominal capacity MW	Effective capacity MW
Champagne	Hydro	30,00	28,00
Ferney	Hydro	10,00	10,00
Tamarind Falls	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	77,00 ^a	77,00 ^a
Nicolay	Gas turbine	80,00	80,00
Total own sources, MW		342,44	318,80
Other sources			
Sugar Estates (seasonal)	Thermal	52,15	0,00
Total source of power, MW		394,59	318,80
System peak demand (simultaneous one-hour demand)	1996 Date	1995 Date	1995 MW
	12-11-96	15-11-95	200,5
	218,17		
Electricity produced	1996 GWh	1995 GWh	Change %
Thermal	699,30	682,09	2,5
Sugar Estates (thermal)	128,83	125,27	2,8
Hydro	103,65	134,18	-22,8
Gas turbine	219,03	105,84	106,9
Total electricity produced, GWh	1 150,81	1 047,38	9,9
Auxiliary consumption/own use	31,71	32,84	-3,4
Total available for distribution, GWh	1 119,10	1 014,54	10,3
System losses	132,89	115,85	14,7
Electricity sold	1996 GWh	1995 GWh	Change %
Domestic	357,92	331,63	7,9
Commercial	253,86	229,18	10,8
Industrial – general	339,03	307,89	10,1
Industrial – irrigation	21,60	17,31	24,8
Street lighting	13,80	12,68	8,8
Total electricity sold, GWh	986,21	898,69	9,7
Number of customers	1996	1995	Change %
Domestic	245 769	237 209	3,6
Commercial	23 631	22 924	3,1

Source: Central Electricity Board (CEB) for the year ended 31 December 1996

	1996	1995	Change %
Number of customers (continued)			
Industrial – general	6 269	6 163	1,7
Industrial – irrigation	270	241	12,0
Street lighting	239	230	3,9
Total number of customers ^f	276 178	266 767	3,5
Transmission and distribution equipment in service			
	1996	1995	Change
Overhead lines	km	km	km
66 kV	151,20	151,20	0,00
22 kV	1 513,60	1 411,39	102,21
6,6 kV	259,38	257,36	2,02
0,415 kV	3 798,35	3 589,01	209,34
Total overhead lines, km	5 722,53	5 408,96	313,57
	1996	1995	Change
Underground cables	km	km	km
66 kV	10,04	10,04	0,00
22 kV	80,62	69,28	11,34
6,6 kV	34,42	34,31	0,11
0,415 kV	104,99	103,32	1,67
Total underground cables, km	230,07	216,95	13,12
Total, km	5 952,60	5 625,91	326,69
	1996	1995	Change
Transformers	MVA	MVA	MVA
Transmission and primary distribution			
11/66 kV	258,00	228,00	30,00
66/22 kV	630,00	570,00	60,00
22/6,6 kV	222,40	222,40	0,00
6,6/66 kV	95,20	95,20	0,00
6,6/22 kV	61,90	61,90	0,00
0,415/22 kV (CEB)	0,15	0,15	0,00
0,415/22 kV (Sugar Estates)	9,25	65,38	-56,13
Not belonging to CEB	25,68	51,13	-25,45
Secondary distribution			
6,6/0,415 kV	130,45	117,62	12,83
22/0,415 kV	551,43	578,80	-27,37
Total, MVA	1 984,46	1 990,58	-6,12
	1996	1995	Change %
Number of CEB employees	1 918	1 945	-1,4
GWh sold per employee	0,514	0,462	11,3
Population of Mauritius, number (million)	1,1 ^b	1,1	0,0
Average selling price, Mauritian rupees/kWh	2,18	2,20	-0,9

^a A 30 MW generator was commissioned in December 1996.^b Growth rate of 1,2%.

MOZAMBIQUE

Source: *Electricidade de Moçambique (EDM) for the year ended 31 December 1996*

Source of power	Type	Nominal capacity MW	Effective capacity MW
Maputo	Coal fired	57,50	20,00
Mavuzi	Hydro	52,00	44,50 ^a
Chicamba	Hydro	38,40	34,00
Corumana	Hydro	16,60	14,00 ^a
Cuamba	Hydro	1,09	1,00 ^a
Lichinga	Hydro	0,75	0,60
Maputo	Gas turbine	78,50	62,00 ^a
Beira	Gas turbine	12,00	12,00
Angoche	Diesel	1,60	0,95
Inhambane	Diesel	4,28 ^b	2,00 ^a
Lichinga	Diesel	1,30	0,65 ^a
Lionde	Diesel	3,95	2,55 ^a
Mocuba	Diesel	0,84	0,70 ^a
Nacala	Diesel	19,83 ^b	6,09 ^a
Nampula	Diesel	6,54	4,13 ^a
Pemba	Diesel	8,04	5,60 ^a
Quelimane	Diesel	7,15 ^b	6,25 ^a
Xai-Xai	Diesel	2,67	1,80 ^a
Cuamba	Diesel	0,51	0,40
Tete	Diesel	0,80	0,30
Total own sources, MW		314,35	219,52
Other sources			
Hydroelectrica de Cahora Bassa (HCB)	Hydro	2 075,00	415,00
Emochá	Hydro	0,40	0,40
Total source of power, MW		2 389,75	634,92
System peak demand (simultaneous one-hour demand)		1996 Date and time MW	1995 Date and time MW
Southern system	07-11-96 20:00	111,90	15-12-95 12:00 103,50
Central system	14-10-96 19:00	48,00	21-01-95 19:09 43,20
Northern system	12-08-96 19:00	24,40	23-08-95 20:00 24,00
Electricity produced		1996 GWh	1995 GWh Change %
Coal fired	0,04	0,00	-
Hydro	579,42	335,08 ^c	72,9
Gas turbine	0,00	0,00	-
Diesel	30,10	28,80 ^c	4,5
Total electricity produced, GWh		609,56	363,88
Imports from Eskom	596,27	599,53 ^c	-0,5
Imports from Malawi	0,24	1,71 ^c	-86,0
Imports from Zimbabwe	2,11	0,19	1 010,5
Auxiliary consumption and own use	23,64	17,90 ^d	32,1
Exports	1,96	0,00	0,0
Total available for distribution, GWh		1 182,58	947,41 ^d
System losses		496,24	250,34 ^d

MOZAMBIQUE	CONTINUED
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Source: *Electricidade de Moçambique (EDM) for the year ended 31 December 1996*

	1996	1995	Change
Electricity sold	GWh	GWh	%
Domestic	268,93	272,00 ^d	-1,1
General (low voltage)	136,13	146,57 ^d	-7,1
Medium and high voltage	262,36	260,62 ^d	0,7
Public lighting	18,92	17,88 ^d	5,8
Total electricity sold, GWh	686,34	697,07	-1,5
Number of customers	1996	1995	Change
Domestic	146 839	135 112 ^d	8,7
General (low voltage)	23 211	23 077 ^d	0,6
Medium and high voltage	1 016	980 ^d	3,7
Total number of customers	171 066	159 169	7,5
Transmission and distribution equipment in service			
Overhead lines	1996	1995	Change
	km	km	km
275 kV	85,0	85,0	0,0
220 kV	1 316,0	1 316,0	0,0
110 kV	1 158,0	1 158,0	0,0
60 kV	266,0	266,0 ^b	0,0
33 kV	1 341,0	1 341,0	0,0
22 kV	293,0	293,0	0,0
11 kV	127,0	127,0	0,0
6,6 kV	368,5	353,0	15,5
5,5 kV	6,2	6,2 ^b	0,0
0,4 kV	2 467,2	2 284,6	182,6
Total overhead lines, km	7 427,9	7 229,8	198,1
Underground cables	1996	1995	Change
	km	km	km
60 kV	2,0	2,0 ^b	0,0
33 kV	63,0	63,0	0,0
22 kV	53,8	53,8	0,0
11 kV	286,0	286,0	0,0
6,6 kV	130,8	130,8	0,0
5,5 kV	20,3	20,3	0,0
0,4 kV	978,0	978,0	0,0
Total underground cable, km	1 533,9	1 533,9	0,0
Total, km	8 961,8	8 763,7	198,1
Transformers	1996	1995	Change
	MVA	MVA	MVA
Total, MVA	1 580,0	1 580,0 ^b	0,0
	1996	1995	Change
			%
Number of EDM employees	2 565	2 595 ^c	-1,2
GWh sold per employee	0,268	0,269	-0,4
Population of Mozambique (1995 estimate), number (million)	18,0	17,4	3,6
Average selling price, US\$/kWh	0,071	0,072	-1,4

^a Updated according to machine availability.

^b Corrected.

^c Revised.

^d Adjusted.

sub-saharan africa

NAMIBIA

Source: NamPower for the year ended 30 June 1996

Source of power	Type	Nominal capacity MW	Net maximum capacity 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 own source, 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, MW		217,7	217,7
Total source of power, MW		604,7	604,7
System peak demand (simultaneous one-hour demand)		1995/96 Date and time MW	1994/95 Date and time MW
		26-07-96 19:00 282	23-11-94 21:00 277
Electricity produced		1995/96 GWh	1994/95 GWh
Thermal		18,0	115,5
Hydro		854,0	1 134,1
Diesel		1,3	9,1
Total electricity produced, GWh		873,3	1 258,7
Electricity purchased from			Change %
Eskom		1 078,3	757,6
ZESCO		12,0	9,3
Exports to Eskom (Aggeneys)		29,5	146,4
Total available for distribution, GWh		1 934,1	2 025,6
System losses		233,0	377,5
Electricity sold		1995/96 GWh	1994/95 GWh
Local authorities		913,0	878,7
Mining		656,2	630,8
Business/manufacturing		8,5	8,5
Government (including Caprivi)		92,7	103,1
Rural supplies		30,7	27,0
Total electricity sold, GWh		1 701,1	1 648,1

Source: NamPower for the year ended 30 June 1996

	1995/96	1994/95	Change %
Numbers of customers			
Local authorities	55	55	0,0
Mining	23	22	4,5
Business/manufacturing	19	18	5,6
Government (including Caprivi)	434	407	6,6
Rural supplies	1 366	1 161	17,7
Exports	2	2	0,0
Total number of customers	1 899	1 665	14,1
Transmission and distribution equipment in service			
	1995/96 km	1994/95 km	Change km
Overhead lines			
330 kV	521	521	0,0
220 kV	1 645	1 645	0,0
132 kV	946	946	0,0
66 kV and lower	10 546	9 580	966,0
Total overhead lines, km	13 658	12 692	966,0
	1995/96	1994/95	Change %
Number of NamPower employees	771	751	2,7
GWh sold per employee	2,206	2,195	0,5
Population of Namibia (1991 census), number (million)	1,6 ^b	1,4	14,3
Average selling price, cents/kWh	13,62	12,70	7,2

^a Managed by NamPower on behalf of Namibian Government.

^b Projected.

sub-saharan africa

SWAZILAND

Source: Swaziland Electricity Board (SEB) for year ended 31 March 1996

Source of power	Type	Nominal capacity MW	Net maximum capacity 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	1995/96 MW	1994/95 MW	
	August 1995	139,1	July 1994 117,5	
Electricity produced	1995/96 GWh	1994/95 GWh	Change %	
Hydro	196,8	109,0	80,6	
Diesel	0,7	0,8	-12,5	
Total electricity produced, GWh		197,5	109,8	79,9
Electricity purchased from Eskom		598,7	597,0	0,3
Total available for distribution, GWh		796,2	706,8	12,6
Own use and system losses		125,3	103,6	20,9
Electricity sold	1995/96 GWh	1994/95 GWh	Change %	
Domestic	122,6	132,7	-7,6	
Commercial	57,1	54,3	5,1	
Industrial	375,4	307,6	22,0	
Irrigation	116,6	108,6	7,3	
Total electricity sold, GWh		671,7	603,2	11,4
Number of customers	1995/96	1994/95	Change %	
Domestic	23 795	21 643	9,9	
Commercial	4 657	4 166	11,8	
Industrial	713	678	5,2	
Irrigation	103	109	-5,5	
Total number of customers		29 268	26 596	10,0
Transmission and distribution equipment in service				
Overhead lines	1995/96 km	1994/95 km	Change km	
132 kV	206	206	0	
66 kV	912	912	0	
33 kV	91	91	0	
11 kV	2 825	2 669	156	
Total overhead lines, km		4 034	3 878	156

SWAZILAND	CONTINUED
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Source: Swaziland Electricity Board (SEB) for year ended 31 March 1996

	1995/96	1994/95	Change
Transformers	MVA	MVA	MVA
132/66 kV	178,00	138,00	40,00
66/11 kV	228,50	218,50	10,00
33 or 11/0,4 kV	21,75	21,75	0
Total, MVA	428,25	378,25	50,00
	1995/96	1994/95	Change
			%
Number of SEB employees	677	609	11,2
GWh sold per employee	0,992	0,990	0,2
Population of Swaziland (1991 census), number	820 000	820 000	0
Average selling price, emalangenzi/kWh	00,286	00,350	-18,3

sub-saharan africa

TANZANIA

Source: Tanzania Electric Supply Company Limited (TANESCO) for the year ended 31 December 1996

Source of power – TANESCO	Type	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
Ubungu	Gas turbine	112,0	107,0 ^a
Total, MW		493,7	482,0
Other sources			
Kiwira ^b		–	–
TANWAT ^b		–	–
Total source of power, MW		493,7	482,0
System peak demand (simultaneous one-hour demand)	Date and time	1996 MW	1995 MW
	07-03-96 21:00	337,6	04-12-95 20:00 332,5
Electricity produced		1996 GWh	1995 GWh
Hydro		1 747,8	1 538,8
Diesel		241,4	303,5 ^a
Kiwira and TANWAT		14,0	14,0
Total electricity produced, GWh		2 003,2	1 856,3
Imports from Zambia		2,8	2,7
Imports from Uganda		15,9	18,3
Auxiliary consumption/own use		11,5	12,9 ^a
Exports		0,0	0,0
Total available for distribution, GWh		2 010,4	1 864,4
System losses		238,9	316,5
Electricity sold		1996 GWh	1995 GWh
General use (T1)		1 060,2	861,6
Low-voltage supply (T2)		297,1	271,2
High-voltage supply (T3)		325,5	330,1
Public lighting (T4)		3,0	1,4
Bulk sales to Zanzibar (T5)		85,7	83,6 ^a
Total electricity sold, GWh		1 771,5	1 547,9
			Change %
			13,6
			-20,5
			7,9
			3,7
			-13,1
			-10,9
			0,0
			7,8
			-24,5
			23,1
			9,6
			-1,4
			114,3
			2,5
			14,4

sub-saharan africa

TANZANIA CONTINUED

Source: Tanzania Electric Supply Company Limited (TANESCO) for the year ended 31 December 1996

	1996	1995	Change %
Number of customers			
General use (T1)	329 039	296 388	11,0
Low-voltage supply (T2)	1 311	1 398	-6,2
High-voltage supply (T3)	118	161	-26,7
Public lighting (T4)	1 120	1 112	0,7
Bulk sales to Zanzibar (T5)	1	1	0,0
Company use (T6)	190	190	0,0
Total number of customers ^a	331 779	299 250	10,9
Transmission and distribution equipment in service			
	1996	1995	Change
Overhead lines	km	km	km
220 kV	1 911	1 911 ^a	0
132 kV	1 416	1 416 ^a	0
66 kV	138	138 ^a	0
33 kV	5 294	5 034 ^a	260
11 kV	3 119	3 105 ^a	14
0,4 kV	10 777	10 633	144
Total overhead lines, km	22 655	22 237 ^a	418
	1996	1995	Change
Submarine cable	km	km	km
132 kV	41	41	0
Total submarine cable, km	41	41	0
Total, km	22 696	22 278	418
	1996	1995	Change
Transformers	MVA	MVA	MVA
220/132 kV	630,0	360,0	270
220/33 kV	305,0	127,5	178
132/66 kV	20,0	20,0	0
132/33 kV	546,6	171,6	375
66/33 kV	15,0	5,0	10
33/0,4 kV and 11/0,4 kV	948,8	854,0	95
Total, MVA	2 465,4	1 538,1	927,3
	1996	1995	Change
Number of TANESCO employees	7 556	7 500	0,7
GWh sold per employee	0,234	0,206	13,6
Population of Tanzania, number (million)	28,9	26,4	9,5
Average selling price, TSh ^c /kWh	62,09	62,00	0,1

^a Restated.

^b Information on generating capacity and type of power stations not available at time of publication.

^c Tanzanian shillings.

sub-saharan africa

ZAMBIA

Source: Zambia Electricity Supply Corporation Limited (ZESCO) for the year ended 31 March 1996

Source of power		Nominal capacity MW	Effective capacity MW	
Hydro		1 648	1 632	
Diesel		8	6	
Total, MW		1 656	1 638	
Other producers of electricity (mines)				
Hydro		38	38	
Gas turbine		80	80	
Geothermal		20	20	
Total source of power, MW		1 794	1 776	
System peak demand (simultaneous one-hour demand)	Date and time	1995/96 MW	1994/95 MW	
	15-08-95 19:30	1 010	31-05-94 - 1 108	
Electricity produced		1995/96 GWh	1994/95 GWh	Change %
Hydro		7 821	8 102	-3,5
Diesel		15	14	7,1
Total electricity produced, GWh ^a		7 836	8 116	-3,4
Electricity imports		573	0	-
Exports (including Botswana)		975	1 067	-8,6
Auxiliary consumption/own use		16	12	33,3
Total available for distribution, GWh		7 418	7 037	5,4
System losses		1 056	866	21,9
Electricity sold		1995/96 GWh	1994/95 GWh	Change %
Domestic		943	844	11,7
Agricultural		178	206	-13,6
Industrial		1 009	962	4,9
Mining		4 124	4 134	-0,2
Other		108	25	332,0
Total electricity sold ^b , GWh		6 362	6 171	3,1
Number of customers		1995/96	1994/95	Change %
Domestic		127 983	118 009	8,5
Agricultural		1 299	1 322	-1,7
Industrial		14 779	16 910	-12,6
Other		7 641	6 938	10,1
Total number of customers ^c		151 702	143 179	6,0

Source: Zambia Electricity Supply Corporation Limited (ZESCO) for the year ended 31 March 1996

 Transmission and distribution equipment in service

	1995/96	1994/95	Change
Overhead lines	km	km	km
330 kV	2 008	2 118	-110
220 kV	348	555	-207
132 kV	85	164	-79
88 kV	704	700	4
66 kV	1 366	5 720	-4 354
33 kV	- ^d	598	-
Total overhead lines, km	4 511	9 855	-5 344
Transformers	MVA	MVA	MVA
330/220 kV	1 200	240	960
330/132 kV	250	125	125
330/88 kV	240	210	30
330/66 kV	120	60	60
220/88 kV	140	86	54
220/33 kV	60	60	0
220/11 kV	50	50	0
88/33 kV	367	45	322
66/33 kV	40	5	35
Total, MVA	2 467	881	1 586
	1995/96	1994/95	Change %
Number of ZESCO employees	4 377	4 464	-1,9
GWh sold per employee	1,454	1,382	5,1
Population of Zambia, number (million)	9,5 ^e	9,2	3,3
Average selling price, Zambian kwacha/kWh	18,86	13,35	41,3

^a Energy generated by mine power stations not included.

^b Retail sales, except for ZCCM which buys in bulk.

^c Does not include customers in mining townships.

^d Final figures not available at time of publication.

^e Estimate based on 3,2% annual growth.

sub-saharan africa

ZIMBABWE

Source: Zimbabwe Electricity Supply Authority (ZESA) for the year ended 30 June 1996

Source of power	Type	Nominal capacity MW	Effective capacity MW
Hwange	Coal fired	920	856
Munyati	Coal fired	120	60
Harare	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)		1995/95 Date Date	1994/95 Date Date
		20-06-96	19-06-95
		1 744	1 616 ^a
Electricity produced		1995/96 GWh	1994/95 GWh
			Change %
Coal fired		5 160,2	5 526,3
Hydro		2 163,1	2 284,7
Total electricity produced, GWh		7 323,3	7 811,0
Bulk imports from			
Electricidade de Moçambique		0,0	0,8
Eskom		1 096,7	162,8
SNEL		729,7	1 055,8
ZESCO		1 345,1	1 093,0
Bulk exports (wheeling)		0,0	45,5
Auxiliary consumption/own use		23,4	13,9
Total available for distribution, GWh		10 471,4	10 064,0
System losses, GWh (including distribution)		1 106,5	1 028,1
Electricity sold		1995/96 GWh	1994/95 GWh
			Change %
Domestic		1 734,2	1 658,2
Agricultural		690,5	902,7
Commercial and lighting		1 385,9	1 383,0
Industrial		3 951,8	3 507,1
Mining		1 579,1	1 571,0
ZESA		23,4	13,9
Total electricity sold, GWh		9 364,9	9 035,9

sub-saharan africa

ZIMBABWE CONTINUED

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

	1995/96	1994/95	Change %
Number of customers			
Domestic	338 931	321 267	5,5
Agricultural	10 094	9 917	1,8
Commercial	36 061	35 020	3,0
Industrial	1 836	1 815	1,2
Mining	671	668	0,4
ZESA	288	375	-
Total number of customers	387 881	369 062	5,1
Transmission and distribution equipment in service			
	1995/96	1994/95	Change km
Overhead lines	km	km	km
330 kV	3 500	3 500 ^a	0
220 kV	160	160 ^a	0
132 kV	1 801	1 801 ^a	0
110 kV	5	5	0
88 kV	1 625	1 572 ^a	53
66 kV	184	184	0
33 kV	9 188	8 197 ^a	991
22 kV	216	214	2
11 kV	31 000	30 974	26
Low voltage	12 502	12 502	0
Total overhead lines, km	60 181	59 109	1 072
	1995/96	1994/95	Change MVA
Transformers	MVA	MVA	MVA
400/330 kV	750	-	-
330/220 kV	200	200 ^a	0
330/132 kV	1 855	1 855 ^a	0
330/88 kV	1 368	1 193 ^a	175
330/33 kV	540	480 ^a	60
132/88 kV	120	60	60
132/33 kV	1 683	1 653	30
132/11 kV	120	120	0
88/66 kV	40	40	0
88/33 kV	340	340 ^a	0
88/11 kV	812	812	0
66/11 kV	41	41 ^a	0
Total, MVA	7 869	6 794	1 075
	1995/96	1994/95	Change %
Number of ZESA employees	7 655	7 903	-3,1
GWh sold per employee	1,223	1,143	7,0
Population of Zimbabwe, number (million)	11,1	10,4	6,7
Average selling price, Z\$/kWh	0,305	0,310	-1,6

^a Adjusted.

^b ZESA non-revenue consumption excluded.

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)	
Botswana	Botswana Power Corporation (BPC)	BPC
Democratic Republic of Congo	Société Nationale d'Electricité (SNEL)	SNEL
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)	
Zambia	Zambia Electricity Supply Corporation (ZESCO)	ZESCO
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.

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Burkina Faso	32
Cameroon	20
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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
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Sudan	34
Swaziland	3
Tanzania	12
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Numerical order

1	South Africa
2	Lesotho
3	Swaziland
4	Namibia
5	Botswana
6	Zimbabwe
7	Mozambique
8	Angola
9	Zambia
10	Malawi
11	Democratic Republic of the Congo
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

COUNTRIES



ELECTRICITY SUPPLY STATISTICS

Source: United Nations Energy Statistics Yearbook (1993) and information obtained from certain 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	6,7	
Angola	12/96	158	208	—	—	366 ^b	0,4	
Benin		15	—	—	—	15	0	
Botswana	3/97	118	—	—	—	118	0,1	
Burkina Faso		65	—	—	—	65	0,1	
Burundi		11	32	—	—	43	0,0	
Cameroon		97	530	—	—	627	0,8	
Cape Verde		7	—	—	—	7	0	
Central African Republic		21	22	—	—	43	0,0	
Chad		29	—	—	—	29	0	
Comoros		4	1	—	—	5	0	
Congo	12/95	10	89	—	—	99	0,1	
Congo, Democratic Republic of the	12/96	38	2 523	—	—	2 561	2,9	
Côte d'Ivoire		278	895	—	—	1 173	1,3	
Djibouti		85	—	—	—	85	0,1	
Egypt		9 029	2 825	—	—	11 854	13,6	
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	6/96	111	567	—	45	723 ^d	0,8	
Lesotho	3/97	2	3	—	—	5	0	
Liberia		251	81	—	—	332	0,4	
Libyan Arab Jamah.		4 600	—	—	—	4 600	5,3	
Madagascar		114	106	—	—	220	0,3	
Malawi	3/96	25	216	—	—	241	0,3	
Mali		42	45	—	—	87	0,1	
Mauritania		44	61	—	—	105	0,1	
Mauritius	12/96	265	54	—	—	319	0,4	
Morocco		2 029	693	—	—	2 722	3,1	
Mozambique	12/96	125	510	—	—	635 ^e	0,7	
Namibia	6/95	147	240	—	—	387	0,4	
Niger		63	—	—	—	63	0,1	
Nigeria		3 274	1 300	—	—	4 574	5,3	
Réunion		180	119	—	—	299	0,3	
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	0,1	
Somalia		70	—	—	—	70	0,1	
South Africa, Republic of	12/96	35 961 ^f	2 247 ^g	1 840	—	39 778	45,8	
Sudan		275	225	—	—	500	0,6	
Swaziland	3/96	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	5,5	83	1 324	18 174	680
201	846	-	-	1 047	0,3	-	-	1 047	100
5	-	-	-	5	0	240 ^c	-	245	48
724	-	-	-	724	0,2	753	-	1 477	1 055
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
0	5 740	-	-	5 740 ^h	1,6	41	1 456	4 325	114
812	1 098	-	-	1 910	0,6	-	-	1 910	143
182	-	-	-	182	0,1	-	-	182	327
38 950	8 520	-	-	47 470	13,5	-	-	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
417	3 970	-	391	4 778	1,4	-	-	4 778	11 448
6	6	-	-	12	0,0	330	-	342	0
305	175	-	-	480	0,1	-	-	480	169
17 000	-	-	-	17 000	4,8	-	-	17 000	3 368
252	347	-	-	599	0,2	-	-	599	43
2	858	-	-	860	0,2	-	2	858	0
118	212	-	-	330	0,1	-	-	330	33
120	26	-	-	146	0	-	-	146	68
1 047	104	-	-	1 151	0,3	-	-	1 151	842
9 474	443	-	-	9 917	2,8	1 000 ^c	-	10 917	421
30	579	-	-	610	0,2	599	2	1 206	4 508
19	854	-	-	873	0,2	1 090	30	1 934	877
173	-	-	-	173	0,1	193 ^c	-	366	43
8 600	3 200	-	-	11 800	3,4	-	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
172 234	491	11 775	-	184 500	52,5	29	5 554	178 975	4 419
389	939	-	-	1 328	0,4	-	-	1 328	50
1	197	-	-	198	0,1	599	-	796	971

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	%
		Thermal	Hydro	Nuclear	Geothermal	of total		
Tanzania, United Republic of	12/96	107	375	–	–	482	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	
Zambia	3/96	86	1 670	–	20	1 776 ^d	2,0	
Zimbabwe	6/96	1 056	666	–	–	1 722 ^d	2,0	
Africa		66 401	18 563	1 840	95	86 899		
World		1 893 279	719 591	358 203	10 000	2 981 073		

^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 5 441,5 MW in reserve storage.

^g Includes 1 580 MW pumped storage capacity.

^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
255	1 748	–	–	2 003	0,6	19	–	2 002	0
86	5	–	–	91	0	312 ^c	–	403	104
6 352	64	–	–	6 416	1,8	130	140	6 406	747
7	781	–	–	788	0,2	–	114 ^c	674	34
85	–	–	–	85	0	–	–	85	326
15	7 821	–	–	7 836	2,2	573	975	7 434	783
5 160	2 163	–	–	7 323	2,1	3 172	–	10 495	8 579
285 354	53 620	11 775	459	351 208		9 368	9 987	350 589	21
7 668 946	2 379 037	2 172 090	47 250	12 267 323		425 972	427 522	12 265 773	2 207

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					Ranking
	Total	Thermal	Hydro	Nuclear	Geo-thermal	
World	2 981 073	1 893 279	719 591	358 203	10 000	
Africa	86 899	66 401	18 563	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	—	—	15
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 ^a	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	85 314	63 270	19 904	2 100	40	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 ^c	40 337	35 967	2 531	1 840	—	14
Spain	43 892	20 447	16 395	7 020	30	13
Sweden	37 179	8 813	18 425	9 912	29	16
Switzerland, Lichtenstein	15 550	800	11 760	2 990	—	30
S. Arabia, pt. Ntrl. 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, Fed. Rep.	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.

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
12 272 329	7 673 794	2 379 195	2 172 090	47 250	425 972	427 522	12 270 779	2 216
351 208	285 354	53 620	11 775	459	9 368	9 987	350 589	511
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
3 872 043	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	–	–	–	–	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 ^b	0 ^b	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	0	3 663	65 093	410 018	7 126
525 721	350 656	21 465	153 476	124	33 628	32 758	526 759	6 513
356 519	279 000	70 667	6 800	52	1 400 ^b	160 ^b	357 759	397
58 888	45 716	12 085	–	1 087	–	–	58 888	307
71 980	60 980	11 000	–	–	–	–	71 980	1 122
222 788	174 653	44 482	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	78 295	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	6 342
181 301	168 136	1 390 ^d	11 775	–	2 801	5 584	178 519	3 887
156 529	74 690	25 779	56 060	–	4 606	3 339	157 796	3 994
144 311	7 488	75 380	61 385	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 ^b	300 ^b	71 088	3 399
34 156	24 142	10 014	–	–	500 ^b	100 ^b	34 556	3 253

^a Including Hong Kong.

^b Estimate by the Statistical Division of United Nations Secretariat.

^c Updated according to statistics received for Botswana, Lesotho, Namibia, South Africa and Swaziland.

^d Electrical energy used for pumping has been deducted.

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 (kilowatt)

1 000 kW = 1 MW (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 (megawatt-hour)

1 000 MWh = 1 GWh (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

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ESKOM

Eskom Corporate Communication
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Johannesburg
2000
Republic of South Africa