

Electricity Supply Commission.

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**ANNUAL REPORT**  
of the  
**COMMISSION**  
for the  
Year ended 31st December, 1925,  
with a  
brief review of its activities  
up to  
30th September, 1926.

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1926.

# Electricity Supply Commission.

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Electricity House,

82, Marshall Street,

Johannesburg,

30th September, 1926.

To the Honourable

The Minister of Mines and Industries,  
Pretoria.

SIR,

In conformity with the provisions of Section 14 of the Electricity Act, 1922, the Commission has the honour to submit its third annual report—for the year ended 31st December, 1925—together with a brief review of its activities up to the date of this report.

During the period under review the work of the Commission has again consisted mainly of preliminary work, including the negotiation and supervision of contracts for the supply and erection of buildings, machinery, plant and overhead transmission lines and the laying of cables, the acquisition of land and servitudes, water and surface rights, etc., in connection with the several works in hand, the negotiation of agreements with consumers and the survey of electricity requirements within the areas of supply granted to the Commission by the Electricity Control Board.

The progress of construction work and negotiations with consumers is referred to in greater detail under the headings of the several undertakings.

Some idea of the extent of the preliminary work in which the Commission has been involved

in connection with the establishment of the undertakings now in hand may be obtained from a brief summary of the principal contracts entered into since the inception of the Commission.

No less than 93 important contracts have been entered into to date for the supply of plant and materials and the execution of various works. These contracts are exclusive of a large number of orders for miscellaneous items not covered by the main contracts.

The agreements and deeds entered into in respect of the purchase of land, leases, servitudes, rights-of-way, private sidings, etc., number 41.

Nineteen agreements have been entered into with consumers in respect of the supply of electricity from the various undertakings in hand, including five special agreements dealing with the construction of the Commission's undertakings and the interlinking thereof with existing power systems. Additional consumers' agreements are in process of negotiation. These agreements are all for large bulk supplies. In addition, schemes are in hand for supplies direct to a large number of domestic consumers.

A number of miscellaneous agreements have also been concluded relative to supplies of coal and water, coal haulage, etc.

Most of the agreements are of a nature peculiar to the power supply business, and many of them are without precedent in South Africa. Some of them have involved arduous and protracted negotiations.

As will be appreciated by those experienced in the starting up of new business enterprises, the difficulties encountered in the initial stages, and the negotiations leading up to the settlement of the numerous and varied principles and points at issue have entailed heavy administrative work upon the Commission and its staff.

The undertakings being established by the Commission are as follows:—

Name of Undertaking.	Initial Installed Capacity.	
	Kilowatts.	Kilovolt Amperes.
Witbank ...	60,000	70,500
Capetown ...	30,000	33,300
Durban ...	36,000	45,000
Sabie ...	1,550	2,200

Commission's Undertakings.

As stated in the Commission's second annual report, although the Colenso undertaking has been constructed by the South African Railways and Harbours Administration, the Commission is, by arrangement with the Administration, undertaking the supply of electricity from that undertaking to consumers along the route of the electrified section of the Natal Main Line, under the authority of a Permit granted to the Commission by the Electricity Control Board on 26th June, 1925. The question of the Commission taking over the Colenso undertaking is now under consideration, and is referred to more fully on page 13 of this report.

### WITBANK UNDERTAKING.

The initial installed capacity of the Witbank Power Station is three main generating sets of 20,000 kilowatts each, giving a total installed capacity of 60,000 kilowatts, and twelve boilers, each of a normal capacity of 68,000 lbs. of steam per hour.

Since the submission of the Commission's second annual report, the following additional contracts have been placed for plant, equipment and work in connection with the Witbank undertaking:—

Contracts.

Contractor.	Plant and Work.
British Insulated and Helsby Cables, Ltd., Prescot ... ..	Cables and cable boxes.
Bullers Limited, London ...	Insulators for overhead transmission line from power station to pump house at dam.

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Contractor.	Plant and Work.
A. Stuart, Germiston ... ..	Construction of stores and oil handling buildings, locomotive shed, offices, garage and ash bunker, also block of single quarters.
Hudswell, Clarke & Co., Ltd., Leeds ... ..	Shunting locomotive.
Hubert Davies & Co., Ltd., Johannesburg ... ..	Power Station lighting installation.
Babcock & Wilcox, Ltd., London ... ..	10-ton overhead workshop crane.
Loudon Bros., Ltd., Glasgow ... ..	Workshop machine tools.
Standard Telephones and Cables, Ltd., London ...	Power Station telephone equipment.

Progress  
of Works.

Construction work on the Witbank undertaking is nearing completion.

The dam on the Great Olifants River and the pump house and auxiliary buildings are completed. The pumping plant has been erected, and the transmission and pipe lines from the power station to the dam and the high level service reservoir are completed.

The cooling ponds and the coal and ash handling plants are completed, and the Power Station buildings are practically completed.

The first 20,000-kilowatt generating set was started up provisionally on 3rd May, 1926, and the second generating set on 15th July, 1926. Eight boilers are in service, and it is expected that the third set and the remaining four boilers will be on load about the end of October, 1926. The station should be completed ready for commercial service early in the new year.

As the first delivery of steelwork from overseas to the site was not made until April, 1925, it will be seen that commendable progress has been made with a work of such magnitude.

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The store, workshop and office buildings are completed, also the following residences for the staff:—

- Resident Engineer's House.
- Assistant Resident Engineer's House.
- Rest House.
- Boarding House and Housekeeper's Quarters.
- Three Blocks of Four-roomed Single Quarters.
- Ten Pairs of Married Quarters.

Reference was made in the Commission's second annual report to the question of accommodation for the operating staff at Witbank. The absence of sufficient improvement in the housing position has necessitated the extension of the original housing programme by the construction of a block of twelve single quarters. This building is nearing completion.

The Commission's largest consumer from the Witbank undertaking will be The Victoria Falls and Transvaal Power Company, Limited. Detailed references have been made in previous reports to the agreement entered into between the Commission and the Victoria Falls Company, under which that Company will take a large block load of power, amounting to approximately 400,000,000 units per annum, from the Witbank Power Station, and under which the Victoria Falls Company is (subject to certain limitations) required to take all the surplus electricity that can be generated at the Witbank Station.

Supplies to  
Consumers.

One large industrial consumer has decided to transfer to Witbank, where, by reason of cheap power being available there on the completion of the Witbank undertaking, the company expects to be able to develop to an extent which could not have been contemplated in its present situation. This consumer's works are now in process of construction at Witbank. Several collieries in the Witbank district have also decided to take supplies of electricity from



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the Witbank undertaking, and negotiations are proceeding with other consumers in the district.

A formal agreement, dated 25th May, 1926, was concluded with the Witbank Municipality under which the Commission will undertake the supply and reticulation of electricity to all consumers, residential and otherwise, within the township, as well as the lighting of the streets.

The Commission's distribution system in the Witbank area will consist of underground cables and overhead lines transmitting electricity at 21,000 volts to sub-stations situated in the township and on the respective consumers' premises. The pressure of the reticulation system in the Witbank Municipal area will be 380/220 volts.

Contracts for  
Distribution  
System.

The following contracts have so far been placed in connection with the Commission's distribution system within its area of supply at Witbank:—

Contractor.	Plant and Work.
British Insulated Cables (S.A.), Ltd., Johannes- burg ... ..	Cables and accessories.
A. Reyrolle & Co., Ltd.; Johannesburg ... ..	Sub-station switchgear.
Bartle & Co., Ltd., Johan- nesburg ... ..	Transformers.
C. Kelley & Partners, Ltd., Johannesburg ... ..	Distribution system in Wit- bank Municipal area.

### CAPETOWN UNDERTAKING.

The Salt River Power Station will at the outset consist of three main generating sets of 10,000 kilowatts each and four boilers, each of a normal capacity of 60,000 lbs. of steam per hour. The undertaking also includes a step-up sub-station at the Power Station site, rotary converter sub-stations at Three Anchor Bay, Milnerton Junction, Claremont, Diep River, Muizenberg and Glencairn; duplicate 12,000-

volt underground cables connecting the step-up sub-station with the Dock Road Power Station belonging to the Capetown Corporation and the sub-stations at Three Anchor Bay and Milnerton Junction; duplicate 33,000-volt underground cables connecting the Muizenberg and Glencairn sub-stations; an underground 33,000-volt cable and an overhead 33,000-volt line connecting the Power Station with the sub-stations at Claremont, Diep River and Muizenberg; and a 33,000-volt distribution system extending to the Cape Explosives Works at Somerset West and to Paarl.

Since the Commission's second annual report Contracts. was submitted, the following additional contracts have been placed for plant and equipment and work in connection with the Capetown undertaking:—

Contractor.	Plant and Work.
Dougall & Munro, Ltd., Durban ... ..	Power Station foundations, buildings. spray ponds and intake works.
F. W. Brackett & Co., Ltd., Colchester ... ..	Circulating water screens.
W. H. Allen, Sons & Co., Ltd., Bedford ... ..	House turbine.
A. B. Reid & Co., Ltd., Capetown ... ..	Sub-station buildings.
C. Kelley & Partners, Ltd., Johannesburg ... ..	Steel sheet piling and other iron and steel work for intake works.
S.A. Scale Co., Ltd., Johannesburg ... ..	Weighbridge.
Leistikow, Allison & Lyon, London ... ..	Shunting locomotive.
Alley & MacLellan, Wor- cester, England ... ..	Penstocks and valves.
British Mannesmann Tube Co., Newport ... ..	Steel pipes.
MacFarlane, Strang & Co., Glasgow ... ..	Cast iron pipes.
Reunert & Lenz, Ltd., Johannesburg ... ..	Vertical spindle pumps, motors and accessories.

Contractor.	Plant and Work.
Guest, Sykes & Chapman, Ltd., Johannesburg ... ..	Valves and penstocks.
East Rand Engineering Co., Ltd., Germiston ...	Cast iron specials.
Orenstein & Koppel, Ltd., Johannesburg ... ..	Iron and steel work for intake works.
A. Reyrolle & Co., Ltd., Hebburn-on-Tyne ... ..	Power Station cables and accessories.

Progress  
of Work.

The progress made with the various sections of the work is outlined below.

The engine room and boiler house foundations are completed. The erection of building steel-work is proceeding, 1,350 tons of steelwork having been shipped and approximately 508 tons erected to date.

Shipment of turbo-alternators, condensing and boiler plant and switchgear has commenced, and some of this plant and equipment is already on the site.

The bulk of the power, telephone and pilot cables have been delivered and cable laying is in progress, approximately 39,000 yards of cable of all classes having been laid to date.

Practically all the material for the coal and ash handling plants has been passed for shipment, over 80 per cent. having been shipped.

Foundations for the coaling appliances have been completed.

The railway siding connecting the Power Station site with Capetown Railway Station has been completed, and portions of the permanent Power Station sidings have been laid and are being used for construction traffic.

The fencing in of the Power Station site is nearing completion.

Excavation, levelling, filling and foundation works for the sub-station buildings at Three

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The industrial unrest which has prevailed for some time past in Great Britain is adversely affecting certain deliveries.

In view of the rapid growth of the demand for electricity at Capetown and in the Cape Peninsula, and to loads having been secured by the Commission in the rural areas, it became apparent that within a few years additional generating plant would be required in the Salt River Power Station to meet the requirements of the Commission's consumers. In the circumstances, it was decided to extend the engine room (which will at the outset house three main 10,000-kilowatt generating sets) to accommodate a fourth generating set and to complete the piling foundations for a fifth set.

Extension of  
Salt River  
Power  
Station.

The boiler house (in which there will be four boilers at the outset) is being extended to accommodate eight boilers.

This will admit of additional generating and boiler plant being installed at short notice as required, and at considerably less expense than if the extension of the buildings had to be undertaken just as the original buildings were completed or about to be completed.

Apart from these extensions, it has also been found necessary for the Capetown Corporation to make arrangements to instal additional generating and boiler plants in its Dock Road Power Station.

As indicated in the Commission's second annual report, negotiations were commenced early in 1925 with a view to the supply of electricity by the Commission to a number of consumers situated in the rural districts outside the Cape Peninsula.

Cape Rural  
Supply  
Scheme.

In the past, electricity requirements in these districts have been met from small and independent power producing plants. The investiga-

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tions undertaken by the Commission soon disclosed the fact that there was a considerable potential load in this area, and that, as most of the larger consumers had reached the stage at which they were contemplating either the erection of new power plants or the extension of their existing power plants, it was imperative that immediate action be taken by the Commission to secure those consumers, in order to make a rural area distribution scheme a feasible proposition. Had new plants been obtained or the extensions been proceeded with as contemplated, the erection of a rural transmission system and the supply of electricity thereto from the Salt River Power Station would have had to be postponed perhaps for many years. It may therefore be regarded as a fortuitous circumstance that the Commission had then reached the stage, in respect of its Capetown undertaking, at which it was in a position to consider contracts for the supply of electricity to consumers in this area.

As a result of the negotiations entered into, the following consumers were secured:—

Cape Explosives Works, Ltd. (Somerset West),  
 Paarl Municipality,  
 Bellville Brick and Tile Works,  
 Hume Pipe Co., Ltd. (Bellville),  
 South African Railways and Harbours' Quarries (Bellville),  
 Capetown Corporation's Quarries (Brackenfel),

and arrangements made to proceed with the erection of a transmission system from the Salt River Power Station extending to Bellville, thence in a north-easterly direction as far as Paarl, and in a south-easterly direction to the Cape Explosives Works at Somerset West.

Contracts have been placed as follows in connection with the transmission line material and equipment for the Cape rural supply scheme:—

Contractor.	Plant and Work.
C. Kelley & Partners, Ltd., Johannesburg ... ..	Transformers.
Wilson & Herd, Ltd., Johannesburg ... ..	Outdoor sub-stations.
Dowson & Dobson, Ltd., Johannesburg ... ..	Transmission lines.
P. E. Redelinghuys, Somers- set West ... ..	Stores and other buildings.

The transmission line has been completed as far as Paarl, and the section of the line from Bellville to the Cape Explosives Works at Somerset West will be completed about the end of the year.

Pending the completion of the Commission's Power Station at Salt River, arrangements have been made with the Capetown Corporation whereby the supply to consumers on the rural supply system will be given from the Corporation's Dock Road Power Station.

The supplies to two of the consumers, namely, the Hume Pipe Co. and the Bellville Brick and Tile Works commenced in May and June last respectively.

Since the costs of transmission and distribution must be borne by the consumers for whom the system is being established, an attractive tariff could only be offered on the basis of a certain aggregate minimum consumption being contracted for.

Arrangements providing for the requisite minimum consumption having been agreed to, the benefits of the generation of electricity on a large scale at the Commission's Salt River Power Station have thus been secured to consumers in the rural areas outside the Cape Peninsula

This additional load will also be of material advantage to the Commission's Capetown undertaking inasmuch as the capital charges on the Salt River Power Station will be divided over a larger aggregate power load and amongst a

greater number of consumers. As primary consumer from the Salt River Power Station, the Railway Administration—which would otherwise have had to bear the whole or the greater portion of the capital charges on the Power Station—will benefit considerably from the contribution to the Power Station costs by the rural area consumers. In addition to the advantage to the consumers secured in the rural areas and to the Railway Administration, the rural distribution system will make a supply of electricity available over a wider area, and thus tend to the more rapid development of the undertaking. Further consumers are anticipated, and further developments in the rural distribution system are likely in the not far distant future. Every increase in load will not only help the rural supply system itself, but will, in addition, be advantageous to all other consumers from the Capetown undertaking.

In a new area consumers are usually scattered and at some distance from the source of supply, and in the initial stages it is not always possible to secure consumers at a price which, in addition to covering the cost of distribution and any additional costs incurred in order to give the supply, will at the same time include the consumers' strictly proportionate share of the fixed charges on the Power Station. Development on a strictly proportional basis would not only be slow, but in many cases would be impracticable, to the disadvantage not only of the initial consumers, who would lose the benefits which new consumers would bring, but also to those whose business had to be refused because their load would not stand a strictly proportionate share of the costs. In the case of a private undertaking the reticulation system usually has to be established or extended in advance of development, the undertaking, if need be, or the new section of it, being carried on at a loss in the initial stages.

The Commission has been fortunate in this respect, as at Capetown, Witbank and Durban

it has been successful in securing from the outset one large single consumer for whose requirements the undertaking has been primarily designed. In the Cape rural supply area the Commission has again been fortunate in securing sufficient consumers at the outset to form the nucleus of a system which not only affords great scope for the development of electricity supply in the rural districts at comparatively cheap prices, but will also pay its way, including its proper share of the fixed charges on the Power Station, from the outset.

### COLENZO UNDERTAKING.

Mention was made in the Commission's first and second annual reports that arrangements had been made with the Railway Administration whereby the Colenso undertaking would be taken over by the Commission as soon as the Power Station, transmission lines and traction substations were completed and placed in commercial service.

A separate report, dated 3rd August, 1926, upon the Commission's proposals in connection with the acquisition of the Colenso undertaking was submitted to you for approval, in terms of Section 5 of the Electricity Act, 1922, the date then provisionally fixed for the transfer being 25th September, 1926. The Commission's proposals as set out in that report were approved by you on 11th September, 1926.

It was subsequently decided by the Railway Administration that the transfer of the Colenso undertaking should not take place until the formal agreement embodying the terms and conditions of transfer had been entered into between the Administration and the Commission. As this agreement could not be completed in time for the transfer to take place on 25th September, the date of transfer had to be postponed. The agreement providing for the transfer is now being negotiated with the Railway Administration.

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Supply of  
electricity  
to Local  
Authorities  
and other  
consumers  
from Colenso  
Under-  
taking.

The Commission's proposals in regard to the supply of electricity to local authorities, industrial and other consumers along the route of the electrified section of the Natal Main Line formed the subject of a separate report to you, dated 15th June, 1925, and were also referred to in the Commission's second annual report.

Agreements for the supply of electricity in bulk have since been concluded with the Municipalities of Pietermaritzburg, Ladysmith and Estcourt and with the Glencoe Local Board. The supply to the Municipalities of Ladysmith and Estcourt was commenced in March, 1926, and the supply to the Glencoe Local Board in August, 1926. The agreement with the Pietermaritzburg Municipality was concluded in May, 1926, but, as the Municipality has to make changes in its distribution system and the Commission has to instal certain sub-station equipment before this supply can be given, it will probably be approximately nine months hence before the work is sufficiently advanced to enable a full supply to be taken by the Municipality.

At the outset the supplies to the local authorities mentioned will amount to approximately 7,500,000 units per annum, but it is estimated by the Pietermaritzburg Municipality that its requirements alone within the next five years will be of the order of 10,000,000 units per annum.

Terms and conditions of supply have been quoted to other consumers along the line between Glencoe Junction and Pietermaritzburg, and negotiations with several of these consumers are proceeding.

## DURBAN UNDERTAKING

The Durban Power Station will at the outset consist of four main generating sets, two of 12,000 kilowatts capacity each and two of 6,000 kilowatts capacity each, together with six boilers of a nominal capacity of 60,000 lbs. of steam each per hour.

On 1st October, 1925, a separate report upon the establishment of an electricity undertaking at Durban was submitted to you in terms of Section 5 of the Electricity Act, 1922, and was approved by you on 8th December, 1925. In that report and in the Commission's second annual report reference was made to the terms and conditions of the agreement entered into on 21st April, 1925, between the Commission and the Corporation of the Borough of Durban for the construction by the Commission of a new Power Station at Congella, Durban, and the supply by the Commission of electricity to the Durban Corporation.

The Power Station will be built on the Congella Lands on a site approximately 20 acres in extent, situate between the new Graving Dock and Umbilo Railway Station. The land belongs to the Railway Administration, and transfer thereof to the Commission will be given as soon as the boundaries have been definitely fixed and diagrams completed.

Main  
Features of  
Under-  
taking.

Sea water from Durban Bay will be used for circulating purposes, the circulating water intake being situated in the new Graving Dock channel adjoining the entrance to the Graving Dock.

A distinctive feature of the Congella Power Station will be the "Lopulco" system of pulverised coal firing, under which the coal is reduced to powder and blown into the boilers, where it burns in suspension like gas.

The use of powdered coal for firing boilers presents advantages and economies in operation hitherto unattained by chain-grate stokers. This method of firing has been in commercial use for some years in America with marked success, and is being rapidly adopted in Europe.

The advantages of the pulverised coal system include its efficiency, its flexibility and ease of control, its cleanliness and its greater overload capacity.

The primary object of the Durban undertaking is to supply electricity to the Durban Corporation and to the Railway Administration for general and industrial requirements. As the Commission's Power Station at Congella is designed for an ultimate capacity of 72,000 kilowatts, the plant capacity will be readily capable of extension to meet increases in the demand for electricity in the Durban area, and to provide power for railway traction purposes as and when the Government decides to proceed with the electrification of the Durban-Maritzburg Section of the Natal Main Line.

## Contracts.

In March, 1926, the following contracts were placed for plant and equipment for the Durban undertaking, viz. :—

Contractor.	Plant and Equipment.
International Combustion, Ltd., Johannesburg ...	Boiler and pulveriser house equipment and steel frame buildings.
C. A. Parsons & Co., Ltd., Johannesburg ... ..	Turbo alternators and con- densing plant.
A. Reyrolle & Co., Ltd., Johannesburg ... ..	Power Station switchgear.
Siemens (S.A.), Ltd., Johannesburg ... ..	Transformers.

In July, 1926, the contract for the Power Station foundations was placed with Messrs. Pauling & Co., Ltd., Johannesburg. A contract has since been placed with Messrs. J. & R. Niven. Ltd., Johannesburg, for the coaling appliances.

Railway sidings have been laid to the site. The foundation work is in progress, and the plant and equipment is in process of manufacture in the contractors' works.

Extension of  
Congella  
Power  
Station.

As indicated in the Commission's report dated 1st October, 1925, upon the establishment of an electricity undertaking at Durban, negotiations have been proceeding between the Commission and the Durban Corporation with a view to deter-



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## Extension of Congella Power Station.

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mining the best and most economical means of providing for the increased load which the Corporation will have to meet before the new Power Station can be completed, and what additional plant, if any, should be installed in the Congella Power Station over and above the two 12,000-kilowatt sets provided for under the existing agreement between the Commission and the Durban Corporation.

Although the agreement with the Durban Corporation was only entered into as recently as April, 1925, the increase in the demand for power in the interval has made it necessary for the Corporation to reconsider its whole position.

The revised arrangements since agreed upon with the Durban Corporation are as follows:—

The new Power Station at Congella is to be built to accommodate five 12,000-kilowatt sets and eight boilers, the initial installation to consist of two 12,000-kilowatt sets and four boilers. As soon as convenient after the two 12,000-kilowatt sets are placed in commercial operation, the Commission will take over from the Corporation two 6,000-kilowatt sets and two boilers belonging to the Corporation and instal them as part of the new Power Station, the two 6,000-kilowatt sets to be housed in a separate building from the 12,000-kilowatt sets. The initial installed capacity of the new Power Station will then be 36,000 kilowatts with six boilers, space being available for the installation of three additional 12,000-kilowatt sets and two additional boilers.

The present rate of increase in the demand for electricity in the Durban area indicates that an additional 12,000-kilowatt set will be required within a comparatively short time after the completion of the Congella Power Station, and an appreciable saving will be effected by making provision now whereby additional plant can be installed at short notice as required.

One of the two 6,000-kilowatt sets to be taken over from the Durban Corporation was installed by the Corporation in its Alice Street Power Station in 1924, at the same time as one of the two boilers. The second 6,000-kilowatt set and the second boiler, which are duplicates of those installed in 1924, are on order by the Corporation, and will shortly be installed in Alice Street Station in order to take care of the rapidly increasing demand upon the Corporation's station while the new station at Congella is in course of construction.

The Corporation, as from 1st January, 1929, or the date upon which the two 6,000-kilowatt sets and two boilers belonging to the Corporation are installed in Congella Station, will take from the Commission a bulk supply of not less than 60,000,000 units per annum and a maximum demand of 14,000 kilowatts, in place of the 48,000,000 units and 9,000 kilowatts provided for in the April, 1925, Agreement.

The new guarantee of 60,000,000 units per annum and 14,000 kilowatts excludes any existing or new supplies which the Railway Administration may take direct from the Corporation, which supplies will be added to the Corporation's guarantee.

The estimated total demand of the Railway Administration will be of the order of 5,000 kilowatts by the time Congella Station is completed.

The revised arrangements agreed upon will form the subject of a Supplementary Agreement between the Commission and the Durban Corporation. This Supplementary Agreement is now under consideration by the Durban Corporation.

The two boilers to be taken over from the Corporation are fitted with chain-grate stokers, but these boilers will be converted to burn pulverised fuel before being installed at the Congella Station.

Electricity will be generated at the Congella Power Station as three-phase alternating current at a pressure of 6,600 volts and a frequency of 50 cycles. This is the system of generation principally in use in the Corporation's existing station, and, apart from other advantages of this system as applied to the conditions at Durban, it is desirable that the inter-connection of the Congella and Alice Street Stations should be possible of accomplishment with the minimum complication and expense.

### SABIE UNDERTAKING.

The Commission's proposals in regard to the establishment of an electricity undertaking at Sabie, to which reference was made in the Commission's first and second annual reports, formed the subject of a separate report, dated 23rd July, 1926, submitted to you in terms of Section 5 of the Electricity Act, 1922.

As mentioned in the latter report, the Sabie undertaking will consist of two hydro-electric Power Stations, one situated on the Sabie River and the other on the Malieveld Spruit, together with the necessary transmission and distribution lines.

The installed capacity of the Sabie River Power Station will be 1,350 kilowatts, made up of three generating sets of 450 kilowatts each, while at the Malieveld Station one 350-kilowatt generator set has been installed.

The Malieveld scheme, which was undertaken as a small stop-gap scheme, was started up on 1st December, 1925.

The shortage of power in the Sabie district became so acute in 1925 as to become a serious menace to the continued operation of some of the mines, and, in order to safeguard the mines against risk of flooding, it became imperative to provide temporary relief pending the completion of the main scheme on the Sabie River.

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The Malieveld Power Station will continue in operation until the main station on the Sabie River is completed, after which it will, so far as need be, be used as a stand-by and supplementary plant.

Contracts,  
Sabie River  
Scheme.

The following contracts for plant, equipment and work have been placed in connection with the Sabie River scheme, viz. :—

Contractor.	Plant and Work.
Reunert & Lenz, Ltd., Johannesburg ... ..	Waterwheels and generators.
Dowson & Dobson, Ltd., Johannesburg ... ..	Transmission and pipe lines.
Siemens (S.A.), Ltd., Johannesburg ... ..	Transformers and switchgear.
A. Stuart, Germiston ... ..	Construction of weir and intake works, tunnels, canals and headbox, Power Station foundations and sub-station building.
R. de Boer, Sabie ... ..	Operators' Quarters.
J. & R. Niven, Ltd., Johannesburg ... ..	Steel superstructure for power house.

Progress  
of Works,  
Sabie River  
Scheme.

The transmission line has been completed, and work on the Power Station, water-race and pipe-line is well advanced.

It is anticipated that the Sabie River Station will be ready for commercial service early next year.

Main  
Features of  
Sabie River  
Scheme.

The Sabie River Power Station is situated on the right bank of the river on the farm Bergvliet, about eight miles downstream from Sabie Township.

The turbine installation at the Sabie River Power Station will consist of three wheels, each taking 35 cusecs normally and 45 cusecs on overload. Each wheel will be direct-connected to a generator of 600 kilovolt ampere rating (equivalent to 450 kilowatts at 75 per cent. power factor). Two of the units will be in service normally, the third being a stand-by.

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A weir about 10 feet high has been erected on the Sabie River at a point approximately 9,000 feet upstream from the Power Station. The water for working the turbines will be conveyed by means of a water-race about 6,500 feet long from the intake at the weir to the forebay above the Power Station. The water-race crosses an aqueduct about 147 feet long, and passes through three tunnels 7 feet wide by 6 feet high and approximately 2,150, 1,516 and 1,000 feet in length. The forebay is connected to the power house by a 42-inch pipe about 540 feet long. The net operating head is approximately 200 feet.

The Power Station is designed to take about 70 cusecs in normal working, but will be able to work at 25 per cent. overload. When operating at 25 per cent. overload, 90 cusecs will be required, and provision is being made to handle this volume of water.

Electricity will be generated at the Sabie River Power Station as three-phase alternating current at a pressure of 3,300 volts and a frequency of 50 cycles.

Power will be stepped up from the voltage of generation to 22,000 volts, at which pressure it will be transmitted by overhead transmission line to a sub-station situated about one mile from Sabie Township, where it will be stepped down to 3,300 volts for distribution to consumers.

The Malieveld Power Station is situated on the left bank of the Malieveld Spruit, on the farm Rietfontein, about six miles from Sabie Township.

Main  
Features of  
Malieveld  
Scheme.

The turbine installation at the Malieveld Station consists of one wheel taking 8 cusecs, the rating of the generating set being 350 kilowatts.

A diversion weir about 4 feet high has been erected on the Malieveld Spruit about 7,000 feet upstream from the site of the Power Station. From the weir site the water is led into a water-

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race about 9,000 feet long, by means of which it is conveyed to a head box above the Power Station. The head box is connected to the power house by a pressure pipe 900 feet long. The net operating head is approximately 600 feet.

Electricity is generated at the Malieveld Station as three-phase alternating current at a pressure of 500 volts and a frequency of 50 cycles.

Power is stepped up from the voltage of generation to 6,600 volts, at which pressure it is transmitted by overhead line to a sub-station at Sabie. From Rietfontein to Sabie the Malieveld transmission line is carried on the poles of the Rietfontein transmission line (belonging to Glynn's Lydenburg, Limited), which connects the small hydro-electric power station operated by that Company at Rietfontein with the Glynn's Lydenburg Mine at Sabie.

Pending the completion of the Commission's sub-station at Sabie, electricity from the Malieveld scheme is taken on to the Glynn's Lydenburg sub-station, from which point it is distributed to consumers.

General.

As part of the Sabie undertaking, the Commission has constructed a 3,300-volt distribution line about three miles long, over which power is conveyed from the Sabie sub-station to consumers in the Golden Valley area.

Prior to the Malieveld Power Station being started up, agreements were entered into with consumers providing for the disposal of the whole of the output of the station. Agreements are now being negotiated for supplies from the Sabie River scheme. The output capacity of the Sabie River Power Station at the district load factor of 60 per cent. is approximately  $4\frac{3}{4}$  million units per annum.

## MUNICIPAL SCHEMES.

Up to the date of this report, sixty-six Municipal schemes have been reported upon, and supplementary reports upon tenders have been submitted in respect of thirty-two schemes.

During the year under review the following schemes were reported upon:—

## CAPE.

Bedford.	King William's Town.*
Cambridge.	Moorreesburg.
Dordrecht.	Mossel Bay.
Fort Beaufort.	Queenstown.
George.*	Somerset West.
Hopetown.	Walmer.
Indwe.	Wellington.

## TRANSVAAL.

Belfast.	Johannesburg.
Heidelberg.	

## ORANGE FREE STATE.

Rouxville.	Vrede.
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## NATAL.

Durban.	Glencoe.
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\* Reports on Tenders only.

In dealing with Municipal schemes, in terms of Section 38 of the Electricity Act, 1922, the Commission is involved in a considerable amount of investigational work and correspondence apart from its formal reports to the Administrators of the several Provinces. The schemes submitted to the Commission vary considerably both in size and character. They include new schemes and extensions of existing undertakings as well as proposals involving the purchase of electricity in bulk. The Commission's reports embrace technical, general and financial considerations.

A feature of the development of electricity production and supply in South Africa is the large number of Municipal schemes inaugurated in

recent years in towns not previously provided with the amenities of electricity. No less than thirty-eight new Municipal schemes have been dealt with under Section 38 of the Electricity Act, 1922, in a period of between three and four years. This number includes several schemes for the purchase of electricity in bulk, but the majority consist of more isolated towns which have established undertakings of their own.

The extent to which the public in general is becoming alive to the advantages of the availability and uses of electricity is manifest.

### GENERAL.

In terms of Section 14 of the Electricity Act, 1922, the Commission submits for the year 1925

As Annexure " A " :

The Report of the Auditors.

As Annexure " B " :

Balance Sheet, duly audited.

As Annexure " C " :

Schedule of Expenditure on Capital Account.

As Annexure " D " :

Statement showing the price or rent of any land or rights, or interest in or over land or any other property acquired or hired by the Commission.

As none of the undertakings in hand had been completed at 31st December, 1925, the statements called for under paragraphs (c), (d), (f) and (g) of Section 14 are not yet available.

The Victoria Falls and Transvaal Power Company, Limited, is constructing the Witbank Power Station for and on behalf of and to the approval of the Commission, and, in terms of the agreement between the Commission and the Company, to which reference has been made in previous reports, the Commission is refunding to the Victoria Falls Company the amount

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expended by the Company on construction work as the Company's accounts and vouchers are checked. The amount of £563,159 15s. 6d. included in the Balance Sheet as at 31st December, 1925, which forms Annexure " B " to this report, under the heading of " Sundry Creditors " therefore includes an amount of £518,290 11s. 1d. expended by the Victoria Falls Company which had not as at 31st December, 1925, been refunded by the Commission. The balance of £44,869 4s. 5d. includes amounts due to contractors for work executed up to 31st December, 1925, retention moneys under various contracts, Consulting Engineers' fees and trade accounts due or accruing at that date.

By Order of the Commission,

I have the honour to be,

Sir,

Your obedient servant,



SECRETARY.



THE REPORT OF THE AUDITORS.

Johannesburg,  
21st April, 1926

The Chairman and Members,  
Electricity Supply Commission,  
Johannesburg.

GENTLEMEN,

We have audited the Books and Accounts of the Commission for the calendar year 1925, and now beg to submit our report thereon.

In terms of Clause 13 (4) of the Electricity Act, 1922, we certify as follows:—

(a) We have found the Accounts of the Commission to be in order.

(b) The figures in the Balance Sheet must be taken in conjunction with the note appearing thereon.

Included in the expenditure on capital account is an amount of £46,495 11s. 5d., representing administrative and other general expenditure relating to all the undertakings which has not yet been apportioned between them. It has been deemed advisable to defer the allocation of such expenditure until the construction works are further advanced.

Subject thereto, the Balance Sheet and Statements of Capital Expenditure bearing our signatures, dated 21st April, 1926, present a true and correct view of the financial position of the Commission.

(c) In view of the fact that at 31st December last none of the permanent works of the Commission were in a position to produce power and earn revenue, no provision has been made for redemption or repayment of loans.

(d) The value of the assets of the Commission is correctly stated.

(e) The reserve required under Clause 9 of the Electricity Act of 1922 has not yet been established, as no permanent plant had been brought into operation by the Commission at 31st December, 1925.

(f) All our requirements and recommendations as Auditors have been carried out.

Yours faithfully,

B. HALSEY.

ALEX. AIKEN & CARTER.



# Electricity Supply Commission.

## SCHEDULE OF EXPENDITURE ON CAPITAL ACCOUNT to 31st DECEMBER, 1925.

Expenditure in connection with Electric Power Undertakings.	Amount Expended to 31st Dec., 1924.	Amount Expended during 1925.	Total to 31st Dec., 1925.
<b>CAPETOWN UNDERTAKING:</b>			
Land ... ..	—	£16,030 8 10	£16,030 8 10
Buildings and Other Structures ... ..	—	45,121 5 0	45,121 5 0
Machinery and Plant ... ..	—	1,015 8 3	1,015 8 3
Consulting Engineer's Fees, Supervision and Miscellaneous Expenses during Construction ... ..	£5,940 1 4	24,423 7 5	30,363 8 9
Administration and Management ... ..	2,179 11 0	2,850 8 9	5,029 19 9
Interest during Construction ... ..	569 11 10	1,785 1 11	2,354 13 9
	<b>£8,689 4 2</b>	<b>£91,226 0 2</b>	<b>£99,915 4 4</b>
<b>COLENSO UNDERTAKING:</b>			
Preliminary Expenditure ... ..	£567 4 1	£867 16 3	£1,435 0 4
Administration Expenses ... ..	81 7 8	314 19 2	396 6 10
Interest during Construction ... ..	5 9 3	36 2 1	41 11 4
	<b>£654 1 0</b>	<b>£1,218 17 6</b>	<b>£1,872 18 6</b>
<b>DURBAN UNDERTAKING:</b>			
Consulting Engineer's Fees and Preliminary Expenditure ... ..	£2,026 7 3	£5,141 4 7	£7,167 11 10
Administration and Management ... ..	334 13 2	1,036 15 3	1,371 8 5
Interest during Construction ... ..	73 10 11	204 4 5	277 15 4
	<b>£2,434 11 4</b>	<b>£6,382 4 3</b>	<b>£8,816 15 7</b>
<b>SABIE UNDERTAKING:</b>			
Land ... ..	—	£510 0 0	£510 0 0
Buildings and Other Structures ... ..	£54 0 6	2,886 1 8	2,940 2 2
Machinery and Plant ... ..	0 8 10	20,280 2 9	20,280 11 7
Supervision, Preliminary and Miscellaneous Expenses during Construction ... ..	2,300 12 7	1,074 1 0	3,374 13 7
Administration Expenses ... ..	1,088 3 10	1,637 19 3	2,726 3 1
Interest during Construction ... ..	10 6 7	303 3 8	313 10 3
	<b>£3,453 12 4</b>	<b>£26,691 8 4</b>	<b>£30,145 0 8</b>
<b>WITBANK UNDERTAKING:</b>			
Value of Work Executed by The Victoria Falls and Transvaal Power Co., Ltd. ... ..	—	£735,846 2 1	£735,846 2 1
Preliminary and Miscellaneous Expenses during Construction ... ..	£10,473 4 1	938 4 4	11,411 8 5
Administration Expenses ... ..	99 4 1	167 7 7	266 11 8
Interest during Construction ... ..	521 15 2	4,101 8 1	4,623 3 3
	<b>£11,094 3 4</b>	<b>£741,053 2 1</b>	<b>£752,147 5 5</b>
<b>EXPENDITURE FOR ALLOCATION:</b>			
Administration Expenses ... ..	£21,802 16 4	£14,960 9 9	36,763 6 1
Auditors' Fees and Expenses ... ..	122 8 9	263 8 2	385 16 11
Consulting Engineers' Fees and Expenses: General ... ..	2,388 14 6	796 18 9	3,185 13 3
Furniture and Office Equipment (Head Office) ... ..	2,565 2 8	445 18 0	3,011 0 8
Legal Expenses: General ... ..	97 15 7	9 19 6	109 10 0
Insurance Premiums ... ..	8 10 2	16 13 1	25 3 3
Interest during Construction ... ..	1,101 17 6	1,913 3 9	3,015 1 3
	<b>£28,089 0 5</b>	<b>£18,406 11 0</b>	<b>£46,495 11 5</b>
<b>SUMMARY:</b>			
CAPETOWN UNDERTAKING ... ..	<b>£8,689 4 2</b>	<b>£91,226 0 2</b>	<b>£99,915 4 4</b>
SABIE UNDERTAKING ... ..	<b>2,434 11 4</b>	<b>6,382 4 3</b>	<b>8,816 15 7</b>
WITBANK UNDERTAKING ... ..	<b>3,453 12 4</b>	<b>26,691 8 4</b>	<b>30,145 0 8</b>
EXPENDITURE FOR ALLOCATION ... ..	<b>11,094 3 4</b>	<b>741,053 2 1</b>	<b>752,147 5 5</b>
	<b>28,089 0 5</b>	<b>18,406 11 0</b>	<b>46,495 11 5</b>
	<b>£54,414 12 7</b>	<b>£884,978 3 4</b>	<b>£939,392 15 11</b>

Johannesburg,  
17th April, 1926.

A. E. HARTE, Accountant.

Referred to in our Report dated 21st April, 1926.

ALEX. AIKEN & CARTER, } Auditors.  
B. HALSEY,

# Electricity Supply Commission.

STATEMENT SHOWING THE PRICE OR RENT OF ANY LAND OR RIGHTS OR INTERESTS IN OR OVER LAND  
OR ANY OTHER PROPERTY ACQUIRED OR HIRED BY THE COMMISSION AS AT 31st DECEMBER, 1925.

Area. Morgen.	Sq. Roods.	Farm.	District.	Title.	Purchase Price.	Acquired From.	Purposes For Which Required.
<b><u>CAPETOWN UNDERTAKING.</u></b>							
9	210		Lot P.12, Paarden Island, Cape Province	Freehold	£15,567 3 2	Capetown City Council	Generating Station Site.
<b><u>SABIE UNDERTAKING.</u></b>							
		Bergvliet No. 397	Pilgrims Rest, Transvaal	Water Right	Nil	Water Court, District No. 22, Transvaal	Hydro - Electric Generating Station.
		Bergvliet No. 397	Pilgrims Rest, Transvaal	Servitudes of Abutment, Aqueduct, Storage, Rights-of-Way, etc.	500 0 0	S. H. Coetzee	Dam, Water Race, Pipeline, Generating Station and Ancil- lary Works.
<b><u>WITBANK UNDERTAKING.</u></b>							
67	26	Witbank No. 141, Portion R	Middelburg, Transvaal	Freehold, excluding All Rights to Coal	255 10 0	Witbank Colliery, Ltd.	Generating Station Site.
40	342	Joubertsrust No. 554, Portion J	Middelburg, Transvaal	Freehold, excluding All Rights to Coal			
11	248	Doornpoort No. 196, Portion S.2	Middelburg, Transvaal	Servitude in Perpetuity	2,750 0 0	Transvaal and Delagoa Bay Investment Co., Ltd.	Dam and Works.
259	0	Doornpoort No. 196, Portion S.1	Middelburg, Transvaal	Servitude of Storage in Perpetuity			Submerged Ground.
0	42	Doornpoort No. 196, Portion S.3	Middelburg, Transvaal	Servitude in Perpetuity			Gauging Weir.
7	505	Doornpoort No. 196	Middelburg, Transvaal	Right-of-Way	150 0 0	J. P. Reyneke	Access.
		Zeekoewater No. 520, Portion S.1 of Portion A	Middelburg, Transvaal	Servitude of Storage in Perpetuity			Submerged Ground.
		Zeekoewater No. 520	Middelburg, Transvaal	Right-of-Way in Perpetuity	50 0 0	J. P. Reyneke	Access for Transvaal and Delagoa Bay Investment Co., Ltd.
		Zeekoewater No. 520, Portion A	Middelburg, Transvaal	Servitude of Right-of-Way in Perpetuity			Roadway giving Access to Dam, including Joint Use of Portion of Roadway with Transvaal and Delagoa Bay Investment Co., Ltd.
		Zeekoewater No. 520, Portion A	Middelburg, Transvaal	Servitude of Right-of-Way in Perpetuity	250 0 0	J. P. Reyneke	Power Conductors, Water Pipe- line and Access.
		Zeekoewater No. 520, Portion B	Middelburg, Transvaal	Servitude of Right-of-Way in Perpetuity	600 0 0	P. J. D. Steenkamp	Power Conductors, Water Pipe- line and Access.