[2] 18.14

VENDA ELECTRICITY CORPORATION

EPORT ON CAPITAL BUDGET FOR THE 9 MONTHS ENDED 31-12-1991

	BUDGET	PAYMENTS	BALANCE
. PROJECT BROUGHT FORWARD			
Lower Tshituni	60,000	56,892	3,108
. CONSTRUCTION			
2.1. Sundry Minor Extensions & Improvements	7,500,000	6,526,973	973,027
2.2. Mulima/Tshitale Line	780,000	28,931	751,069
_.3. Tshiombo/Maraxwe Line	240,000	9,500	230,500
2.4. Tshikuwi Line	240,000	236,607	3,393
2.5. Dzwerani Line	150,000	6,650	143,350
2.6. Ha-Mashamba Line	180,000	5,338	174,662
2.7. Ha-Magau Line	150,000	0	150,000
2.8. Tshikonelo Line	150,000	4,750	145,250
2.9. Upgrading of Sanari-Sub	80,000	0	80,000
2.10. Upgrading of Muledane/Thohoyandou Line	350,000	278,639	71,361
2.11. Nwanedi Irrigation Scheme	292,000	272,673	19,327
3. BUILDINGS - INDUSTRIAL AREA	189,800	47,363	142,437
3.1. Exension to existing offices	120,750	47,363	73,387
.2. Screen wall & paving	54,050	0	54,050
3.3. Control room	15,000	0	15,000
4. OTHER	829,980	647,063	182,917
4.1. Office furniture & equipment	173,764	191,016	(17,252)
4.2. Vehicles	640,616	439,247	201,369
4.3. Construction Equipment	15,600	16,800	(1,200)
5. LOAN REDEMPTION	985,510	505,277	480,233
	12,177,290	8,626,656	3,550,634

VENDA ELECTRICITY CORPORATION

REPORT ON CAPITAL BUDGET FOR THE YEAR ENDED 31 MARCH 1991

	BUDGET	PAYMENTS	BALANCE
1. Balance from previous year			
1.1 Head Office building	489 337	422 697	66 640
1.2 Kutama /Sinthumule	44 778	43 552	1 226
2. CONSTRUCTION			
2.1 Sundry minor extensions & improvements	6 719 000	7 183 464	(464 464)
2.2 Tshirolwe / Tshikuwi	–	–	–
2.3 Maebane /Midoroni	180 000	166 954	13 046
2.4 Esme four / Bali	210 000	209 040	960
2.5 Rambuda	600 000	329 523	270 477
3. BUILDINGS			
3.1 Regional offices , stores & staff housing	850 000	565 354	284 646
4. VEHICLE,EQUIPMENT & FURNITURE	650 000	821 708	(171 708)
5. REDEMPTION OF LOANS	750 000	204 186	545 814
	10 493 115	9 946 478	546 637

[2]

VENDA ELECTRICITY CORPORATION

FIVE YEAR PLAN

and

TARIFF STUDY

- 1992 to 1997 -

SEPTEMBER 1991

CONTENTS

EXECUTIVE SUMMARY

The findings, conclusions and recommendations resulting from this study are set out in point form hereunder:

1. VEC started operation in April 1987. It is presently a going concern which employs 304 people and services a total of 10 846 consumers. In 1990/91 the system maximum demand was 21,16 MVA and the energy consumed amounted to 115,66 GWh. All electricity sold by VEC is purchased from others.

2. Over the 5-year review period from 1992/93 to 1996/97 VEC will experience average annual growth rates of;

   13,94% on energy purchases, and
   13,50% on maximum demand.

   These growth rates are regarded as being conservative in the light of present system developments.

   System losses amount to 12% of the energy purchased.

   The amount of maximum demand recovered through sales is 82,6% of the maximum demand purchased. By 1996/97 VEC will have a total of 21 247 consumers, 18 925 of which will be domestic consumers. By that time the system maximum demand will be 50,5 MVA and the annual energy consumption will be 261,4 GWh.

   The increase in domestic consumers over the review period is attributed in the main to the present Government policy of subsidising supplies to domestic consumers at a 50% level.

3. Expansion of the VEC system over the next five years will not involve inordinately high capital expenditure on major system development since a large amount of

the basic electricity supply infrastructure already exists. A sum of R23,4 million spent fairly evenly over the period will be required for that purpose. The costs of new consumer connections have been derived on the basis of current departmental costs and current costs in the private contracting sector and new consumer connections will require a further sum of R43,7 million to be spent over the review period. Capital expenditure on buildings, vehicles and equipment will amount to an estimated R5,2 million. All prices have been presented at January 1992 price levels.

4. Only the administrative staffing of VEC will meaningfully increase over the review period to cope with the increasing number of consumer accounts. The present construction staff will gradually be transferred to maintenance duties and new construction work undertaken by private contractors will be correspondingly increased. The manpower requirements of VEC are dealt with in detail in an Annexure to the report.

5. VEC will continue to source its capital requirements from Government, the DBSA and own generation through the tariff in roughly equal amounts over the review period. VEC should also be looking for alternative sources of development capital to supplement present sources.

6. Provision will be made in the budget for depreciation year on year in an amount not less than the loan redemption commitments for that year. Surplus amounts in the depreciation fund should not be allowed to accumulate excessively, but the spending of same needs to be carefully controlled.

7. Estimated operating expenses for the 92/93 financial year amount to some R26 million. This figure increases

to some R39 million at the end of the review period in 1992 price terms.

8. There is a modest surplus of revenue over expenditure in 1992/93 and this surplus will be maintained over the review period. The amount of the surplus expressed as a percentage of turnover is comparable with the accuracy level of the forecasts on which the study is based, and for that reason the surplus should not be regarded as a reason for VEC to reduce its tariffs.

9. New tariffs proposed for implementation in April 1992 are in the same basic form as the existing tariffs. In all cases however it is recommended that the monthly service charges be increased to ensure that a greater proportion of the capital charges is recovered from that source. This results in a marginal reduction in the energy charges and makes the VEC tariffs compare more closely with those of Eskom.

10. Special tariffs which would bring relief to remote rural domestic consumers and to large power users with low load factors (of whom the Agriven water pumping schemes are typical) have been proposed in the report.

11. If the Government subsidy of the domestic consumers continues at 50% level it will amount to some R5,8-million in 1992/93 rising to some R10,7 million in 1996/97 in 1992 price terms. The figure of R5,8 million represents approximately 19% of total revenue from electricity sales in 1992/93.

Various scenarios for reducing the Government subsidy have been examined and the option which would be least onerous to the consumer is to hold the subsidy at a constant amount of money from the start of the review period. However, without the present 50% subsidy the existing VEC domestic tariff does not compare

favourably with those in neighbouring Gazankulu and Lebowa.

12. The new tariffs will have to be increased year on year to cover inflationary increases in the purchase price of electricity and in operating expenses on account of inflation.

1. INTRODUCTION

This five year plan and tariff study was commissioned by the Venda Electricity Corporation in April 1991 under the auspices of a study team comprising:-

The Venda Electricity Corporation.
The Development Bank of Southern Africa
Merz and McLellan (South Africa).

The proposed terms of reference for the study and the scope and responsibility matrix are given in Annexure A.

2. OUTLINE OF EXISTING VEC SYSTEM

2.1 Current Situation

The Venda Electricity Corporation was incorporated and started operations on 1 April 1987.

The system growth since that time is shown in Table 2.1.

TABLE No. 2.1 - VEC SYSTEM GROWTH

BUDGET ITEM	1988/'89	1989/'90	1990/'91
ENERGY PURCHASED GWh	80,10	96,65	115,66
MAXIMUM DEMAND ESKOM POINTS MVA	15,14	17,71	21,16

Electricity is purchased in bulk from Eskom (2 supply points) and Louis Trichardt Municipality, the latter providing only about 2% of the total energy purchased in 1990/91.

Supply is transmitted and distributed at voltages of 132, 66, 22, 11 and 0,38/0,22 kV. A single line diagram of the major transmission and distribution system is included as Appendix A.1.

The 1990/91 valuation of the distribution system (at cost) is R40,373 million. A 1991 system inventory identifying the main components in the network appears as Appendix A.2.

The number of consumers supplied by VEC in 1991/92 is given in Table 2.2.

TABLE No. 2.2 - VEC CONSUMERS IN 1991/1992

CATEGORY	DOMESTIC	SMALL	LARGE 1	LARGE 2
NUMBER OF CONSUMERS	9425	1280	116	23
AVERAGE CONSUMPTION kWh10^3/month	0,32	1,0	10,7	145,0
AVERAGE MAXIMUM DEMAND kVA/month	-	-	47	513

The consumer categories and the present (1991/92) electricity tariffs for each category are set out in Appendix A.3.

VEC is presently staffed with 304 persons divided among the departments listed in Table 2.3 hereunder.

TABLE No. 2.3 - VEC MANPOWER STRENGTH IN OCTOBER, 1991	
DEPARTMENT	STRENGTH
MANAGEMENT	3
ADMINISTRATION	92
CONSTRUCTION	111
MAINTENANCE	70
PLANNING	28

nearly all of whom are based at the VEC's own office block, stores and workshop in Thohoyandou. There are regional offices cum stores in Siloam and Ha-Ravele, and part-time offices at Vleyfontein, Mutale and Madombidzha.

The present breakdown of staff categories in each department is given in the Manpower Study (Annexure B).

A small scale map of Venda is included in the report as Appendix A.1 indicating the physical locations of the major substations and load centres which appear on the system single line diagram.

2.2 Project Development

In considering future development, some kind of norm had to be developed. The assumptions made were:

- Taking an average family of seven, some 250 000 people should have electricity in 10 years' time. This would imply that about half the current population of Venda would have electricity in 10 years' time.

  In quantitative terms this would mean that some 36 000 new connections would have to be made in this ten-year period, or 18 000 during every 5-year period.

- These new connections would be distributed over Venda in line with population density, economic activity and available major distribution facilities.

As the figure of 18 000 new connections during this 5-year period was not considered too high for technical execution, provided development capital could be found, some 18 000 new connections were considered as a maximum scenario. Refer to the maps of Annexure C.

Geographic Considerations:

The geographic spread of new consumer connections for this 5-year period was estimated to follow a pattern outlined below:

Area 1: Dzanani, south of Louis Trichardt	1 000 (500)
Area 2: Vuwani, (southern part)	1 000 (500)
Area 3: Sibasa-Tengwe axis	4 000 (2 500)
Area 4: Thohoyandou-Makhado axis	9 000 (5 000)
Area 5: Vuwani, (northern part)	2 000 (1 000)
Area 6: Gaba Tshaulu	1 000 (500)
Total	18 000 (10 000)

The Makuya area was considered another likely area, while the Shakadza and Musekwa areas were less likely to receive new connections in this period.

The above geographic estimates must not be considered as firm and final. A flexible approach will be adopted to meet priorities and opportunities as development capital becomes available.

As the current development scenario, which has been submitted to the Venda government only permits some 10 000 connections due to capital restraints, a pro rata reduction in each of the above areas would be aimed for, as indicated in the figures in brackets.

2.3 Scenarios Reviewed

In order to keep the statistical data to be presented in this 5-year plan within practical limits for the non-technical reader or the political decision-maker, it has been decided to select a single main scenario, and then to apply a number of sensitivities to the results obtained.

Prior to taking a decision on the main scenario to be applied to this 5-year plan, however, a range of scenarios were considered. As the development capital likely to be available would eventually prove to be the single most important restraint, the capital requirements were calculated for the scenarios selected.

The scenarios looked at were:

TABLE No. 2.4 - FUTURE 10-YEAR SCENARIOS CONSIDERED						
SCENARIO REVIEWED	TOTAL NUMBER OF NEW CONSUMERS DURING THE PERIODS INDICATED					
	EXISTING THIS YEAR	YEAR 1 '92/'93	YEAR 2 '93/'94	YEAR 3 '94/'95	YR 4+5 '95/'97	YR 6 to 10 1997/2002
No.1:MAXIMUM TECHN. REALISTIC	11 000	3600	3600	3600	7200	10 000
No.2:TECHNICALLY RESTRAINED, ONLY 1 CONTRACTOR AVAIL.	11 000	3000	3000	3000	6000	8 000
SELECTED SCENARIO, ALSO THE SCENARIO SUBMITTED TO GOVT.	11 000	2000	2000	2000	4000	
No.3: AS FOR 2, BUT 25% CAPITAL SHORTFALL	11 000	2000	2000	2000	3500	7 600
No.4: AS FOR 2, BUT 50% CAPITAL SHORTFALL	11 000	2000	1350	1350	2700	4 000
No.5: WHAT-IF THE SUBSIDY IS STOPPED 100% THIS YEAR	11 000	2000	2000	2000	3000	7 500

Scenario 5, which considers a sudden stop to the subsidy, indicates that the effect technically speaking, will be felt in the later part of the 5-year period. VEC is of the opinion that the backlog is such, that the current waiting lists and customer profile will be maintained during the next three years, even if the subsidy was stopped. Thereafter the effect would be serious. This takes into account a possible loss in current consumers at the lower end of the income scales.

The capital implications of the above scenarios were calculated to be as follows:

TABLE No.2.5-DEVELOPMENT CAPITAL REQUIRED FOR THE ABOVE SCENARIOS R-million					
BUDGET ITEM	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
SCENARIO 1	17,8	17,8	17,8	17,8	17,8
SCENARIO 2	15,0	15,0	15,0	15,0	15,0
SELECTED SCENARIO	12,5	14,0	12,0	13,5	12,0
SCENARIO 3	7,3	7,3	7,3	7,0	7,0
SCENARIO 4	5,2	4,5	3,5	2,8	2,1
SCENARIO 5	7,3	7,3	7,3	5,5	5,5

Sensitivities:

The sensitivities selected have been influenced by the 50% subsidy and the expressed views by development agencies, that the subsidy should be phased out over a reasonable period of time.

The sensitivities selected for this 5-year planning period, therefore, have been as follows:

1) The subsidy remains at 50% and grows every year, as the consumer base grows.

2) The subsidy is pegged at, and kept constant at the 1991/92 Rand-value over the 5-year period.

3) The subsidy is phased out over the 5-year period in equal portions of 20 percent.

3. LOAD FORECAST

3.1 Electricity Purchases

The projected growth of electricity purchases for the review period is as follows:-

Year	Energy GWh	Maximum Demand (on Eskom Supply Points)
91/92	136,10	26 810
92/93	162,30	31 770
93/94	185,98	36 350
94/95	209,43	40 810
95/96	233,88	45 390
96/97	261,40	50 490

The energy and maximum demand trends are illustrated in Graphs 1 and 2 respectively. The average annual growth rates over the review period are:

energy purchases - 13,94%
maximum demand - 13,50%

These system growth rates are regarded as realistic, and even conservative for the purposes of this study for the following reasons:-

- in the 4,5 years since VEC has been in existence, the compounded growth rate has been 21% per annum.
- in the past 12 months the growth rate has been 22%, of which the private sector accounts for 28% and the Government sector for 6% per annum.
- in October 1991 a total of 264 new consumers were connected to the VEC system, 85% of whom were rural domestic consumers outside the urban areas.

- for every 11 new domestic consumers connected there is one new small power user connected.

Growth at these levels can be expected to persist in the short term because;

a) the Government subsidy of domestic consumers is an inducement to make use of electricity.

b) the Venda Government has indicated a willingness to continue to subsidize electricity consumption and to provide capital for electricity supply.

c) most of the more densely populated areas of Venda are already well provided with electricity supply infrastructure and the capital costs of connecting new consumers are therefore likely to remain relatively low over the review period.

3.2 Electricity Sales

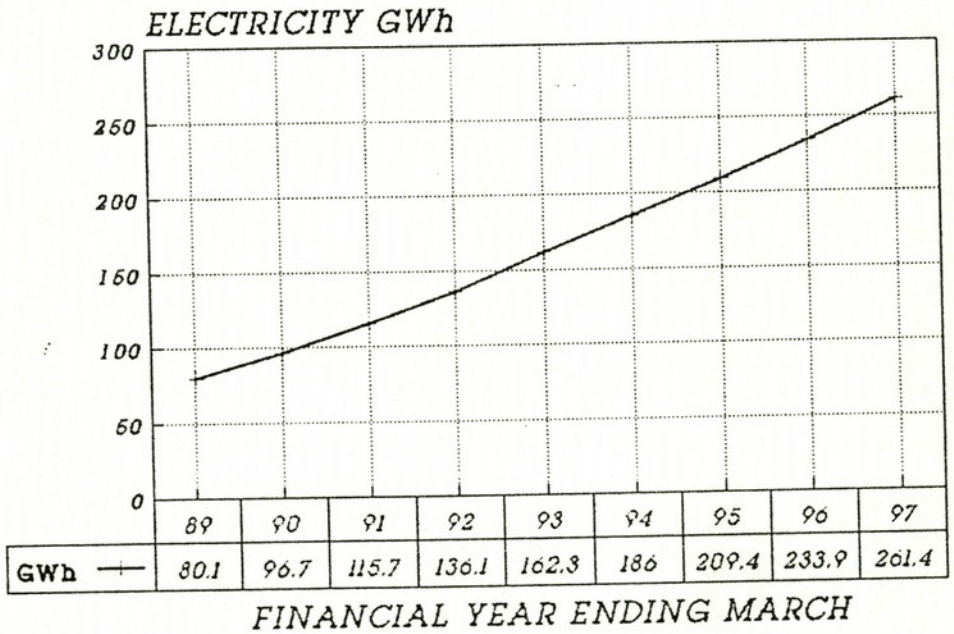
The forecast sales of electrical energy are given in Appendix B.1.

In the case of maximum demand sales, two possible scenarios have been identified viz:-

- the case where sales growth matches the growth of purchases at 13,5% pa and the 1991/92 recovery ratio of 82% (sales as a percentage of purchases) is maintained over the review period.

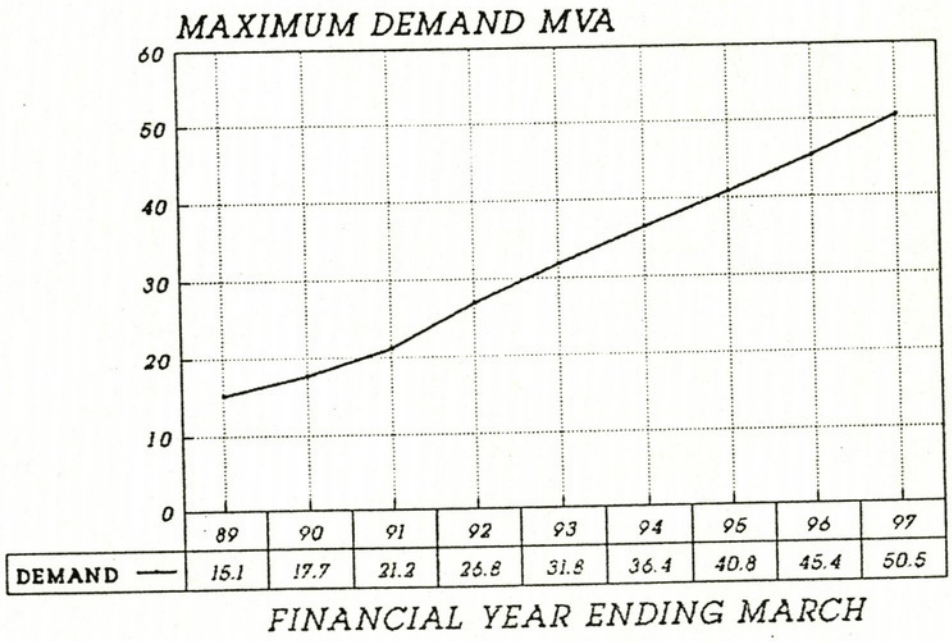
- the case where the proportion of demand recovered is not constant. This would occur if recoverable demand was based on the annual increase in the number of large power users, and the annual natural growth of existing consumer maximum demand. We calculate that this growth would be equivalent

VEC LOAD FORECAST
GRAPH No.1 :ELECTRICTY in GWh



VECSYR-4

VEC LOAD FORECAST
GRAPH No.2 :MAXIMUM DEMAND MVA



VECSYR-5

to 6% per annum and is more realistic than 13,5% per annum in the case of demand sales.

Both cases are shown in Table 3.1

Table 3.1

Forecast of Maximum Demand Sales

Year	Average Monthly MD Sold - kVA	
	13,5% pa	6% pa
91/92	21 940	21 940
92/93	25 998	23 256
93/94	29 754	24 652
94/95	33 399	26 131
95/96	37 149	27 699
96/97	41 318	29 361

3.3 System Losses

System energy losses presently run at 12% per annum. Figures for the losses experienced by other electricity supply authorities have been extracted for comparison purposes and are given below:-

Uitenhage Municipality	3,40%
Botswana Power Corporation	5,43%
City of Durban	5,68%
City of Cape Town	5,76%
City of East London	6,07%
Becor	8,46%
Swaziland Electricity Board	11,24%

The VEC loss figure of 12% must therefore be regarded as high in relation to other similar undertakings, and could be the result of

i) low consumer density
ii) inaccurate meter reading
iii) unmetered supplies
iv) network overloading
v) theft of electricity

all of which could be present to some degree on the VEC system, and should be the subject of investigation by VEC.

3.4 New Consumers

The numbers of new consumers predicted over the review period is shown in Table 3.2 and pictorially in Graph 3. These figures have been used as the base on which capital costs of new consumer connections are calculated in Section 5 of this report.

Table 3.2

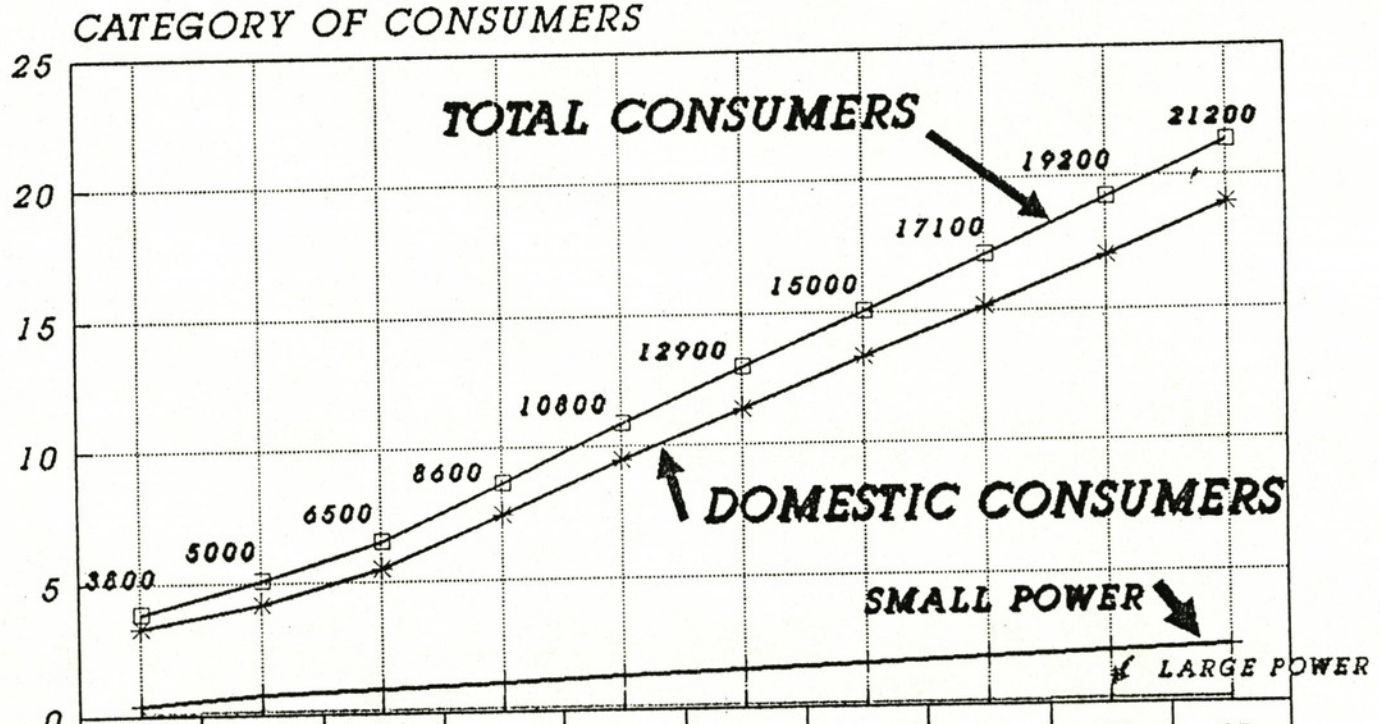
Forecast of New Consumers

Year	New Domestic Consumers	New Small Power Users	New Large Power Users
91/92	1 900	175	6
92/93	1 900	175	9
93/94	1 900	175	4
94/95	1 900	175	4
95/96	1 900	175	3
96/97	———	———	———
Total New	9 500	875	26
Total 91/92	9 425	1 280	141
Total 96/97	18 925	2 155	167

Table 3.2 shows that over the review period the increase in the number of VEC consumers will be as follows:

Domestic Consumers	100,8%
Small Power Users	68,4%
Large Power Users	18,4%

VEC CONSUMER GROWTH
GRAPH No.3 :CUMULATIVE CURVES



ALL FIGURES IN THOUSANDS

	88	89	90	91	92	93	94	95	96	97
LARGE	0.105	0.124	0.129	0.125	0.141	0.147	0.156	0.16	0.164	0.167
SMALL	0.407	0.767	0.923	1.086	1.28	1.455	1.63	1.805	1.98	2.155
DOMESTIC	3.303	4.144	5.453	7.425	9.425	11.325	13.225	15.125	17.025	18.925
TOTAL	3.815	5.034	6.505	8.636	10.841	12.927	15.011	17.09	19.169	21.247

FINANCIAL YEAR ENDING MARCH

VEC5YR-3

It is important to note that the numbers of new consumers each year (Table 3.2) are those numbers which the study group and VEC believe can be connected into the system using the existing VEC construction teams and with reasonable assistance from private contractors over the review period.

Present indications are that applications for electricity supply from prospective consumers will exceed the numbers of connections which can be given in terms of Table 3.2

The results of a more detailed analysis of the following aspects of new consumers, i.e.

- energy apportionment between consumer categories;
- average consumption ranges for consumer categories;
- projected energy consumption over the review period;

are given in Appendices B.2, B.3 and B.4 respectively.

It must be noted that the figures for the large power users designated (2) in Appendix B.3 have been obtained by taking the first 25 consumers in the present large power group, being those with the highest consumptions and in a category with consumptions which are approximately 10 times greater than those of the remaining large power users.

4. SYSTEM DEVELOPMENT

4.1 Major System Development

Present planning by VEC has identified (and in some cases set in motion) various capital projects to upgrade the main transmission and distribution networks in order to meet the forecast growth in system load.

This work is confined to new transmission lines (generally at the higher voltages) and substations, and reinforcement of existing installations of that nature. It also includes a new Eskom point of supply at Wylliespoort.

This work is itemised in Appendix C.1.

Having discussed the basis on which VEC estimated the costs of the work in Appendix C.1, the specific costs of various elements were established (as shown in Appendix C.2) and we concur that the capital required (as tabled in Section 5) is a reasonable estimate for what has to be done.

4.2 New Consumer Connections.

New consumers connected to the VEC system over the review period have been identified according to number and geographical area where possible.

Appendix C.3 gives the number increases in domestic consumer expected in the main residential areas of Thohoyandou, Shayandima and Makwarela. These account for about 30% of the total VEC domestic consumers at the end of the period, compared with 25% at the beginning of the period.

Appendix C.4 gives the present distribution of the large consumers in the system. The relatively small number of additional consumers in this category, the diverse nature of the business and the indeterminacy

of location makes the prediction of new large power user incidence and connection cost difficult to determine with any accuracy.

Suffice to say at this stage that about 30% of new consumer development is expected to take place along the Shayandima-Thohoyandou-Makwarela axis. The remaining 70% of the development will take place in other areas, probably those already served by the major network and those to which it is intended to extend the network.

4.3 Organisational Capacity

The organisational capacity of VEC to cope with the system development until 1997 has been the subject of a separate 5 year manpower plan. Aspects such as the manpower increase during the period and the corresponding manpower budget are dealt with in that study which has been included herein as Annexure B.

5. CAPITAL COST OF SYSTEM DEVELOPMENT

5.1 Major System Development

The capital cost of expanding and reinforcing the main transmission and distribution networks (as discussed in Section 4.1) is shown in Table 5.1 below.

TABLE No. 5.1 - CAPITAL EXPENDITURE ON MAJOR SYSTEM UPGRADING (January 1992 price level)

YEAR	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
ESTIMATE in R-million	2,609	3,953	5,422	3,486	4,737	3,162

5.2 New Consumer Connections

The capital costs of the new consumer connections calculated on the numbers set out in Section 3 have been arrived at using the average costs set out in Table 5.2.

TABLE No. 5.2 - AVERAGE COST OF SUPPLYING A NEW CONSUMER

CONSUMER CATEGORY	COST RANGE (JAN.'92 LEVEL)
DOMESTIC (VEC DEPARTMENTAL CONSTRUCTION)	R 3600
DOMESTIC (PRIVATE CONTRACTOR)	R 4150
SMALL POWER USER	R 7000 to R 9000
LARGE POWER USER	R 15000 to R 21000

The capital costs which appear in Appendix D.1 have been calculated assuming that;

- for domestic supply the VEC cost of R3 600 will apply for the first 3 years and the private contractor's cost of R4 150 will apply for the last 2 years of the review period.

- new supplies for small and large power users have been costed at rates of R8 000/consumer and R18 000/consumer respectively. It must be

noted that in the case of the large power user the prediction and use of an average cost must be viewed with reservations.

5.3 Other Capital Costs

Other capital costs which VEC will have to meet over the review period comprise;

- buildings, where an estimated R0,35 million will have to be spent each year.

- vehicles, an estimated sum of R0,59 million per annum being required for replacement purposes rather than fleet expansion.

- office equipment, an estimated R0,048 million being allowed to cover expansion and replacement of existing facilities.

- construction equipment, for which a sum of R0,050 million has been allowed each year.

Appendix D.2 summarises these costs for each year in question.

The totals projected capital requirements appear in Appendix D.3, the total from which are reflected in Table 5.3 below.

TABLE No. 5.3 - TOTAL CAPITAL EXPENDITURE FORECAST (JAN. '92 LEVELS)

YEAR	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
TOTAL CAPITAL REQUIRED	11,885	13,303	14,852	12,836	15,132	13,539

This is the estimated amount of capital which VEC will need to raise each year to support system development and operation.

The method of sourcing the capital will be discussed in Section 6.

6. SOURCING OF CAPITAL

At the present time VEC obtains its capital requirements from three sources, viz

a) the Venda Government in the form of 'shares'. These are in effect interest-free, indefinite period, non-redeemable loans.

b) loans, which are obtained either from the Development Bank of Southern Africa, or from the commercial sector.

c) own capital generated from the operation of VEC.

Each source presently contributes roughly one-third of VEC's total capital requirements, and that ratio should preferably be maintained during the 5 years covered by this study.

A schedule of current VEC loans from the DBSA is included in Appendix E.1. Appendix E.2 gives details of VEC loans from the commercial sector.

The interest and redemption over the review period on the 5 DBSA loans which VEC has already negotiated with the DBSA is given in Appendix E.3.

Appendix E.4 gives similar details for the commercial loan and Appendix E.5 for the loans from the Industrial Development Corporation.

On the subject of new loans to VEC, the DBSA have made the following stipulations;

° loans will only be granted if they can be linked to economic activity, and if they are likely to promote economic growth in Venda.

Corporation and the Independent Development Trust. VEC could also consider issuing stock as a means of raising capital for development purposes.

- the scheme which the loan funds must be viable, i.e. it must show a positive return or must be associated with an affordable service.

- there must be a high degree of confidence in the projects for which the loans are requested.

- the DBSA wishes to ensure that existing infrastructure is being fully utilised and that the maximum benefit is being derived from capital already spent before new loans are requested.

On this basis the DBSA has indicated that it would prefer not to grant VEC new loans in excess of R4,00 million per annum at the present time.

Table 6.1 has been drawn up on the basis that this will be the case i.e. R4,00 million per annum of new capital from the DBSA with the balance of the amount identified in Section 5 (Table 5.3) obtained in roughly equal amounts from the Venda Government (in the form of shares) and from the operating account i.e. through the tariff.

TABLE No. 6.1 - PROPOSED SOURCING OF CAPITAL R - million

SOURCE	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
GOVERNMENT SHARES	4,350	4,500	5,500	4,500	5,500	4,500
DBSA LOANS	4,000	4,000	4,000	4,000	4,000	4,000
OWN CAPITAL	3,535	4,803	5,352	4,336	5,632	5,039
TOTAL CAPITAL SOURCED	11,885	13,303	14,852	12,836	15,132	13,539

The point must be made that VEC should avail itself of all the sources of capital which are currently available as an alternative to depending solely on the DBSA as it does to a large extent at the present time. Outside sources which should be investigated in this regard are Eskom, the Industrial Development

7. ESTIMATED OPERATING EXPENDITURE

7.1 Purchase of Electricity

Purchase of electricity will cost VEC an amount of R12,44-million in 1991/92 on the Eskom January 1991 Tariff A. For the 136,1 GWh purchased this gives an effective unit purchase price of R0,0914/kWh, i.e. 9,14 cents per unit.

Purchases for each subsequent year in the review period have been based on that unit cost, i.e. the unit cost associated with the Eskom 1991 tariff.

7.2 Operating Expenses

The operating expenses for each year of the review period have been estimated as follows:

- salaries and allowances as per the manpower plan in Section 2;
- vehicle running costs, rentals and system operation and maintenance as per VEC internal figures and budgets;
- administration and sundry costs under the heading of miscellaneous based on VEC budgets and growing at an average rate of 13,6% per annum to match the system growth rate.

7.3 Interest

The estimate of interest payments each year is extracted from Appendix E.7.

7.4 Depreciation

The predicted growth in the asset values of:-

- land and buildings;

- motor vehicles, office equipment and construction equipment.

- the VEC electricity distribution system as a whole;

is given in Appendix F.1, this being based on the projected capital expenditure on each category as outlined in Section 5.

Appendix F.2 has been prepared to show the amounts of money which should be allowed for depreciation each year if

i) land and buildings are not depreciated;

ii) motor vehicles, office equipment and construction equipment are written down at 20% per annum on a straight line basis.

iii) the electricity distribution system is depreciated at 5% per annum on a straight line basis.

If VEC were to set aside the amounts of money appearing in Appendix F.2 i.e. R3,994 million in 1992/93 rising to R6,682 million in 1996/97 two issues would arise viz:-

- should the tariff be increased appropriately to earn the amounts required for depreciation, and

- how would the accumulated depreciation fund be used.

The second issue supposes that the fund amount would either be invested or it would be used to fund new capital development, i.e. it would in effect be in

the same category as "own capital" raised through the tariff for system development purposes.

Seen in that light we do not think it would be correct to burden the tariff to raise large sums in the name of provision for depreciation. Discussions with VEC have revealed that they require a sum of about R1,5 million to be readily available to meet emergencies or unforeseen situations which could arise and that a so-called depreciation fund could be fixed at that level for the review period.

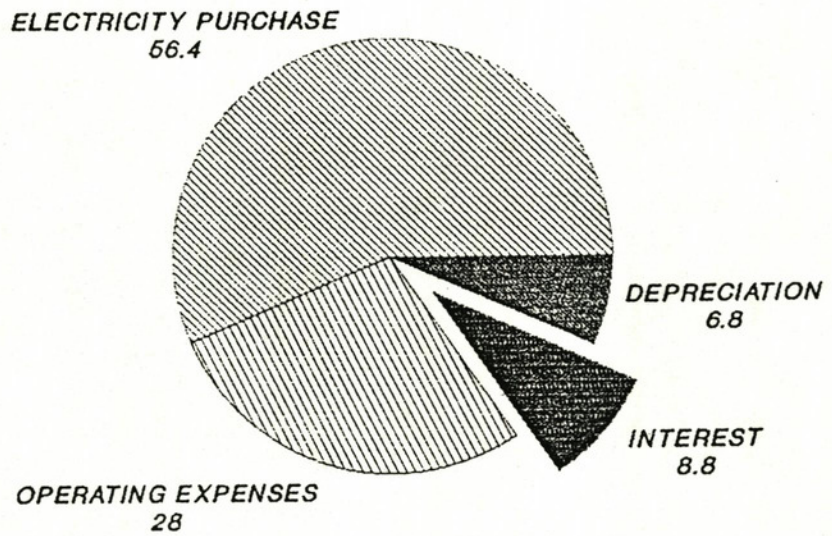
Discussions with the DBSA on the subject of depreciation in an organisation like VEC have led to the suggestion that the amount of money set aside on the operating account each year for depreciation should not be less than the annual commitment for loan redemption. Appendix F.3 has been drawn up to show the latter amount over the review period, and it can be seen that a regular annual amount of R1,5 million would be adequate to cover loan redemption.

We therefore propose that allowance for depreciation be limited to R1,5 million each year and that the depreciation fund be used at the discretion of the Board of VEC, who should be the only body empowered to authorise expenditure from that fund, after annual loan redemption payments have been met.

7.5 Total Operating Expenses

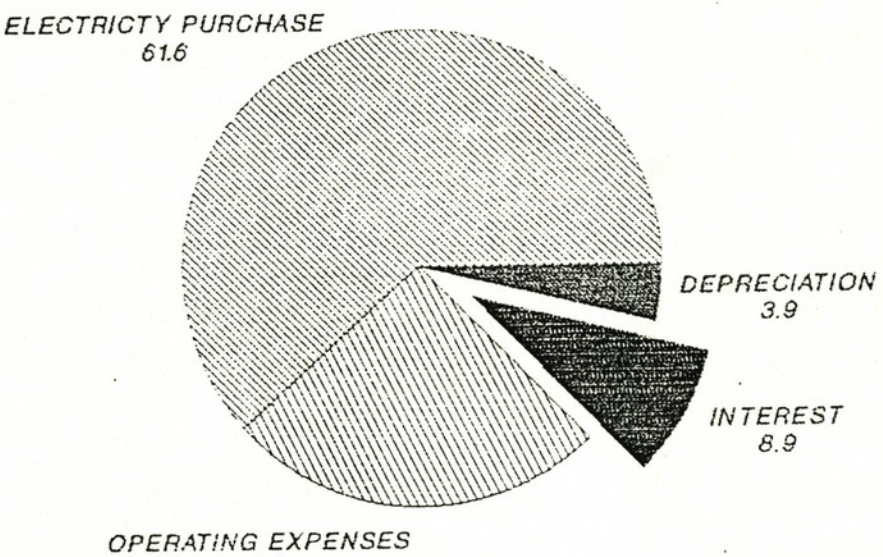
Total operating expenses over the review period are given in Table 7.1 and the apportionment of expenses in each category at the beginning (91/92) and end (96/97) of the period is shown in pie chart form below:

VEC OPERATING EXPENSES APPORTIONMENT
1991/'92 versus 1996/'97



1991/'92 in PERCENT

VEC6YR13



1996/'97 in PERCENT

VEC6YR14

Table 7.1

Estimated Operating Expenses - R million

	91/92	92/93	93/94	94/95	95/96	96/97
Purchase of Electricity	12,440	14,834	16,999	19,142	21,377	23,892
Operational Costs:						
Salaries and Allowances	3,250	3,700	3,700	4,000	4,000	4,300
Vehicle Running costs	0,438	0,481	0,505	0,535	0,556	0,585
Rent	0,077	0,077	0,077	0,077	0,077	0,077
System Operations Maintenance	0,431	0,928	0,831	0,948	1,081	1,233
Miscellaneous	1,966	2,165	2,481	2,841	3,252	3,721
Sub-total	6,162	7,351	7,594	8,401	8,966	9,916
Interest	1,944	2,089	2,448	2,795	3,133	3,455
Depreciation	1,500	1,500	1,500	1,500	1,500	1,500
Total	22,046	25,774	28,541	31,838	34,976	38,763

8. ESTIMATED OPERATING REVENUE

We have considered the following sources of revenue for the review period in question

- Sundry income
- Sales of electricity and associated revenue.

8.1 Sundry Income

The 1991/92 budget lists sundry income from the following sources, and which would be of a recurrent nature;

		Rand
1.	Dividends	1 150
2.	income from retesting, reconnection and meter reading charges	408 500
3.	Interest from:-	
	i) investments	166 750
	ii) consumer deposits	368 800
	iii) housing loans	26 810
4.	Rentals received	90 180
	Total	1 062 190

Of these items, we would expect only Items 2 and 3 (ii) to change significantly over the review period. If, for the sake of simplicity, both are assumed to increase at the system growth rate of 13,5% per annum, the resulting sundry income at January 1992 price and interest levels would be as shown in Table 8.1;

TABLE No. 8.1 - ESTIMATED SUNDRY IŃCOME R - million						
YEAR	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
ESTIMATED SUNDRY INCOME	1,062	1,206	1,368	1,553	1,763	2,001

8.2 Sale of Electricity and Associated Revenue

Direct revenue from the sale of electricity and the provision of electricity falls into the following categories;

- service charges
- connection fees for new consumers
- consumer deposits
- monthly extension charges
- street lighting
- sale of metered energy
- maximum demand charges.

At the present time VEC employs all these categories, each of which is reviewed hereunder in the light of the expected system growth.

Service Charges.

The present service charges (Appendix A.3) are intended to cover fixed monthly costs independent of consumption. Although the service charge is only a significant amount in the case of domestic consumers with small monthly accounts, the principle of a minimum monthly fixed payment is sound and we recommend that service charges be retained in the VEC tariff structure.

The amount of revenue which would be obtained over the review period from service charges is shown in Appendix G.1. These figures are based on the January 1991 tariff.

Connection Fees for New Consumers

Connection fees collected from new consumers are intended to recover all or part of the cost to the supply authority of giving the connection. Being one-off payments they do not make a recurrent (or significant) contribution to revenue, and therefore do not normally fall within the scope of the tariff.

At the present time VEC levies connection fees of;

R125,00 single phase
and R430,00 three phase

for urban consumers.

Appendix G.2 gives the value of the connection fees which would be collected over the review period using the 1991 standard charges for urban consumers.

Consumer Deposits

New domestic consumers and small power users are required to pay a power account deposit which is presently R145 in the case of a domestic consumer and on a sliding scale according to the kVA rating of the installation in the case of a small power user. Taking the figure of R700 associated with a 20 kVA supply as an average amount, the consumer deposits which VEC will collect are given in Appendix G.3.

These deposits should not be regarded as a revenue item in the tariff calculation as they are in effect one-off advance payments which would be refunded to a consumer who was in credit when his supply was terminated.

Monthly Extension Charges

In terms of present VEC policy non-rebatable monthly extension charges are levied on selected consumers in all the categories and the amount of revenue collected from that source is given in Appendix G.4.

It is of interest to note however that other supply authorities, including Eskom, regard the monthly extension charge as performing the same function for the large power user as the single connection fee does for the small power user and the domestic consumer. By that definition the extension charge is not normally

relied on to make a regular and predictable contribution to revenue, particularly in cases where a demand-related rebate is applied to the extension charge, allowing it to be extinguished when the consumer's maximum demand exceeds a certain amount.

Extension charges are calculated for each particular large power user to recover that part of the cost of extending the system which should not be borne by other consumers, and should also include the actual cost of the connection for that particular consumer, i.e. the extension charge should incorporate the connection fee.

If this definition of the extension charge is adopted, then it falls outside the scope of the tariff.

Street Lighting and Miscellaneous

The energy consumption under this heading runs at an average of about 1,7 GWh per annum over the review period, and as such, is less than 1% of total energy consumed. If this energy were charged for at the January 1991 unit rate of R0,196/kWh it would yield an annual revenue of R333 200. This figure will be included under the miscellaneous revenue heading, the total amount of which appears in Appendix G.5.

Sale of Metered Energy

The revenue which the sale of metered energy would yield over the review period is given in Appendix G.6.

Maximum Demand Charges

Revenue collected from the monthly maximum demand charges applied to large power users is reflected in Appendix G.7.

Total Estimated Revenue

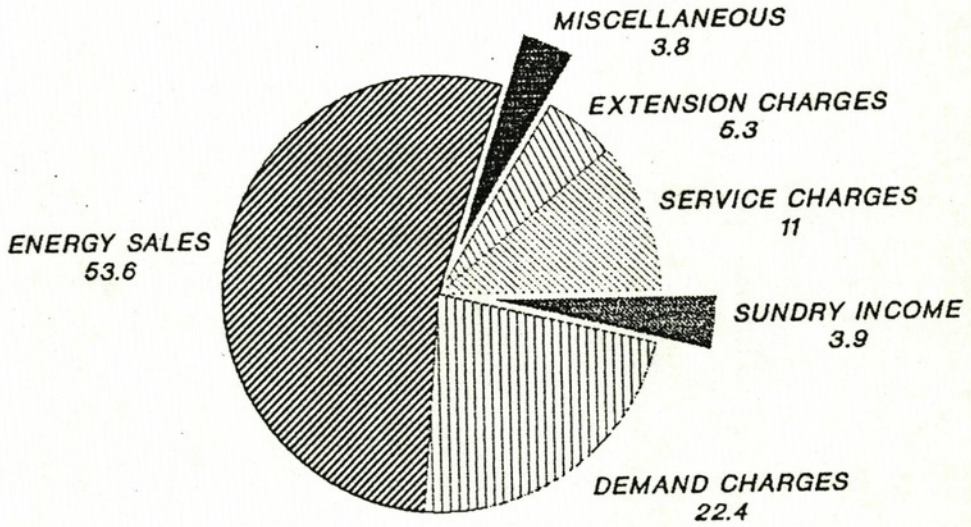
The total projected revenue over the review period is summarised in Table 8.2 based on the January 1991 tariffs and schedule of charges where applicable.

TABLE No. 8.2 - ESTIMATED OPERATING REVENUE			R - million			
BUDGET ITEM	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
SALE OF ELECTRICITY:						
SERVICE CHARGES	2,990	3,613	4,213	4,811	5,408	6,004
ENERGY SALES	14,545	17,631	20,754	23,979	27,447	31,209
DEMAND CHARGES	6,069	6,433	6,819	7,228	7,662	8,121
MISCELLANEOUS	1,109	1,065	1,114	1,165	1,219	1,277
EXTENSION CHARGES	1,440	1,547	1,663	1,789	1,922	2,067
TOTAL SALES	26,063	30,289	34,563	38,972	43,658	48,678
SUNDRY INCOME	1,062	1,206	1,368	1,553	1,763	2,001
GRAND TOTAL REVENUE	27,125	31,495	35,931	40,525	45,421	50,678

The apportionment between different elements making up the total revenue is shown in pie chart form for the beginning of the period (1991/92) and the end of the period 1996/97

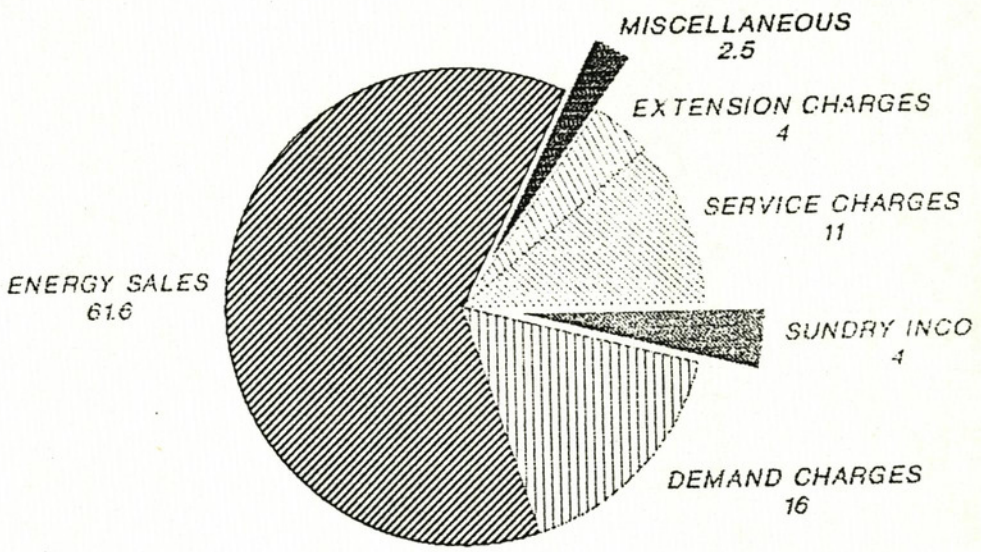
	91/92 %	96/97 %
Service Charges	11,0	11,9
Extension Charges	5,3	4,0
Miscellaneous	3,8	2,5
Energy Sales	53,6	61,6
Demand Charges	22,4	16,0
Sundry Income	3,9	4,0
	100,00	100,00

VEC REVENUE APPORTIONMENT
1991/'92 versus 1996/'97



1991/'92 in PERCENT

VECSYR-9



1996/'97 in PERCENT

9. RECONCILIATION OF REVENUE AND EXPENDITURE

Table 9.1 reconciles revenue and expenditure and shows that at 1991 tariffs there will be a modest surplus of revenue over expenditure after the "own capital" requirements identified in Section 6 of this report have been taken into account

TABLE No. 9.1 - REVENUE versus EXPENDITURE R - million						
BUDGET ITEM	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
TOTAL EST. REVENUE	27,13	31,50	35,93	40,53	45,42	50,68
LESS:ESTIMATED OPERATING EXPENDITURE	-22,05	-25,77	-28,54	-31,84	-34,98	-38,76
SUBTOTAL	5,08	5,73	7,39	8,69	10,44	11,92
LESS: OWN CAPITAL REQUIREMENTS	3,54	4,80	5,35	4,34	5,63	5,04
SURPLUS OF REVENUE	1,54	0,93	2,04	4,35	5,08	6,88

The surplus of revenue over expenditure in the first 2 years of the review period is approximately 4% of turnover, rising thereafter to more than 10% by the end of the period.

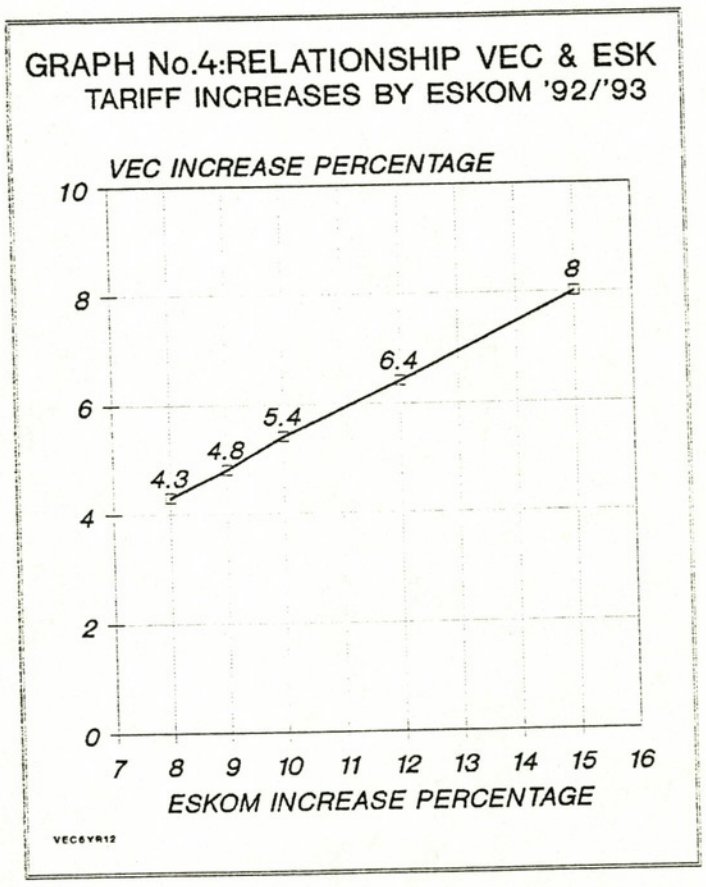
Because the uncertainty level of the revenue and expenditure forecasts is of the order of 5% in the early years, and will increase as the forecast projects further into the future we think that the predicted surpluses should be allowed to stand as shown and should not be drawn down as part of any adjustment to the tariffs considered in later sections of this report.

10. IMPACT ON EXISTING TARIFFS

10.1 Effect of Eskom Tariff Increases

The effects of an increase in the Eskom tariff have been examined to see what corresponding amount of increase would be required in the VEC tariff on that account.

If it is assumed, on the basis of the income and expenditure figures for 1992/3 that the surplus of revenue over expenditure shown in Table 9.1 must be maintained, then Graph 4 shows the amounts by which the VEC tariff would have to be increased to cover various increases in Eskom tariff.



It must be stressed that the percentage increase in VEC tariff in Graph 4 is due solely to the increase in Eskom tariff, and does not reflect any other increases.

The VEC tariff increases would apply to service charges, energy charges and demand charges only, i.e. extension charges and those making up miscellaneous revenue would not be increased.

10.2 Sensitivity to Variations in Capital Costs of New Consumer Connections.

In order to study the effects of variation in the capital costs of new consumer connections we have set out the latter as a proportion of the total annual capital requirement in Table 10.1

TABLE No. 10.1 - EFFECT OF VARIATION IN NEW CONSUMER CAPITAL COSTS (R-million)

YEAR	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
TOTAL CAPITAL REQUIREMENT	13,3	14,9	12,8	15,1	13,5
CAPITAL TO NEW CONSUMER CONNECTIONS	8,3	8,4	8,3	9,4	9,3
NEW AS A PERCENTAGE OF TOTAL	62,5	56,5	64,8	61,8	69,0

from which it can be seen that new consumer connections account for about 63% of the total capital requirements year on year.

We have assumed for the purposes of this exercise that the variation in capital requirements which arises from the variation in the cost of new consumer connections will all be reflected in terms of the "own capital" requirement, i.e. the capital which is to be raised on the operating account. The amounts of capital sourced through Government shares and DBSA loans each year have been regarded as fixed amounts.

Table 10.2 shows the results of the exercise to determine how the amounts of "own capital" will vary

if the costs of connecting a new consumer are 80%, 120% and 150% of the values assumed in Section 5.

TABLE No. 10.2 - VARIATION IN OWN CAPITAL REQUIREMENTS (R - million)					
% VARIATION IN NEW CONSUMER CONNECTION COST	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
- 20 %	3,10	3,70	3,10	3,70	3,20
0	4,80	5,40	4,30	5,60	5,0
+ 20 %	6,50	7,10	6,00	7,50	6,90
+ 50 %	7,00	9,60	8,50	10,30	9,70

Table 10.2 shows that

- a 20% increase or decrease in new consumer connection cost would result in a 35% increase or decrease in "own capital" requirements, and

- a 50% increase in new consumer connection cost would result in an 88% increase in own capital requirement

on the basis of the 1992/93 figures.

The amount of own capital which will be required each year is therefore seen to be materially affected by the actual cost of new consumer connections and it will be necessary for VEC to monitor the latter cost closely as the review period progresses. This is particularly important since VEC intends making increasing use of private contractors for new construction work, and because connection costs are expected to rise when supplies are given to consumers in the less densely populated parts of Venda.

10.3 The Effect of Government Subsidies

At the present time the Venda Government pays VEC 50% of the cost of electricity supplies to domestic consumers. The purpose of the subsidy is to make VEC domestic tariffs comparable with the sub-economic tariffs at present being charged in neighbouring Gazankulu and Lebowa and to encourage the wider use of electricity by making it affordable to a larger number of households.

At the present time therefore the VEC domestic consumer is only paying 50% towards the cost of his electricity. Table 10.3 has been drawn up to show the total revenue which must be collected from the domestic tariff over the review period.

TABLE No. 10.3 - ESTIMATED REVENUE FROM DOMESTIC CONSUMER TARIFF — R - million

BUDGET ITEM	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
SERVICE CHARGES	2,22	2,73	3,24	3,74	4,24	4,74
ENERGY SALES	7,09	8,76	10,62	12,54	14,62	16,74
TOTAL DOMESTIC REVENUE	9,31	11,49	13,86	16,28	18,86	21,48

Four possible scenarios with regard to the subsidy have been examined viz.,

Scenario 1 : the subsidy remains at 50% of the consumer revenue each year.

Scenario 2 : the subsidy remains at its 1991/92 level of R4,65 million in each of the subsequent years.

Scenario 3 : the subsidy is reduced by 20% each year from 1992/93 onwards

such that it reduces to zero in 1996/97 at the end of the review period.

Scenario 4 : The subsidy is removed immediately.

The actual amounts of revenue which will need to be recovered from the consumers in each year for each scenario are set out in Table 10.4.

TABLE No. 10.4 - REVENUE TO BE RECOVERED FROM DOMESTIC CONSUMERS R - million						
SUBSIDY SCENARIO	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
SCENARIO 1: 50 %	4,66	5,75	6,93	8,14	9,43	10,74
SCENARIO 2: CONSTANT VALUE	4,66	6,84	9,20	11,62	14,20	16,81
SCENARIO 3: REDUCING @ 20%	4,66	7,77	11,60	14,42	17,92	21,48
SCENARIO 4: NO SUBSIDY	9,32	11,50	13,86	16,28	18,86	21,48

The corresponding percentage amounts by which the domestic consumer tariffs would have to be increased for each scenario are given in Table 10.5.

TABLE No. 10.5- PERCENTAGE INCREASE IN DOMESTIC CONSUMER TARIFF						
SUBSIDY SCENARIO	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
SCENARIO 1: 50 %	0	0	0	0	0	0
SCENARIO 2: CONSTANT VALUE	0	19	33	43	51	57
SCENARIO 3: REDUCING @ 20%	0	35	67	77	90	100
SCENARIO 4: NO SUBSIDY	0	100	100	100	100	100

Of the scenarios considered, only Scenario 2 offers a reasonably gradual take-up of the previously subsidised amount, but it still means that by 1996/97

the consumer would have to pay 57% more than he would on the original 50% scheme in that year.

It can be seen that on Scenario 3 the consumer would be paying the full amount by 1996/97.

It would thus appear that VEC might have to increase its small and large power user tariffs (if and when the domestic subsidy is reduced) so that the burden is shared by all consumer groups rather than the domestic consumers only.

Domestic consumer tariffs in neighbouring states are given for comparison purposes:

Lebowa (1991):-

Service Charge	R 6,00/month
Unit Charge	R 0,096/kWh

Gazankulu (1990):

Service Charge	R 2,00/month
Unit Charge	R 0,055/kWh

Pietersburg (1990)

Circuit Breaker Charge (average)	R16,10/month
Unit Charge	R 0,1185/kWh

Louis Trichardt (July 1990)

Unit Charge - urban	R 0,1418/kWh
- peri-urban	R 0,1631/kWh

11. NEW TARIFF OPTIONS

11.1 Analysis of Existing Tariffs

General

On the January 1991 VEC tariff the effective recovery rate for each consumer category expressed in Rand/kWh is as follows:-

Consumer Category	Rand/kWh
Tariff A - 'Top 25' consumers	0,1475
- Balance of consumers	0,1785
Tariff B - Three phase	0,2688
- Single phase	0,2180
Tariff C - Domestic	0,2648

Table 11.1 has been drawn up to show how the revenue in 1991/92 is apportioned between the tariff categories using the January 1991 Tariff figures:

Table 11.1

Revenue Apportionment According to Tariff Category 1991/92

	Tariff A Rm	Tariff B Rm	Tariff C Rm	Total %
Service Charges	0,157	0,613	2,220	12
Energy Charges	4,426	3,026	7,093	57
Demand Charges	6,069	-	-	24
Other Charges	1,614	0,120	0,051	7
Total Rm	12,266	3,759	9,364	25,389
Total %	48	15	37	100

i.e. Table 11.1 shows that

- Tariffs A, B and C contributed 48%, 15% and 37% respectively to the total tariff revenue in 1991/92 and
- Service charges, energy charges, demand charges and other charges made up 12%, 57%, 24% and 7% respectively of the total tariff revenue in 1991/92.

It can be seen that energy charges account for the bulk of tariff revenue and that this predominance will become more marked with the large number of new domestic consumers being connected during the review period.

Various aspects of the existing tariffs are discussed in the sections hereunder.

Domestic Consumers (Tariff C)

Graph 5 shows the effective cost of a unit paid by a domestic consumer on the VEC January 1991 tariff over a range of consumption from 50 units/month to 600 units/month.

The present service charge is R21,96/month (half of which is paid by Government subsidy). If the intention is to recover the capital cost associated with a new consumer (typically R3 600)) at the interest rates currently being charged (by the DBSA and over a 20 year period) in the service charge, the latter would have to be increased to an amount of R44,76/month. To maintain the same cost recovery from the average consumer, the unit rate could then be reduced from 19,6 cents/kWh (half of which is presently paid by Government subsidy) to 12,49 cents/kWh.

Doubling the present service charge to a figure of say R40,00 would result in a corresponding reduction in unit cost to 13,59 cents/kWh.

Comparison of VEC Tariff C with that of Eskom in 1991 is as follows:-

	VEC	Escom 'C'	Eskom 'D'
Service Charge - R/month	21,96	23,84	48,86
Unit Charge - cents/kWh;			
i) first 1000 units	19,60	12,964	19,195
ii) balance of units	19,60	12,964	11,106

A higher service charge and lower unit charge would thus bring the VEC domestic tariff more into line with Eskom Tariff C.

Small Power Users (Tariff B)

The cost of a unit to a small power user over the range of 700 to 1400 kWh/month consumption, is shown for the single and three phase cases in Table 11.2

Table 11.2

kWh/month	Effective Unit Cost - Rand/kWh	
	Single Phase	Three Phase
700	0,2271	0,3026
1000	0,2180	0,2707
1400	0,2117	0,2493

The present service charges for single and three phase consumers are R21,96 and R74,65 respectively. If the service charge was required to recoup all the capital cost of a new small power user (typically R8 000) over 20 years it would have to be set at a figure of R99,48.

The effect of increasing the service charge to R100/month would be to reduce the unit charges to;

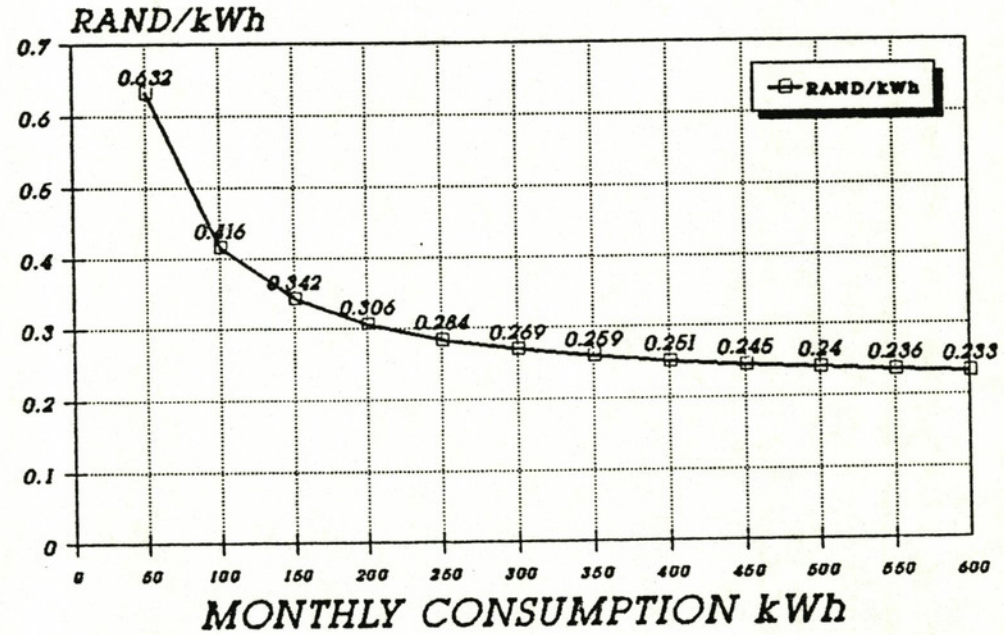
11,18 cents/kWh in the case of the single phase user, and

17,07 cents/kWh in the case of the three phase user

to effect the same cost recovery from the average small power user.

Alternatively, if VEC were to reduce the unit charge from 19,6 cents/kWh to say 16,0 cents/kWh, the existing service charges would have to be increased to R58,00 and R110,70 for the single and three phase cases respectively.

EFFECTIVE UNIT COST
GRAPH No.5 :DOMESTIC CONSUMERS



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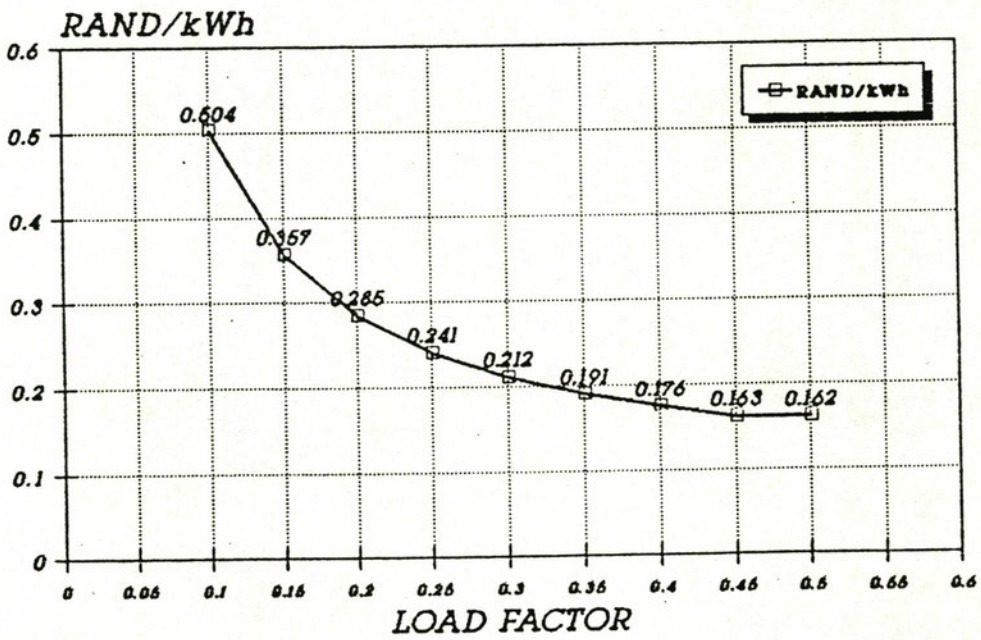
EFFECTIVE UNIT COST
GRAPH No.6 : LARGE POWER USERS



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Comparison of VEC Tariff B with those of Eskom in 1991 is as follows for a consumer using 1000 kWh per month.

	VEC(1)	VEC(2)	Eskom B	Eskom D
Service Charge - R/month	21,96	74,65	79,93	99,92
Unit Charge - cents/kWh (average)	19,60	19,60	15,15	15,15

A higher VEC service charge and lower VEC unit charge would bring the VEC tariffs more in line with those of Eskom.

Large Power Users (Tariff A)

This analysis is confined to the 100 or so large power users who have an average monthly energy consumption of 10 700 kWh and a maximum demand of 47 kVA. Graph 6 shows the effective cost of a unit as a function of load factor on the January 1991 VEC tariff, assuming a power factor of 0,80.

The load factor for the average consumer under consideration is 0,39.

From Graph 6 it can be seen that consumers with load factors at and below 0,20 start to pay a high effective unit price. Several of the Agriven water pumping schemes fall into this category.

Comparing the VEC Tariff A with that of Eskom (January 1991) in the supply voltage range 0,38 to 11,0 kV shows the following relationship:-

	VEC	Eskom
Service Charge - R/month	98,36	99,92
Demand Charge - R/kVA	23,41	21,64
Unit Charge - Cents/kWh	6,650	4,153

If the estimated average cost to VEC of supplying a new large power user is in the order of R18 000 the monthly amount payable by the consumer to cover the capital charges would be R224 at the interest rate and term used previously in this section of the report.

Because of the relatively small number of large power users and the wide range of capital cost associated with giving them a supply it is not practical to try and recover the capital through the service charge. The demand charge is therefore relied on in the main to perform that function (and to recover the demand component in the electricity purchased). Where a very large capital outlay is required to supply a new consumer it is more common to obtain a cash contribution from, or to levy a month extension charge on that consumer.

Increasing the existing service charge to a figure of say R200, by way of example, and leaving the demand charge at R23,41 would reduce the unit charge to 5,70 cents if the cost recovery from an average consumer with a 0,40 load factor were to be maintained.

11.2 Adjustments to Existing Tariffs

The reconciliation of revenue and expenditure in Section 9 shows that the present (1991) VEC tariffs are adequate, and will provide a modest surplus after yielding the requisite amount of "own capital" for system developments.

Of course the 1991 tariff will have to be increased year on year to keep pace with inflation and with the corresponding increases in Eskom tariff. Adjustments to the VEC tariff will also be required from time to time to ensure that the "own capital" requirements are being met, and to compensate for possible changes in the form and quantum of the Government subsidy of domestic consumers.

At this stage, apart from introducing the various special tariffs discussed later in this section of the report, we recommend that VEC make relatively minor changes to the existing basic tariffs to bring them more into line with those of Eskom.

Our reasons for this suggestion are:-

° the increase in the fixed monthly component makes revenue less dependent on consumption;

° the possibility of Venda being incorporated into a larger geographical region (and ultimately into an Eskom or national tariff) does exist and if that were to happen the tariff transition would be less abrupt to erstwhile VEC consumers;

° consumers generally tend to compare their local tariffs with those of Eskom.

The tariffs we recommend are as follows:

<u>Tariff A - Large Power User</u>

Service Charge	R120/month
Demand Charge;	
i) 0,38 - 11 kV	R25/kVA
ii) above 11 kV	R24/kVA
Energy Charge	R0,0600/kWh.

<u>Tariff B - Small Power User</u>

Service Charge	
i) single phase	R38/month
ii) three phase	R88/month
Energy Charge	R0,1800/kWh.

<u>Tariff C - Domestic Consumer</u>

Service Charge	R23/month
Energy Charge	R0,1930/kWh

The existing schedule of standard charges would remain unchanged, i.e. connection fees and consumer deposits would not be affected.

11.3 Special Domestic Tariffs

Attention has been drawn to the fact (Graph 11.1) that domestic consumers who use less than about 150 units per month pay an inordinately high effective unit price, for example, a consumer using only 100 units will pay an effective 41,6 cents per unit.

With the adjusted domestic tariff recommended in Section 11.2 this situation would be marginally worsened i.e. the figure would become 42,3 cents per unit.

Two possibilities exist to provide the very small domestic consumer with some relief, these being:

- a flat rate tariff where the consumer is charged for metered energy only at a suitable unit cost, and

- a circuit breaker tariff where the consumer pays a fixed monthly sum of money which is related to the size of circuit breaker installed in his dwelling.

In our opinion the circuit breaker tariff is the preferable of the two alternatives since it avoids the need for a meter (fixed cost) and for regular meter reading (recurring cost). Should the consumer wish to increase his load at some stage a meter could be fitted at the time the supply was uprated.

In introducing a circuit breaker tariff in Venda we recommend that VEC provide a single circuit breaker size of 5 amps only. This will only permit lighting to be used with small household appliances, the single largest load permitted at any one time being about 1 kW.

The monthly cost which attaches to such a circuit breaker should, we think, be about R30,00, which for a 100 kWh/month consumer is equivalent to 30 cents per unit, and would represent a 25% saving on the amount presently paid on Tariff C.

This saving to the consumer would, of course, represent a loss in revenue to VEC and Tariff C (or possibly Tariffs A and B as well) would have to be adjusted upwards to compensate, i.e. the larger consumer would be subsidising the small consumer on the circuit breaker tariff.

The extent of application of a 5 amp circuit breaker tariff should be investigated by VEC pending introduction on a trial basis. We would also recommend strongly that the circuit breaker tariff be introduced in the more remote rural villages and settlements only where there is a low level of consumer sophistication and the chance of tampering with the supply is therefore less likely.

The subject of introducing budget electricity controllers as an alternative to metered supplies to domestic consumers should also, we think, be looked into by VEC as a separate study in its own right. This subject is complex and is therefore not readily addressed within the scope of this report.

11.4 Special Small Power User Tariffs

At the present time there does not appear to be any need for a special tariff in this category.

11.5 Special Large Power User Tariff

Apart from the very large new consumer with whom VEC might wish to negotiate a special tariff depending on the particular circumstances, the only other large power user category which needs attention is that where the load factor is chronically poor.

These consumers also pay a high effective unit price by virtue of a high demand charge and small energy consumption.

Since this situation arises because of the nature of the operation or process they are involved in, these consumers are often unable to improve their load factors.

The other option which might be available is that of shifting the time at which the maximum demand occurs so that it does not coincide with the VEC system peak. Alternatively, the consumer could avoid operating the offending equipment during VEC system peak periods.

This is the only situation under which VEC could offer relief to the low load factor consumer, and justify it on the basis that VEC was passing on to the consumer the saving which resulted from a lower VEC system peak on Eskom.

We would therefore recommend that VEC introduce an "off peak" tariff to cater for this situation, i.e. the consumer would only be charged for the maximum demand which he incurs during VEC system peak periods. The normal rates for Tariff A could still apply.

As a simpler alternative to this suggestion VEC could avoid the complexity of dual or peak rate demand metering (and abolish the demand charge altogether) by allowing the limit for the transition from Tariff B to be raised from its present level of 100 kVA to say 200 kVA. Large power users with poor load factors (the majority of whom have maximum demands between 100 kVA and 200 kVA) would then be reclassified as small power users and would be charged for units only at the Tariff B rate.

11.6 Time of Use Tariffs

Eskom has recently offered to conduct a study in Venda to assess whether Venda would benefit from a time of use tariff. This subject has therefore not been investigated as part of the five year plan and tariff study

12. ACKNOWLEDGEMENTS

The input to this report and assistance received from the following persons and organisations is gratefully acknowledged;

- the Chief Executive Officer of VEC and his Staff.
- the Development Bank of Southern Africa and all its members who participated in the study.
- the individual members of the Study Group, and in particular

  Mr PB Power - Chairman of the Board of VEC

  Mr AS Bridger - Chief Engineer of VEC

  Mr FP Cillie - DBSA Team Leader.

- Mr EFW Buermann - Institutional Development Specialist who was responsible for the manpower study and who acted as the facilitator in the final preparation of this report.

Special acknowledgement is accorded to the Chief Engineer of VEC for preparing the load forecast and providing the bulk of the input data for the study from the comprehensive records under his control.

LIST OF ANNEXURES

Annexure A	:	Terms of Reference, Scope and Responsibility Matrix.
Annexure B	:	Manpower Plan for the 5 Year Period ending March 1997.
Annexure C	:	Maps(2) of Venda Showing Towns and Villages/Settlements.

ANNEXURE A

TERMS OF REFERENCE AND RESPONSIBILITY MATRIX

1.1 PROPOSED TERMS OF REFERENCE

1. Within a macro planning framework for the region and the intended Venda development program, review previous load forecasts for the Corporation. Prepare an updated load forecast to the year 1996/7 by consumer type, (e.g. domestic, commercial/institutional, and industrial/bulk).

   Identify geographical and consumer areas where load is expected to develop.

   Extrapolate the forecast to the year 2005.

2. Review previous short and long term system development plans, updating these were necessary. Present a five-year physical development plan for the corporation's network, capable of logical extension in the longer term.

3. Prepare a capital expenditure budget covering the next five years.

4. Review the present organisational and institutional arrangements of the corporation and their cost-effectiveness, identifying problem areas, and suggesting any possible improvements and changes in manpower over a period covering the next five years, quantifying this in terms of an operating budget.

5. Present a financial synthesis of forecast expenditure budgets for the next five years.

6. Recommend a new tariff structure for the Corporation, taking into account possible alternative tariffs for power purchases from Eskom.

The recommended tariff should show financial viability over the five-year terms of the study. (It should be assumed that the present government subsidy of domestic tariffs will be phased out).

1.2 SCOPE AND RESPONSIBILITY MATRIX

ELEMENT OF STUDY:	VEC	DBSA	CONS	ESK
1. Macro planning framework:		X		
2. Venda development program:		X		
3. Load forecast:	X	0		
4. System development plan:	0		X	
5. 5-year capital budgets:	0		X	
6. Institutional, manpower, resources:	0	X		
7. Operating expenditure budgets:	X	0	0	
8. Financial synthesis:	0	X		
9. Tariff study:	0		X	
10. Co-ordination, secretariat, report synthesis and preparation:			X	

Legend: X = Prime responsibility.
0 = Co-authorship and/or assistance.

VEC = Venda Electricity Corporation
DBSA = Development Bank of Southern Africa.
CONS = Consulting Engineer.
ESK = ESKOM.

ANNEXURE B

VENDA ELECTRICITY CORPORATION
KOPORASI YA MUDAGASI YA VENDA

MANPOWER PLAN
for the
5-YEAR PERIOD
ending
MARCH 1997

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prepared for the
CENTRE FOR INSTITUTIONAL SPECIALISTS

DEVELOPMENT BANK of SOUTHERN AFRICA

22 OCTOBER, 1991

vec-22

VENDA ELECTRICITY CORPORATION: 5-YEAR MANPOWER PLAN

1. PURPOSE.

The purpose of this document is to present a 5-year manpower plan for VEC, based on the various scenarios of the 5 year business plan currently under review.

2. BACKGROUND.

The consultants Merz and McLellan, Electrical Engineers, presented the first draft of their proposed 5-year business plan during the first week of October, 1991. A number of assumptions were made in their report, which raised questions. It was deemed appropriate to develop a 5-year manpower plan with VEC in order to provide firm manpower input into the business plan.

The Chairman of VEC, Mr Peter Power, had also requested the MCPP unit of the Centre for Institutional Specialists to review the manpower strength prior to deciding on a final budget plan for the next 5 years. The DBSA team visited VEC on 1 and 2 October, 1991 and again on 15 October to obtain the necessary information.

This report presents the final proposals for a 5-year budget, as agreed by all parties at a planning seminar, held on 15 October, 1991, at VEC headquarters.

3. GENERAL MANPOWER STRUCTURE.

The General structure provides for two streams of activities. A technical leg, headed by the Chief Engineer, and a financial/ administrative leg, headed by a manager, but this position is vacant at present. Positions for 301 staff have been provided, which includes the Chief Executive Officer.

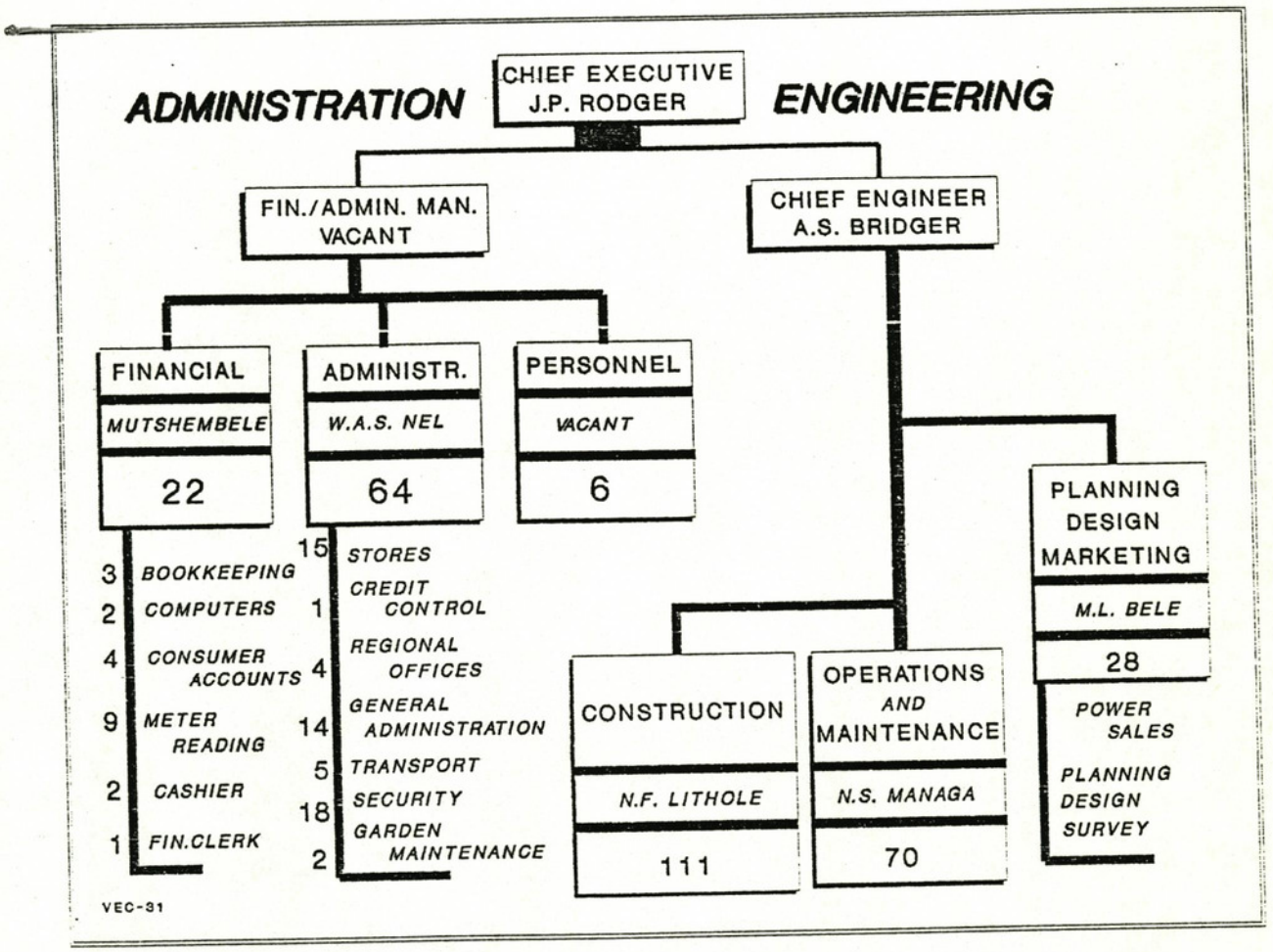
3.1 Engineering (209 staff)

- -Chief Engineer, heading 3 line divisions:
  - -Planning, Design and Marketing (23 staff)
  - -Construction (113 staff)
  - -Operations and Maintenance (69 staff)

3.2 Administration/Finance (92 staff)

- -Administration and Finance Manager, heading 3 sections:
  - -Administration (64 staff)
  - -Finance (22 staff)
  - -Personnel (6 staff)

The general organigram depicting this structure is shown below:



3.3 Planning Design and Marketing

This division splits into 3 units:

-Power Sales, subdividing into:
  * Sales Promotions and Research
  * Quotations (new connections)
  * Investigations (new connections & complaints)
  * Administration of (new) Applications

and

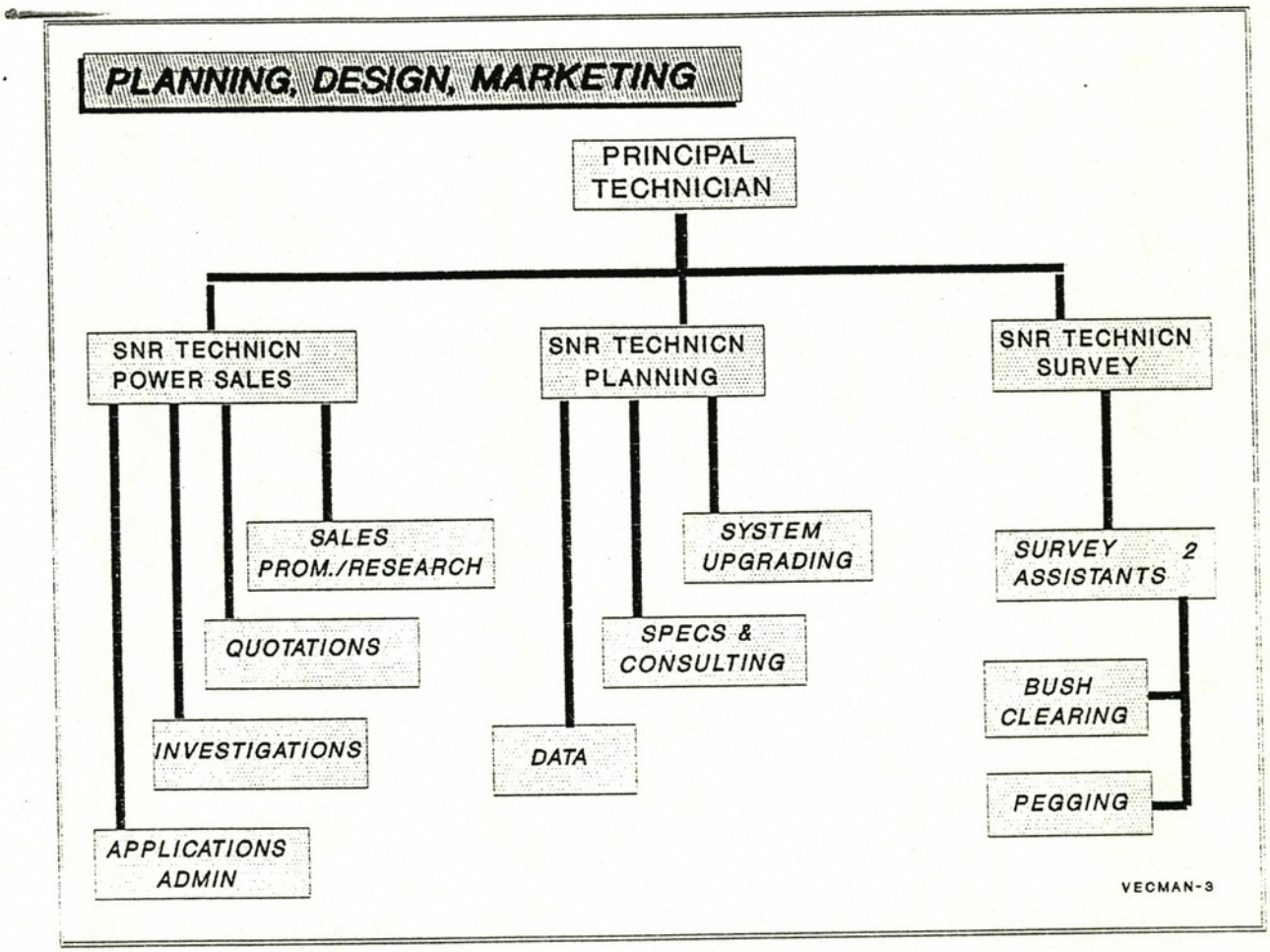
-Planning, concentrating mainly on:
  * The Upgrading of the System
  * Norms, Specifications, Client consultations
  * Data collection and evaluation

and

-Survey, which is mainly a site activity to collect the necessary planning information. Two additional site activities are also controlled by this section:

  * Bush-Clearing (for survey and construction)
  * Pegging (for construction)

The organigram has been depicted below:



3.4 Construction

This is the biggest division in the corporation, employing 6 full teams, each 17 man strong, supported by a backactor team of 8 people.

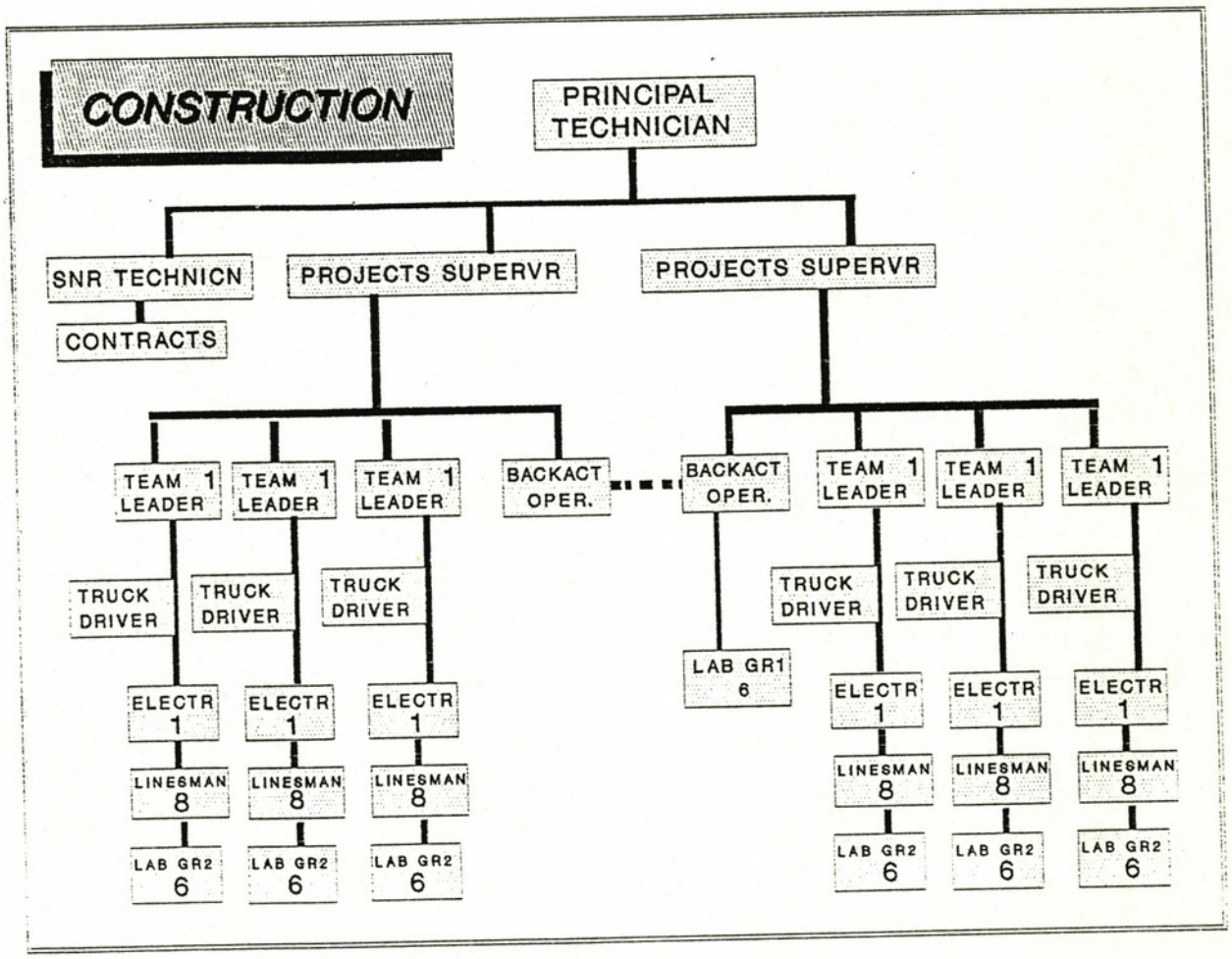
departmental construction -

Departmental construction will slowly be phased out as the need for maintenance capacity grows. The recent introduction of a security section has been done without employing additional staff, but by converting construction labour into security staff, involving special skills training of the people involved.

external contractors -

External contractors are employed to take care of peak loads and whenever the contracts are too complicated or contain high technology outside the capacity of the construction division. A special unit handles external contracts, supported by consultants.

The organigram of the construction division has been depicted below:



3.5 Operations and Maintenance

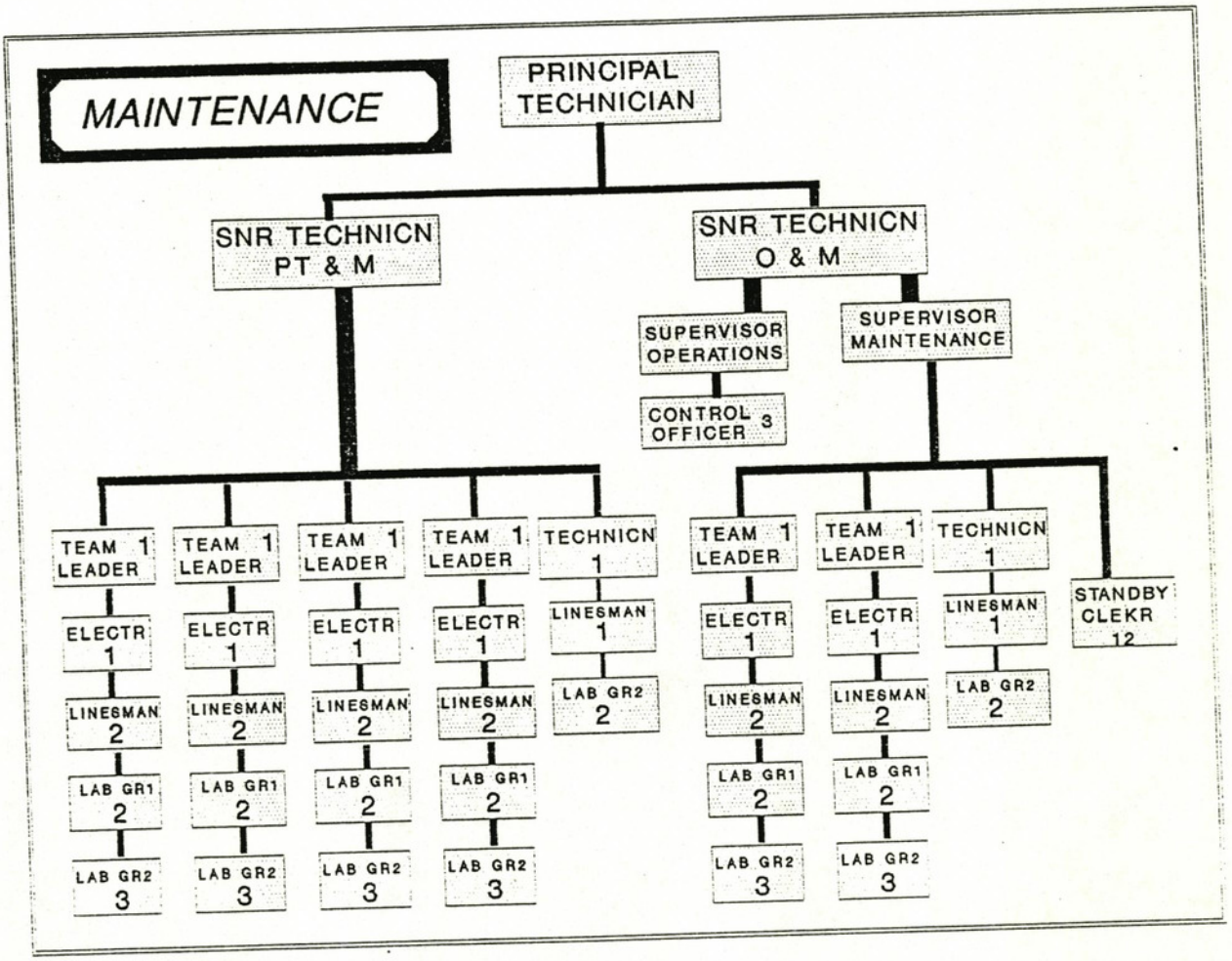
The maintenance division requires 5 full teams, each 9 men strong, supported by another 2 teams, each 4 men strong and headed by a technician, for certain specialist applications.

Operations and maintenance have been split into :

- Power Transmission Operations and maintenance of the relevant system components.
- Operations and maintenance of the low voltage network and the consumer connections. This unit also supplies a 24 hour by 7-day-a-week standby service, which covers the whole of Venda with an efficient radio network wherever no telephone is available.

The 5 teams operate in a flexible manner. Two teams normally cater for the workload in each category indicated above, while the 5th team attends to peak demand in any of the categories.

The organigram depicted below incorporates two supervisor posts to reduce the spread of the one senior technician charged with the responsibility of keeping the customers happy.



4. ANNUAL BUDGET ESTIMATES.

The consultants Merz and McLellan have based their 5-year forecast on information supplied by VEC. The statistics supplied, which were based on the current year's budget and actuals, appeared to be incorrect.

The DBSA team obtained detailed information, and by duplicating the data in a Lotus spreadsheet against the information supplied to the consultants, some considerable deviation has been established. These have been highlighted in the table on the next page, and were resolved during the workshop on 15 October, 1991, in Venda. The "*year cost*" column indicates the final firgures agreed and taken into the 5-year manpower plan.

This has been depicted on the next page, and requires detailed comment, before a base figure for the 5-year plan is confirmed and adopted into the business plan. The table has been compiled from remuneration in any Perolmes grade of people in posts.

VECMAN5Y		VEC :ANNUAL MANPOWER COST R	5,421,422	4,329,524
P-GR	NUMBER	JOB DESCRIPTIONS	YEAR COST	VEC BEFORE
		ADMINISTRATION		
7	1	SNR ADMIN OFFICER	76,743	67,479
9	2	SNR PERS OFF,SNR BOOKKEEPER	112,465	94,014
10	4	SNR ADM.OFF,CR CONTR,SAFETY OFF	193,047	161,340
11	3	TRANSP.OFF,PERS.OFF,CEO SECR.	109,630	91,431
12	13	ADM.OFF,CASHR,BOOKKR,ASST STOREMAN	384,499	321,581
		SNR COMP OPR,CHIEF SEC,MANAGER SECR,HANDYMAN		
13	2	SECR/TYP,OFFICE SUP,HD DRIVER/CRANE OPR	45,308	35,952
14	13	CASHR,SNR CLERK,SWBOARD OPR,ASST TRANS SUPVR	241,750	201,435
15	11	CLERK,ASST COMP OPR,SNR METER RDR,	158,884	148,489
16	20	METER RDR,SECURITY GRD	217,087	163,520
17	1	SEMI SKILLED LABR	9,062	7,549
18	4	TEA MAKER	30,498	25,552
19	18	CLEANER	120,632	100,800
	92	SUBTOTAL ADMINISTRATION	1,699,605	1,419,142
		CONSTRUCTION		
9	1	SNR TECHNICN	50,786	44,097
10	2	CONSTRUCTION FOREMAN	90,027	75,122
11	7	TEAM LEADER	249,218	213,605
13	4	ELECTRICN	85,193	73,068
14	7	DRIVER/CRANE OPR	129,847	108,143
15	17	LEARNER ELECTRICN,LINESMAN GR1	226,575	200,600
16	31	LINESMAN GR2	339,475	282,069
18	17	LABOURER GR1	130,375	108,579
19	25	LABOURER GR2	180,075	149,650
	111	SUBTOTAL CONSTRUCTION	1,481,571	1,254,933
		MAINTENANCE		
9	2	SNR TECHNICN	100,238	83,580
10	1	MAINTENANCE SUPERVISOR	43,718	
11	7	TEAM LEADER	212,836	209,888
13	4	ELECTRICN	108,994	72,892
14	4	STANDBY CLERK	69,118	59,060
15	13	LINESMAN GR1	180,472	151,021
16	14	LINESMAN GR2	143,430	128,408
18	6	LABOUR GR1	31,176	37,920
19	19	LABOUR GR2	116,195	114,152
	70	SUBTOTAL MAINTENANCE	1,006,177	856,921
		PLANNING		
9	3	SNR TECHNICN	151,848	126,999
10	1	SNR CLERK	44,067	36,806
11	3	TECHNICN	108,173	90,516
10	2	ASS SURVEYOR, INSPECTOR	53,876	44,914
13	1	CLERK(POWER MARKETING)	21,626	18,040
14	1	LEARNER ELECTRICN	17,768	14,809
15	1	CLERK	14,780	12,318
16	4	CHARGE HD LAB,LINESMAN GR 2	44,654	37,204
17	2	LABOURER SPECIAL GRADE	20,136	16,784
18	4	LABOURER GR1	30,366	26,664
19	6	LABOURER GR2	41,902	35,004
	28	SUBTOTAL PLANNING	549,196	460,058
		MANAGEMENT		
6	5	PRINC TECHNICN, HEAD ADMIN,ACCOUNTANT	406,929	338,470
	2	CHIEF EXEC.OFFICER, CHIEF ENGINEER	277,944	0
	7	SUBTOTAL MANAGEMENT	684,873	338,470

The table may be summarised as follows:

DIVISION	ACTUAL DATA
ADMINISTRATION	1 699 605
CONSTRUCTION	1 481 571
MAINTENANCE	1 006 177
PLANNING	549 196
MANAGEMENT	684 873
TOTAL REMUNERATION	5 421 422

The budget estimate for 1991/92, derived from data provided to DBSA on 15 October, 1991, thus stands at R5,243 million.

4.1 Manpower cost of constructing capital works

A detailed breakdown of the cost of manpower required for construction purposes during the 1991/92 year is as follows:

Maintenance: 60 percent capitalised .....R 604 000
System Operations & Maintenance.....R 100 000
Construction Division.....R 1 476 000

CONSTRUCTION TOTAL R 2 180 000

4.2 Manpower cost of operations, maintenance and administration

A detailed breakdown of the cost of manpower required for the normal operations, maintenance and administration during the 1991/92 year is as follows:

System Operations & Maintenance.....R 240 000
Budget Heading "Salaries".....R 3 001 422

OPERATIONS TOTAL R 3 241 422
SAY, R 3 250 000

5. MANPOWER INCREASE DURING THE 5-YEAR PLAN.

Firm commitment has been obtained from VEC for the number of extra staff required to carry out the necessary duties over the period. The following additional posts have been identified:

ADDITIONAL POST	GRADE	AMOUNT
FINANCE : 3 METER READERS	15*	41 370
1 CLERK	13	21 912
1 BOOKKEEPER	11	34 442
PERSONNEL: 1 SALARY CLERK	13	21 912
1 ADMIN CLERK	11	34 442
ADMIN. : 3 LABOURERS	19*	17 056
1 CREDIT CONTROLLER	12	27 272
1 SENIOR CLERK	10	40 986
STORES : 3 LABOURERS	19*	17 056
2 CLERKS	12	54 544
DEPOT : 1 LABOURER	19*	17 056
SILOAM 1 CLERK	13	21 912
DEPOT : 3 LABOURERS	19*	17 056
HAKAVELE 1 CLERK	14	17 242
GENERAL : 1 TRANSPORT CLERK	14	17 242
1 HANDYMAN	14	17 242
2 CLEANERS/GARDEN	19*	11 370
1 PETROL ATTENDANT	19*	5 685
2 LABOURERS	19*	11 370
MAINTEN.: 2 ELECTRICIANS 1992	12	54 544
1 ELECTRICIAN 1994	13	21 912
PLANNING : 1 DRAUGHTSMAN	13	21 912
1 INSPECTOR	12	27 272
2 TECHNICIAN	11	68 884
TOTAL ADDITIONAL FOR 1992/93 :		459 186
rounded figure to:		SAY, R450 000
TOTAL ADDITIONAL FOR 1993/94 TO 96/97 :		NIL

The posts that can be converted from construction manpower by either skills training or reducing teams have been indicated by an asterisk in the grade column.

It must be noted that post converted from construction imply no increase in numbers of people, but the cost has to be transferred from the capital budget to the operations and maintenance budget.

6. MAMPOWER 5-YEAR BUDGET.

During the five year plan period it is envisaged to double the domestic consumers, taking them from a current level of around 10 000 to approximately 20 000. This would imply that further maintenance capacity must be created by reducing the construction capacity.

As currently some 60% of maintenance cost is capitalised, we would firstly employ excess maintenance capacity before the construction teams are converted. It is clear, therefore, that VEC will not materially reduce its construction division in the period under review.

VEC has indicated that 60 percent of the current maintenance capacity is spent on capital works. Considering the organogram, this implies that 2 out of 6 teams are needed for current maintenance only, except when problem peaks occur and additional capacity is required to reduce down-time of systems.

With a doubling of consumers in 5 years time, another 2 teams would thus be mobilised away from construction of capital works over that period, or some 30 percent of the current maintenance budget. This amounts to some R 302 000 (para 4.1 above) extra manpower cost to operations and maintenance over that period. The rounded figure of R300 000 has been taken into the budget.

This increase will be taken in two steps, during year 3 and year 5 of the period under review.

We now arrive at the following budget for the 5-year plan period, in January 1992 money value:

MANPOWER BUDGET	DETAILS	AMOUNT
1992/1993	R 3 250 000 + R 450 000 (budg 1991/92) + (extras)	3,70 mil
1993/1994	No Change	3,70 mil
1994/1995	Additional Maintenance	4,00 mil
1995/1996	No Change	4,00 mil
1996/1997	Additional Maintenance	4,30 nil
NOTE: All money values at January 1992 level.		

7. MANPOWER LEVELS.

~~VEC~~ has confirmed that only 19 additional staff must be recruited to provide a manpower complement adequate to meet the need for the period under review. This would increase the current strength to 320 during next year, after which it would remain constant during the planning period.

Shifting resources from construction to operations and maintenance will be the only additional requirement, the cost implications of which have been outlined above.

The forseeable manpower plan would thus be as follows:

MANPOWER NUMBERS	DETAILS	NUMBER
1992/1993	ADMINISTRATION: .... 120 CONSTRUCTION: ..... 93 OPERATIONS & MAINT.: 72 PLANNING & DESIGN: . 32 MANAGEMENT: 3	320
1993/1994	No Change	320
1994/1995	No Change	320
1995/1996	No Change	320
1996/1997	No Change	320

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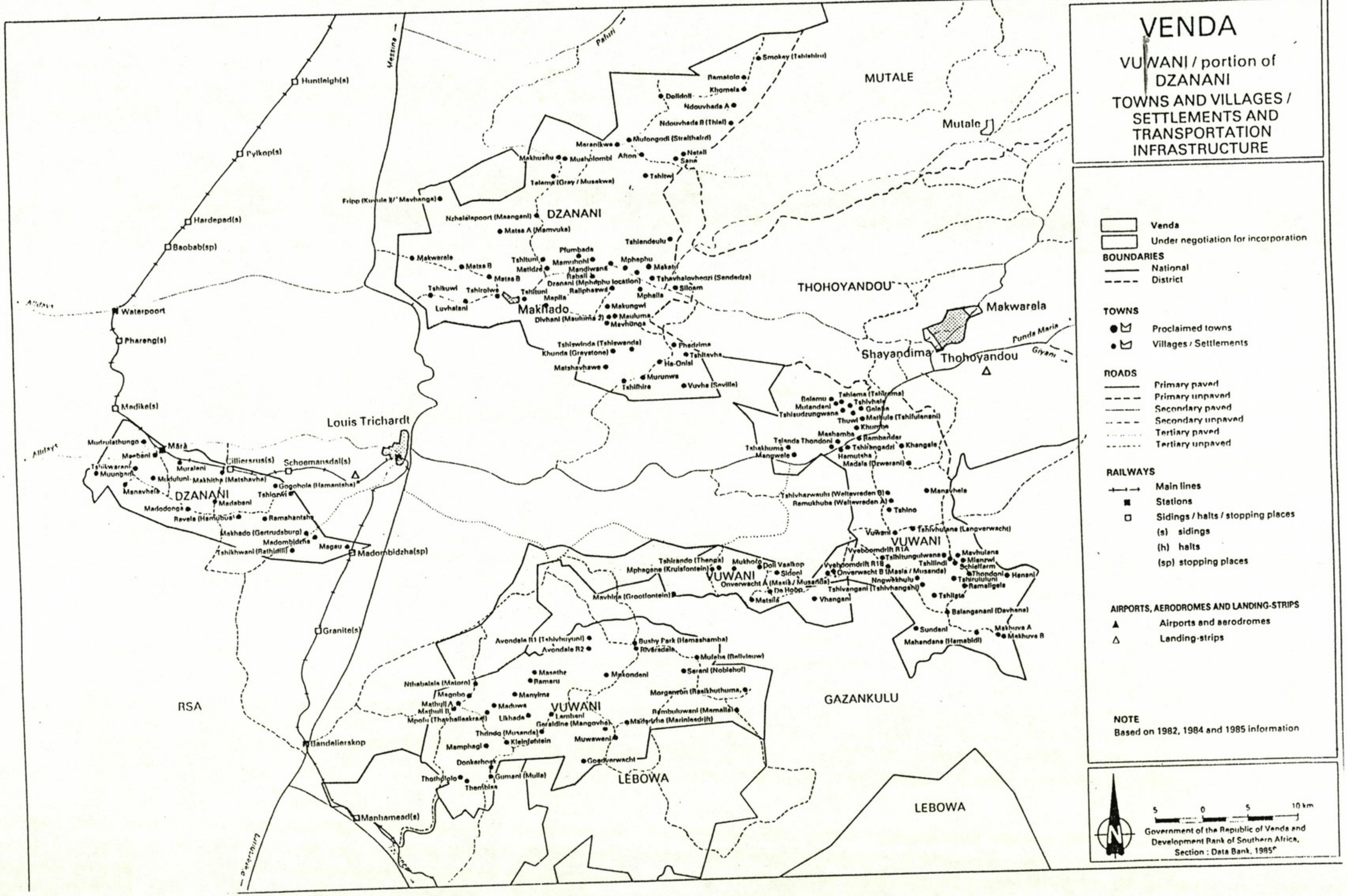
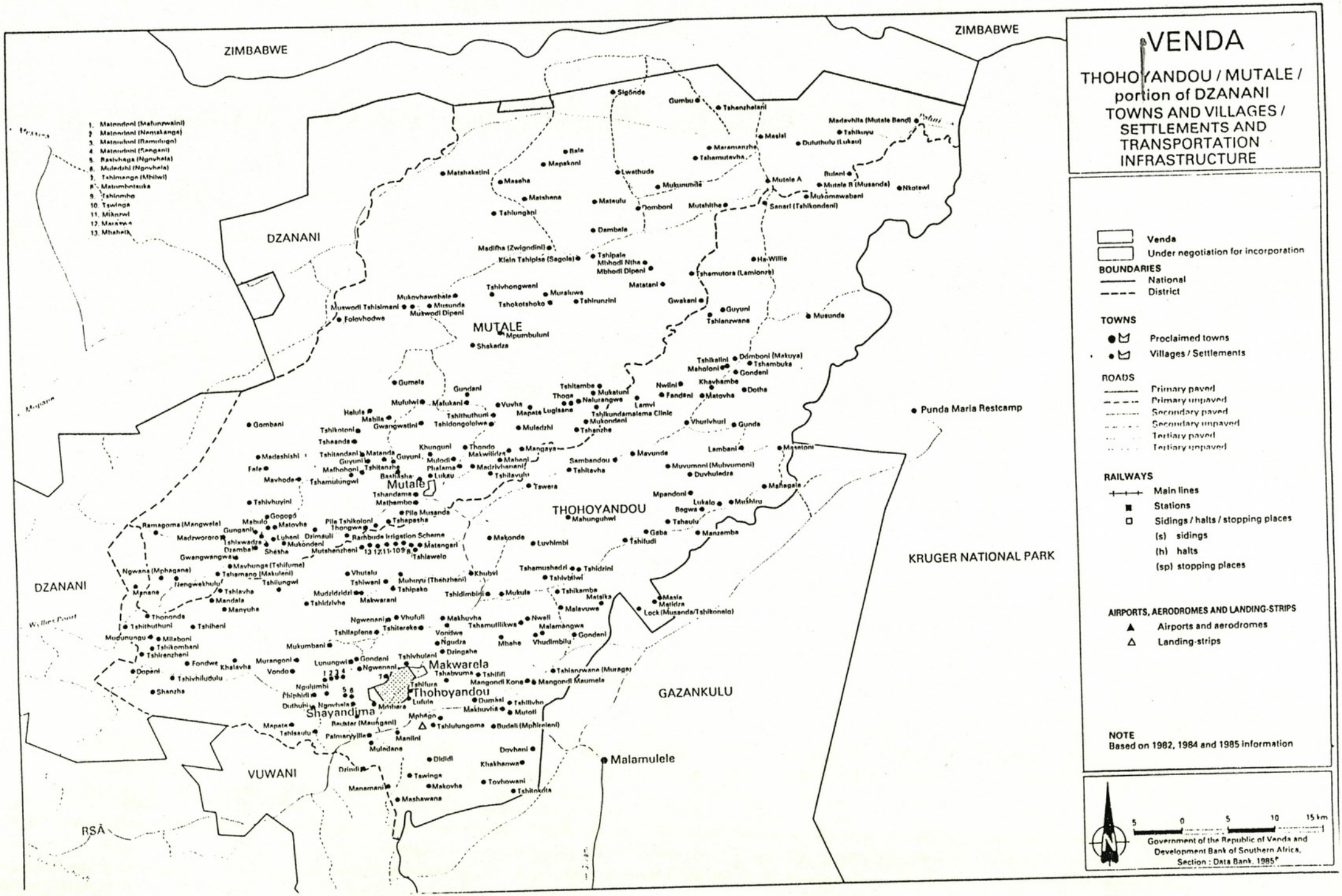

VENDA
VUWANI / portion of DZANANI
TOWNS AND VILLAGES / SETTLEMENTS AND TRANSPORTATION INFRASTRUCTURE
Venda
Under negotiation for incorporation
BOUNDARIES
National
District
TOWNS
Proclaimed towns
Villages / Settlements
ROADS
Primary paved
Primary unpaved
Secondary paved
Secondary unpaved
Tertiary paved
Tertiary unpaved
RAILWAYS
Main lines
Stations
Sidings / halts / stopping places
(s) sidings
(h) halts
(sp) stopping places
AIRPORTS, AERODROMES AND LANDING-STRIPS
Airports and aerodromes
Landing-strips
NOTE
Based on 1982, 1984 and 1985 information
5 0 5 10 km
Government of the Republic of Venda and Development Bank of Southern Africa, Section : Data Bank, 1985
MUTALE
Mutale
DZANANI
THOHOYANDOU
Thohoyandou
Makwarela
Shayandima
Makhado
Louis Trichardt
VUWANI
GAZANKULU
LEBOWA
RSA
Huntleigh(s)
Pylkop(s)
Hardepad(s)
Baobab(sp)
Waterpoort
Phareng(s)
Madike(s)
Cilliersrus(s)
Schoemansdal(s)
Madombidzha(sp)
Granite(s)
Bandelierskop
Manhamead(s)
Messina
Pafuri
Punda Maria
Giyani
Pietersburg
Alldays


VENDA
THOHOYANDOU / MUTALE / portion of DZANANI
TOWNS AND VILLAGES / SETTLEMENTS AND TRANSPORTATION INFRASTRUCTURE
ZIMBABWE
ZIMBABWE
DZANANI
MUTALE
THOHOYANDOU
KRUGER NATIONAL PARK
GAZANKULU
VUWANI
Malamulele
RSA
Punda Maria Restcamp
Mutale
Makwarela
Thohoyandou
Shayandima
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Under negotiation for incorporation
BOUNDARIES
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District
TOWNS
Proclaimed towns
Villages / Settlements
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Primary paved
Primary unpaved
Secondary paved
Secondary unpaved
Tertiary paved
Tertiary unpaved
RAILWAYS
Main lines
Stations
Sidings / halts / stopping places
(s) sidings
(h) halts
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AIRPORTS, AERODROMES AND LANDING-STRIPS
Airports and aerodromes
Landing-strips
NOTE
Based on 1982, 1984 and 1985 information
5 0 5 10 15 km
Government of the Republic of Venda and Development Bank of Southern Africa, Section : Data Bank, 1985

LIST OF APPENDICES

LIST OF APPENDICES
(continued)

APPENDIX A.2

VENDA ELECTRICITY CORPORATION

ESTIMATED SYSTEM INVENTORY 1991

1. **OVERHEAD TRANSMISSION LINES:**

220 Volt single phase	411 km
380 Volt three phase	50 km
11/22 kV single phase	11 km
11/22 kV three phase	566 km
66 kV	14 km
132 kV	95 km

2. **TRANSFORMERS (INSTALLED CAPACITY):**

Distribution - single phase	3 659 kVA*
Distribution - three phase	29 150 kVA*
22/11 kV	33 500 kVA
66/11 kV	5 000 kVA
66/22 kV	20 000 kVA
132/22 kV	70 000 kVA

*installed since April 1987

3. **CIRCUIT BREAKERS:**

11 kV - indoor	32
22 kV - outdoor	20
66 kV - outdoor	3
132 kV - outdoor	5

4. **POLE-MOUNTED RECLOSERS AND SECTIONALISERS:**

11 kV	3
22 kV	21

APPENDIX A.3

VENDA ELECTRICITY CORPORATION

CONSUMER CATEGORIES AND TARIFFS JANUARY 1991

1. SCHEDULE OF STANDARD PRICES

Tariff A : Large Power User

Service Charge	:	R98,36/month
Demand Charge	:	
i) for supply at 220/380 Volts up to and including 11 kV		R23,41/kVA/month
ii) for supply above 11 kV and below 132 kV		R22,69/kVA/month
Energy Charge	:	R 0,0665/kWh
Surcharge	:	- nil -

Definition : Notified maximum demand of 25 kVA or over and three phase supply.

Tariff B : Small Power User

Service Charge	:	
i) single phase supply		R21,96/month
ii) three phase supply		R74,65/month
Energy Charge	:	R 0,196/kWh
Surcharge	:	- nil -

Definition : A maximum demand which at no time exceeds 100 kVA and a supply voltage of 220 volts single phase, or 380 volts three phase.

Tariff C : Domestic Consumer

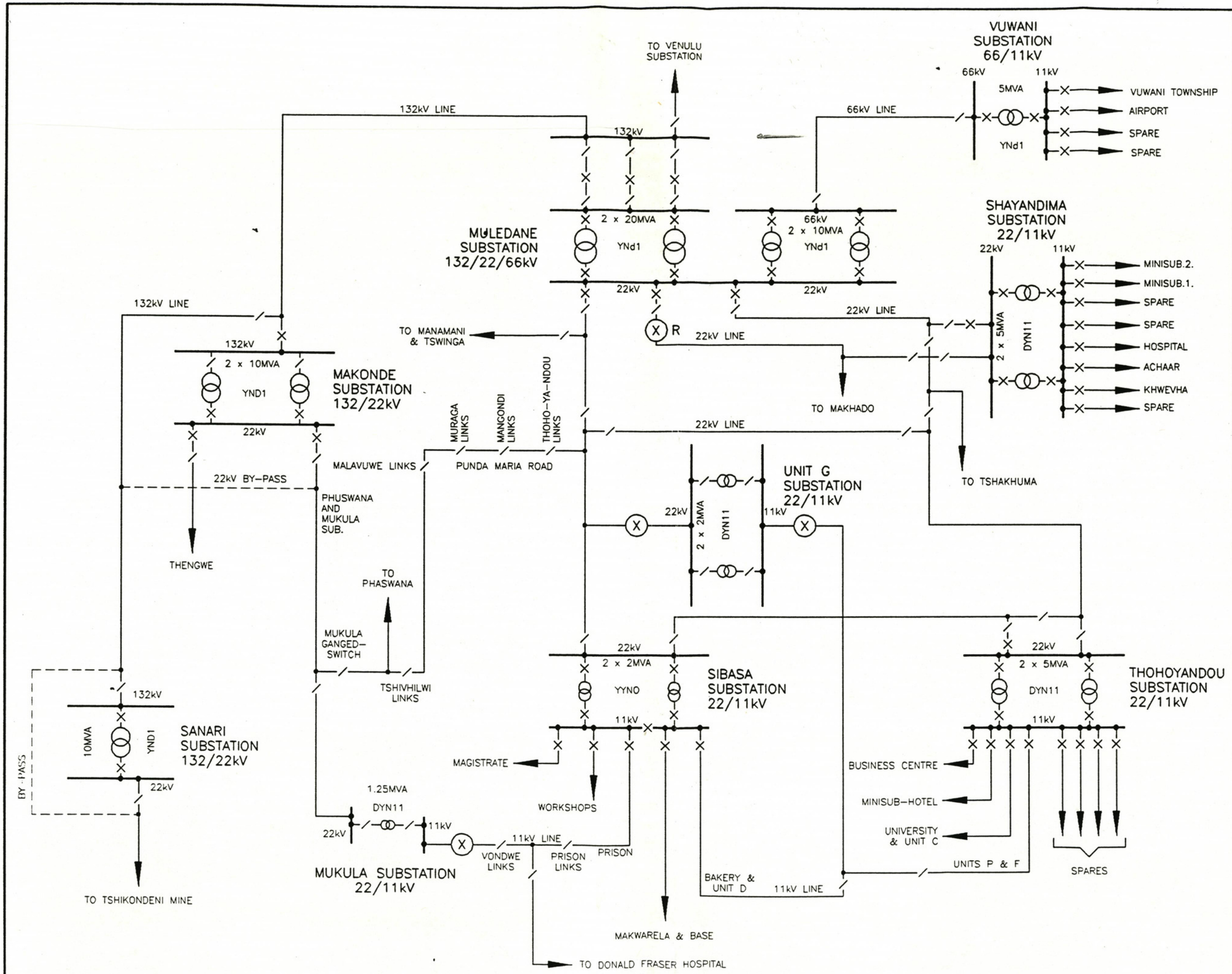
Service Charge	:	
i) to the consumer		R10,98/month
ii) from Government subsidy		R10,98/month
Energy Charge	:	
i) to the consumer		R 0,098/kWh
ii) from Government subsidy		R 0,098/kWh
Surcharge	:	- nil -

Definition : Electricity for domestic purposes for a dwelling unit, group of dwelling units and for a church, hall, old age home or the like premises.

2. STANDARD CHARGES

Connection Fees :	Single Phase	Three Phase
i) Urban	R125	R430
ii) Rural	R150	R570

Deposits :	
i) Tariff B	Approximately R30/kVA of load
ii) Tariff C	R145



DRN DATE	
DETAILS	
REV	
REFERENCE DRAWINGS	
SCALE	1 : 1

TEL : 339 5754 FAX : 339 1373

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2017

DRAWN S.K.	DATE 23.09.9
CHKD	APPD

CLIENT
VENDA ELECTRICITY CORP'N.

PROJECT

PROJECT No. 632.5

TITLE
SINGLE LINE DIAGRAM
MAJOR TRANSMISSION & DISTRIBUTING SYSTEM - 1990

DRG No APPENDIX A.1
37.11/632.16001

CAD REF No. 3711001

REVISION

DRN	DATE				
DETAILS					
REV					

REFERENCE DRAWINGS

SCALE 1 : 600,000

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BRAAMFONTEIN
2017

DRAWN S.K. DATE 26.09.91

CHKD APPD

CLIENT
VENDA ELECTRICITY CORP'N

PROJECT

PROJECT No. 632.5

TITLE
MAP OF VENDA
SHOWING MAJOR
SUBSTATION LOCATIONS

DRG No APPENDIX A.4
SK91–24

CAD REF No. SK91–24

REVISION