第7章　事　業　評　価

7－1　国家開発計画上の効果

ＧＥＣはガイアナの国策にそって、既設火力発電設備の整備によって電力の供給力を増大する計画と、全国の周波数を統一する計画を現在推進中である。従って本案件の実施はＧＥＣの上記計画推進の一助となり、また国家開発計画の促進に寄与する所大である。

7－2　社会的便益および効果

本案件であるディーゼル発電機整備計画が実現すれば、西デメララ地域は５－１－３で述べた恒常的停電がもたらす諸障害、すなわち、教育、医療面における支障、飲料水供給、治安などに対する悪影響から解放され、同地域の住民が現在直面している社会的混乱、不便、焦燥が解消され、また、現在農林省が推進中の排水ポンプの安全な稼動も可能となり、農園、仕事場および家庭を浸水の被害から守ることができよう。ベルサイユ発電所の信頼度の向上によって、病院で停電のため尊い人命が失われたりすることもなくなり、また病院の医療向上、施設の拡充も可能となる。

第8章　結論および提言

第 8 章　結論および提言

8－1　結　　論

電力の安定供給並びに経済運用を行うには、供給力の増大と周波数の統一は必須条件である。従って本案件は上記条件を同時に行うものであり、又、計画内容についても需要面、技術面から検討した結果、最適な計画内容であることが確認出来る。

又、本計画の実施により、社会的混乱、不便及び焦燥が西デメララ地域から一掃されるという効果は多大なものである。

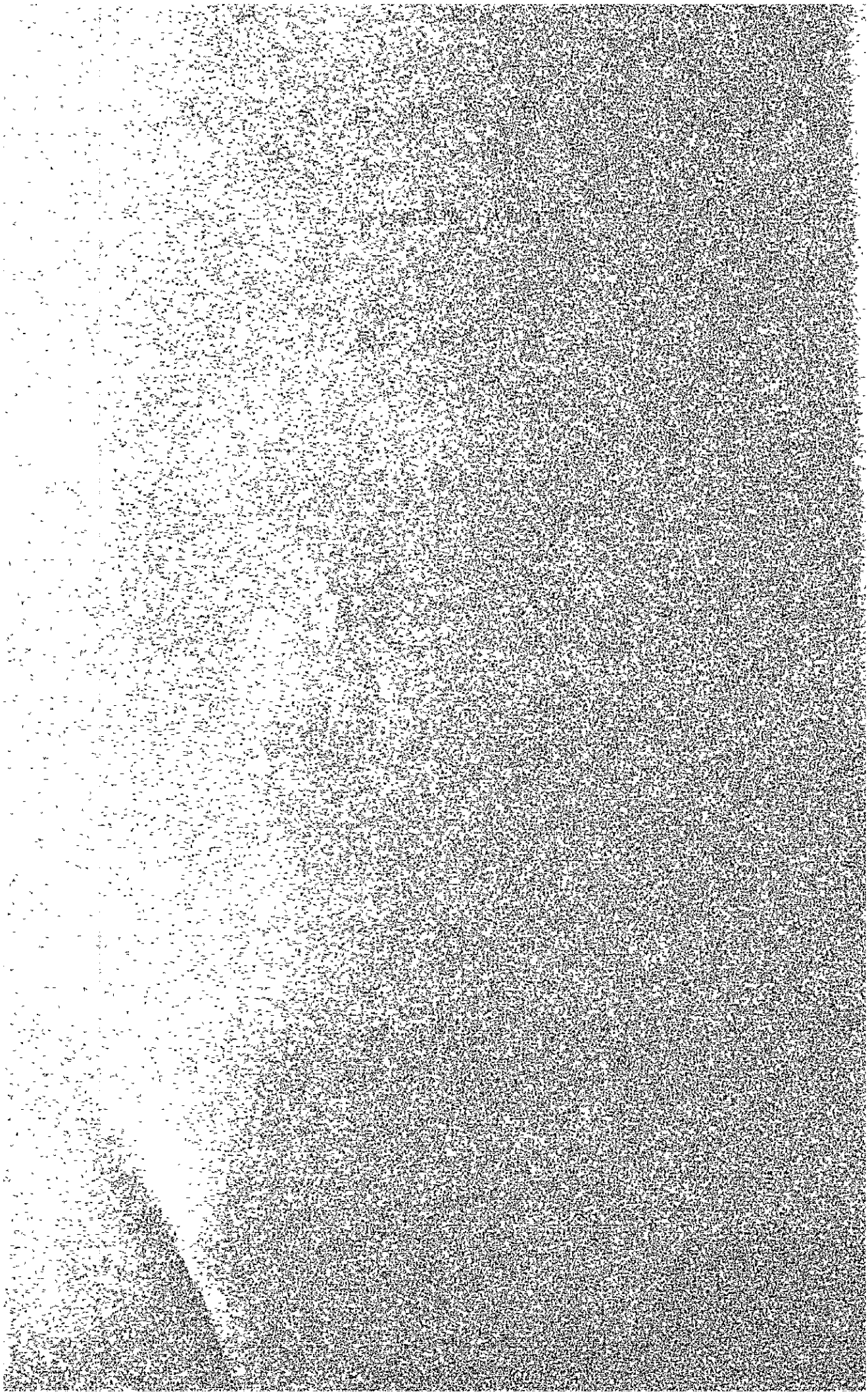
従って本計画の実施は意義深いものであり、日本国政府が無償援助を行なうことは充分妥当なものと判断される。

8－2　提　　言

本案で整備される発電設備は、ＧＥＣが行う周波数統一計画の完成によって、その発電設備の機能が充分発揮出来るものであるので、ＧＥＣは経済的制約など諸々困難があると考えられるが，可及的速やかに、その工事を完成することが望ましい。

本案件の完成後、同発電所にて運転・保守にたずさわるＧＥＣの技師は、出来るだけ多く製作者から派遣される日本の技術指導員ならびにコンサルタントから技術の修得のため据付工事に参画することが必要である。

資　料　編



添　付　資　料　目　次

主要面談者，調査団員，相手機関名

I 主 要 面 談 者

(1) 在ベエネエズエラ日本大使館

内 藤 大 使

広 田 一等書記官

栗 山 二等書記官

(2) 経 済 企 画 省

Mr. L.E.B. Johnson	次 官
Mr. Winston S. Murray	国際経済協力局長
Mrs. Gina Farnum	〃 アジヤ部長
Mr. Ormond Grant	〃 課長

(3) エネルギー・鉱山省

Mr. Harun Rashid	大 臣
Mr. Henry Bovell	次 官
Mr. Doorga Persaud	エコノミスト

(4) 国家エネルギー庁

Mr. Kaman Singh	副 総 裁

(5) 国営企業公社

Mr. Roy McArthur	副 総 裁

(6) 電 力 公 社(GEC)

Mr. Joseph Holder	総 裁
Mr. Neville Barnwell	副 総 裁
Mr. Lloyd Rose	ディゼル発電部長
Mr. Monte Alexander	給電指令所次長
Mr. Philip Bobb-Semple	ベルサイユ発電所長
Mr. David Gomes	開発計画技師
Mr. Victor Forsythe	電力運用技師

Mr.Winston Wills　　電力系統保護技師

Ⅱ 調 査 団 員

団　長　雨 貝 哲 雄　　国際協力事業団
電力計画　久 野 守 一　　㈱EPDCインターナショナル
電力経済　福 田 哲 也　　〃

Ⅲ 関係機関名及び住所

機　関　名	住　所
Ministry of Economic Planning and Finance	Homestretch Avenue D'Urban Park Georgetown Guyana P.O. Box 10748 Georgetown Telephone: 64971 Cable, Telex: nil
Ministry of Energy and Mines	41 Brickclam & Boyle Place Georgetwon Guyana P.O. Box 1074 Georgetown Telephone: 66549 Telex: 2285
Guyana National Energy Authority	295 Murray Street Georgetown Guyana P.O. Box 903 Georgetown Telex: 2253
Guyana State Corporation	45-47 Water Street Georgetown Guyana P.O. Box 1020 Georgetown Telephone: 61032 Telex: 2214
Guyana Electricity Corporation	40 Main Street Georgetown Guyana P.O. Box 10390 Georgetown Telephone: 59141 Telex: GELECORP
Honorary Consul of Japan Mr. Hans W. Barrow	125 Carmichael Street South Cummingsburg Georgetown Guyana P.O. Box 10750 Georgetown Telephone: 67261 Telex: 2289 GYINS BROK

資料 2

調　査　日　程

月　日	曜　日	内　　容	出　　席　　者
9. 4	日	成田発，ニューヨーク着	
9. 5	月	ニューヨーク発，カラカス着	
9. 6	火	ベネズエラ大使館訪問	
		インセプションレポートの説明	
		ベネズエラ国電力事情の調査依頼	
9. 7	水	カラカス発 ポートオブスペイン経由ジョジタウン着	
9. 8	木	スケジュール ミーティング（経済企画省）	Mr. L.E.B. Johnson
		インセプション レポートの内容説明	Mrs. Gina Farnum
		調査スケジュールの打合せ	Mr. Ormond Grant
		質問書の概要説明	Mr. Doorga Persaud
		（経済企画省，エネルギー鉱山省，	Mr. Kaman Singh
		エネルギー庁，電力公社）	Mr. Neville Barnwell
			Mr. Lloyd Rose
		現地調査	Mr. Doorga Persaud
		Sophia 周波数変換所	Mr. Monte Alexander
		設備調査	Mr. Victor Forsythe
		給電指令所	Mr. Winston Wills
		電力系統の資料収集	
		電力潮流状況の調査	
		給電設備の調査	
9. 9	金	質問書の細部説明及び資料収集	Mr. Doorga Persaud
		（電力公社）	Mr. Lloyd Rose
		エネルギー鉱山省のエコノミスト	Mr. David Gomes
		公社の技術者	
9.10	土	Gayana State Corporation	Mr. Roy McArthur
		（GUYSTAC）	Mr. Neville Barnwell
		（電力公社の Chairman）	Mr. Lloyd Rose
		インセプション レポートの内容説明	Mr. Doorga Persaud
		電力公社にて資料収集	Mr. Doorga Persaud
			Mr. David Gomes

月　日	曜　日	内　　容	出　　席　　者
9.11	日	ベルサイユ発電所調査	Mr. Doorga Persaud
		デイゼル発電機及び諸設備の実情調査	Mr. Lloyd Rose
		既設備のコンクリート基礎調査	Mr. Philip Bobb-Semple
		発電所の周辺敷地の調査	
		資　料　収　集	
		雨貝団長到着	
9.12	月	エネルギー・鉱山大臣表敬訪問	Mr. Harun Rashid
		インセプションレポートの説明	Mr. Henry Bovell
		無償資金協力システムの説明	Mr. Ormond Grant
			Mr. Doorga Persaud
			Mr. Joseph Holder
			Mr. Neville Barnwell
		電力公社との打合せ	Mr. Joseph Holder
		本計画地域の現状及び裨益効果について	Mr. Neville Barnwell
		電力公社にて資料収集	Mr. Doorga Persaud
			Mr. David Gomes
9.13	火	計画内容の検討及び未収集資料の確認	Mr. Joseph Holder
			Mr. Neville Barnwell
		資　料　収　集	Mr. Doorga Persaud
			Mr. David Gomes
9.14	水	関係各省と未収集資料について合同会議	Mr. Winston S. Murray
		無償資金協力システムの説明	Mrs. Gina Farnum
		電力公社と供与機材の検討	Mr. Ormond Grant
		打合せ議事録（案）の作成	Mr. Henry Bovell
			Mr. Doorga Persaud
			Mr. Joseph Holder
			Mr. Neville Barnwell
			Mr. David Gomes

月　日	曜　日	内　　容	出　　席　　者
9.15	木	電力公社と議事録（案）の検討	Mr. Ormond Grant
			Mr. Doorga Persaud
			Mr. Joseph Holder
		議事録（案）を関係各省に配布・検討	Mr. Neville Barnwell
			Mr. David Gomes
9.16	金	議事録（最終案）の検討・確認会議	Mr. Winston S. Murray
			Mrs. Gina Farnum
		議事録の作成	Mr. Ormond Grant
			Mr. Doorga Persaud
			Mr. Joseph Holder
			Mr. Neville Barnwell
			Mr. David Gomes
9.17	土	議事録の最終確認	Mr. Hans W. Barrow
		議事録の調印（午后2時30分）	Mr. L.E.B. Johnson
			Mr. Winston S. Murray
			Mrs. Gina Farnum
			Mr. Ormond Grant
			Mr. Henry Bovell
		ベルサイユ発電所及び周辺地域の再確認	Mr. Doorga Persaud
		ジョージタウン発，ポートオブスペイン着	Mr. Joseph Holder
			Mr. Neville Barnwell
			Mr. David Gomes
9.18	日	ポートオブスペイン発，カラカス着	内　藤　大　使
		ベネズエラ大使に調査・討議結果の報告	栗山二等書記官
9.19	月	調査及び討議結果の概要報告	広田一等書記官
			栗山二等書記官
9.20	火	カラカス発，シカゴ経由	
9.22	木	成　田　着	

MINUTES OF DISCUSSIONS

ON

DIESEL POWER GENERATOR SUPPLY PROJECT

IN

THE CO-OPERATIVE REPUBLIC OF GUYANA

SEPTEMBER 17, 1983

MINUTES OF DISCUSSIONS
ON
DIESEL POWER GENERATOR SUPPLY PROJECT
IN
THE CO-OPERATIVE REPUBLIC OF GUYANA

In response to the request made by the Government of the Co-operative Republic of Guyana for Diesel Power Generator Supply Project (hereinafter referred to as "the Project"), the Government of Japan has dispatched a mission headed by Mr. Tetsuo Amagai for the sole purpose of conducting a basic design study required for the Project from September 8, 1983 to September 16, 1983 through the Japan International Cooperation Agency (hereinafter referred to as "JICA"). The Japanese mission has carried out a field survey and held a series of discussions through which the Japanese mission exchanged views with the Guyanese authorities concerned with the Project.

Based upon the field survey and a series of discussions, the Japanese mission and the Guyanese authorities concerned with the Project have agreed to recommend to their respective Governments examination of the outline of the basic design study attached herewith towards the realization of the Project.

Georgetown, Guyana
September 17, 1983

Mr. Tetsuo Amagai
Team Leader

L.E.B. Johnson
Permanent Secretary
Ministry of Economic Planning.

The Japanese Basic Design Study Team
Japan International Cooperation Agency.

ATTACHMENT I - LIST OF ATTENDANTS IN MEETINGS

JICA Mission dispatched by the GOVERNMENT OF JAPAN

Mr Tetsuo Amagai	Team Leader
Mr Moriichi Hisano	Power System Planning Engineer
Mr Tetsuya Fukuda	Power Economist

GOVERNMENT OF GUYANA

Ministry of Economic Planning

Cde L E B. Johnson	Permanent Secretary
Cde Winston S Murray	Head, Department of International Economic Co-operation
Cde Gina Farnum	Head of Section (Far East Asia) Department of International Economic Co-operation
Cde Ormond Grant	Desk Officer Department of International Economic Co-operation

Ministry of Energy and Mines

Cde Harun Rashid	Minister
Cde Henry Bovell	Permanent Secretary
Cde Doorga Persaud	Economist

Guyana National Energy Authority

Cde Kaman Singh	Vice Chairman

Guyana State Corporation (GUYSTAC)

Cde Roy McArthur	Vice President (Administration)

Guyana Electricity Corporation (GEC)

Cde Joseph Holder	General Manager
Cde Neville Barnwell	Engineering Manager (Designate)
Cde Lloyd Rose	Manager, Diesel Generation Department
Cde Monte Alexander	Manager (ag.), Systems Control Department
Cde Philip Bobb-Semple	Power Station Engineer
Cde David Gomes	Planning and Development Engineer
Cde Victor Forsythe	Systems Operation Engineer
Cde Winston Wills	Protection and Instrumentation Engineer

ATTACHMENT II - BACKGROUND OF THE PROJECT

SEE ANNEX I.

ATTACHMENT III - Outline Of The Proposed Project

1. Purpose

The Guyana Electricity Corporation (GEC) is a public utility established under the Electricity Act of Guyana and is under the jurisdiction and control of the Ministry of Energy and Mines and the Guyana State Corporation.

Due to the difficulties confronting Guyana in respect of importing materials, equipment and supplies including spare parts on account of deterioration in the international balance of payments, it has become quite difficult for GEC to operate and maintain GEC's thermal power stations without load shedding and voltage drops.

Twelve (12) out of thirty (30) generating units are not operational because of the shortage of imported spare parts, and are awaiting systematic refurbishment and repair. This situation greatly affects the social life of inhabitants in GEC's power system areas.

A power station named "Versailles Power Station" belongs to GEC's Georgetown Interconnected System which supplies electricity mainly to Georgetown City and neighbouring areas. The said power station has four (4) units of diesel generators with a total installed capacity of eight (8) Megawatts.

Of these units, only two (2) units are in operation as of September 1983, producing a maximum of one decimal eight (1.8) Megawatts. At the present time, the electricity supply in the service areas around the said power station is characterized by load shedding and regular interruptions in all sections and voltage drops in the areas distant from the power station.

In order to overcome this difficulty and inconvenience in these areas, GEC through the Government of Guyana has requested the procurement and installation of equipment and devices, necessary spare parts thereof as enumerated in Section 6 under Japanese Grant Aid for the purpose of alleviating the system overload in Georgetown Interconnected Power System.

2. Objectives

2.1 Technical Improvement Expected From The Project.

It is considered that this Project will contribute to the promotion of frequency conversion from 50 to 60Hz and to the implementation of rehabilitation programmes of GEC's generating facilities.

2.2 Social Benefits Of The Project

The main social benefit of the project is that it will end load shedding in the West Demerara Area with all the social dislocation, inconvenience and irritation that load shedding causes. In particular the everyday load shedding of the area between Windsor Forest and Lookout on the West Coast when there is only one machine operating in the Versailles Power Station will end. Reliable electrical power in the West Demerara Area will mean reliable operation of the proposed drainage pumping station and avoidance of flooding of farms, homes and workplaces. In particular small farmers who grow vegetables for the city will benefit. The services of the new West Demerara Hospital will be improved and its expansion guaranteed. Security of premises will be improved. The Government of Guyana has agreed to send to the Ministry of Foreign Affairs and JICA through the Embassy of Japan in Venezuela the quantitative data and information evidencing the description of social benefits not later than the middle of October 1983.

3. Project Site

The Project Site is as shown in Annex II.

4. Existing Facilities in Project Area

The Versailles Power Station supplies electricity to the West Bank and West Coast of Demerara. There are about 11,300 acres of rice lands, and 35,000 acres of sugar cane lands in this area. In addition there are silo centers for storage of unmilled rice and significant acreages of vegetable and livestock farms. The population is estimated at 50,000 persons and more than fifteen (15) water supply facilities are in operation for pumping water to communities in the said area.

There are two (2) hospitals in the area - a regional and a cottage hospital. These are dependent on the pure water supply system for medical services to patients. There are seventy one (71) schools in this area.

5. Present electricity supply situation in the area

See Annex III.

6. List of Equipment and Devices to be procured from Japan

In line with the guidelines for procurement of Japanese products and services under Japanese Grant Aid, it is confirmed that the equipment and devices together with spare parts thereof will be procured from Japan.

7. List Of Equipment and Devices, etc.

A list of the equipment, devices, spare parts thereof, etc., is as per Annex IV.

8. Installation

It is confirmed that the term "Installation" necessary for this Project is defined as the erection of the major equipment on the existing foundations at Versailles Power Station, and foundation and erection works required for the devices at the said Power Station.

It is confirmed that repair of the existing building for the generating units will be done by the Government of Guyana at its expense if necessary, and that this cost is not included in the amount of Grant Aid.

It is confirmed that three (3) existing generating sets will be removed by the Government of Guyana at its expense, and that this cost is not included in the amount of Grant Aid.

It is confirmed that installation, and commissioning of equipment and devices will be performed by a Japanese contractor on his overall responsibility with the use of mutually acceptable Guyanese sub-contractor(s).

9. Executing Organisation of the Project

The executing organisation of the Project is as shown in Annex V.

10. Demarcation of Works Between The Government of Guyana and the Government of Japan.

No.	Description	Covered by Grant Aid	Covered by Government of Guyana
1	To remove the defunct diesel engine generators from Versailles Power Station		O
2	To repair if necessary the building in which equipment and devices procured under Japanese Grant Aid will be installed		O
3	To prepare for replacement of distribution transformers and consumers' apparata due to the frequency conversion from 50 to 60Hz		O
4	To bear the following commissions to the foreign exchange bank for the banking service upon the B/A		
	i) Advising commission of A/P		O
	ii) Payment commission		O
5	To ensure unloading and customs clearance at port of disembarkation in Guyana		
	i) Marine transportation of the equipment and devices from Japan to Guyana	O	
	ii) Tax exemption and customs clearance of the equipment and devices at the port of disembarkation		O
	iii) Inland transportation from the port of disembarkation to project site.	O	
6.	Installation	O	

No.	Description	Covered by Grant Aid	Covered by Government of Guyana
7	i) To accord Japanese nationals whose services may be required in connection with the supply of equipment and devices and the services under the verified contract such facilities as may be required for their entry into Guyana and stay therein for the performance of their work.		0
	ii) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies imposed in Guyana with respect to the supply of equipment, devices and services under the Contracts to be executed for the project.		0
8	To maintain and use properly and effectively the facilities procured and installed under the Grant Aid.		0
9	To bear all the expenses other than those to be borne by the Grant, necessary for the execution of the project.		0

The Japan International Co-operation Agency (JICA) will send twenty (20) copies of the basic design report to the Government of Guyana.

Both sides will implement this project in confirmity with the Japanese Grant Aid System.

BACKGROUND OF THE PROJECT

1. DEVELOPMENT PERSPECTIVE AND STRATEGY

1. The Government of Guyana is committed to the establishment of co-operative socialism, an income distribution that permits the satisfaction of basic human needs and the continuing creation of new employment opportunities through increased levels of public and private investment and the fullest possible development of human resources. The Government is equally committed to an income distributional profile that is consistent with its social objectives and with the level of morale on which the programmes are based. Furthermore, the Government is committed to the provision of adequate recreational and social amenities so that the motivation for pursuing the charted development path can be present to ensure the achievement of stated development targets. Within this framework, the development strategy aims at reducing the country's vulnerability to fluctuations in international prices and demand at a creating higher employment opportunities through the expansion and diversification of exports and the development of efficient import substitution, and at achieving self-sufficiency in food and producing surpluses for regional consumption.

2. The structural changes associated with this development effort will require considerable investment for their achievement. In the phasing of the process by which changes in the structure will be effected, priority will be given to the restoration of activities to their former levels and to the fuller utilization of capital investments already made in Guyana. Even the achievement of this limited and more immediate target will require substantial assistance in the short-term to sustain living standards, which have been affected, in part, by substantial declines in the terms of trade.

3. For the longer term, the major elements of structural change on which attention will be focused are as follows:

(a) A sharp expansion in the production base to include in the longer run the smelting of aluminium using local supply of hydroelectric power.

(b) Sustained growth in the intermediate period and thereafter in the production of agricultural commodities, of mining output, of fishing and forestry products, and of non-traditional manufacturers leading to a consequential reduction in the relative importance of services sectors by simultaneous restraint in the rate of growth of services in the government sector.

(c) Diversification of the output of the productive sectors by the introduction of new activities and by the increased processing of the products at present produced as raw materials, such as timber, ground provisions, etc.

(d) Substitution of the present huge imports of fossil fuels by the eventual installation of hydroelectric power as indicated above but also by the use of a wide range of measures to utilize more efficiently the existing availability of local and imported sources of energy.

(e) As a derivative of the above approaches, the dependence on external sources of supply will be reduced. In addition to the expansion of exports from the growth in production, the reduced dependence on fuel imports will lead to an improvement in the external balance and to a reduction in the gap on current account of the balance of payments to proportions that are more manageable in terms of their financing needs.

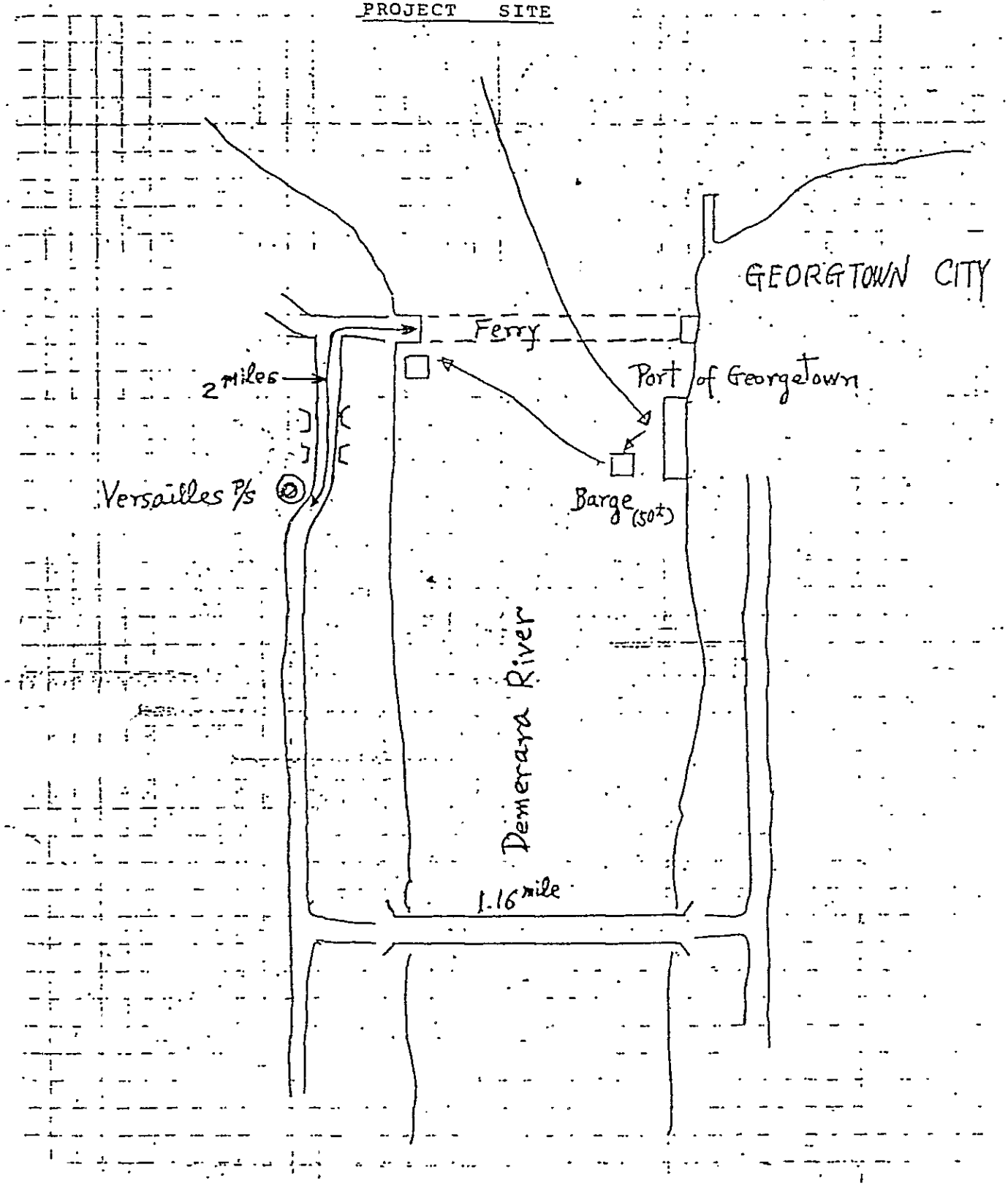
4. In order to proceed with the programme of structural adjustment as outlined above, the Government is committed to the removal of a number of pressing constraints. These relate, at first, to the critical balance of payments weakness which has affected the economy very severely in recent years. The second is the wide range of allocational inefficiencies reflected in prices and tariffs that are in evident need of adjustment. The

third is the inadequate spatial distribution of activities that leads to inefficiency in production and to an imblance between urban, rural and hinterland areas. The fourth is the weakness in systems of management that are required for smooth co-ordination of structural changes and the shortage of skills necessary for the development and administration of public and private enterprises.

2. Guyana Electricity Corporation's Measures

The National Development Plans involve increase in the supply of electricity and an increase in the reliability of that supply. The supply of electricity from the existing GEC system is unreliable and cannot meet the demands let alone the requirements of the National Development Plans. GEC has to therefore rehabilitate and develop its own systems to improve the supply of electricity to agriculture, commercial, industrial, governmental and domestic users if the objectives of the National Development Plan are to be realized. This involves rehabilitation of our generation plant and rehabilitation and development of our transmission and distribution system. It is expected that the development on the generating side shall be executed by agencies other than GEC using indigenous sources of energy. When these fail GEC will still be required to function reliably. For maximum reliability and benefit GEC intends, as far as possible to-inter connect all the main power stations by a national grid.

PROJECT SITE



The Present Electricity Supply Situation In the Area

The Versailles Power Station was originally built in 1972 as an 8 MW (4 x 2 MW) Station intended to operate as an isolated station to serve the needs of the West Demerara Area from Vriesland on the West Bank to Lookout on the West Coast a total distance of 35 miles.

With the advent of the oil crisis in 1974, foreign exchange became increasingly scarce and as machines at all stations including Versailles developed faults, they were consciously taken out of service pending the availability of foreign exchange to buy necessary replacement parts.

The production record of the Versailles Station (1972-1983) attached is self-explanatory.

At present Versailles is reduced to an unreliable two machine station and although it forms part of the interconnected system, load shedding on the West Coast at peak periods must be introduced in accordance with the typical load shedding schedule attached (areas 24 and 25) especially when only one machine is operational. The reason being that the length of the line on the West Coast causes severe voltage drops and since the one 2 MW (ECR 1.76 MW) cannot supply the MVAR's and the useful power (MW), load shedding usually takes place by opening a switch located at Windsor Forest a distance of approx. 6 miles from the Station. Therefore, residents from that point to Lookout a distance of approx. 30 miles are without power especially at nights from 19:00 hours (7.00 p.m.) to 22:00 hours (10.00 p.m.) when the demand increases to about 3.1 MW on the West Coast Feeder, with the West Bank at approx. 1.3 MW and the total demand on the Station being approx. 4.4 MW.

Of the two machines available, one produces approx. 1.0 MW and the other produces approx. 0.8 MW.

The maximum demand during the daytime on the West Coast Feeder alone is approx. 1.4MW, so that when there is only one machine working in Versailles Power Station between 0.5 and 0.7 MW of load has to be shed.

In Guyana there is no policy which constrains Governmental or non Governmental agencies from constructing or enlarging buildings because of an inadequacy of power. Buildings are usually erected and connected to the system and receive electricity as and when it is available.

ECR = Economic Continuous rating.

The social impact of load shedding in the West Demerara Area.

On Education

School Radio Programmes which are normally broadcast for the benefit of the children cannot be heard. Audio visual aids which are used in schools for the benefit of students cannot be effected. On cloudy or heavily overcast days, classes have to be abandoned, and at nights, children cannot prepare home-work for submission to their class teacher on the following day.

On Health

Since the power supply is unreliable, hospitals and health centres are normally advised to install standby generating sets. Where these are not installed or are out of order, doctors and nurses are reluctant to perform surgical operations by gas or candle light and would prefer to wait until the power is restored.

In any event standby generators in some cases cater only for emergency lighting and not for the operating theatre or X-ray rooms.

On Potable Water Supply

In the West Demerara Area, potable water is delivered to homes from wells by means of electric pumps. Since there is either limited or no storage facilities for gravity feeding, when the power is switched off, no water could be received in the home. This disrupts the normal household routine. Some shift workers are therefore not able to have a bath before proceeding to work. This makes them irritable and uncooperative.

On Drainage

The West Demerara area is below sea level at high tide. This means that when the tide is high gravity drainage is not possible. This leads to the flooding of yards, homes and work places, affecting workers at work and going to and coming from work, and children going to and from school. In addition farms are flooded and crops are adversely affected. Because of the latter, the Ministry of Agriculture plans to construct a 350 horse power drainage pump station in the West Demerara area in 1984 to alleviate this problem. Guyana Electricity Corporation will not prevent the Ministry of Agriculture from building this pump station but will advise the Ministry that its operations will be adversely affected by the inadequacy of the Versailles Power Station.

On Security

Load shedding in the West Demerara area at nights means greatly reduced levels of lighting. This causes greater security problems as stealing from homes, farms and work places increases. Stealing from small farms discourages small farmers and adversely affects the production of vegetables.

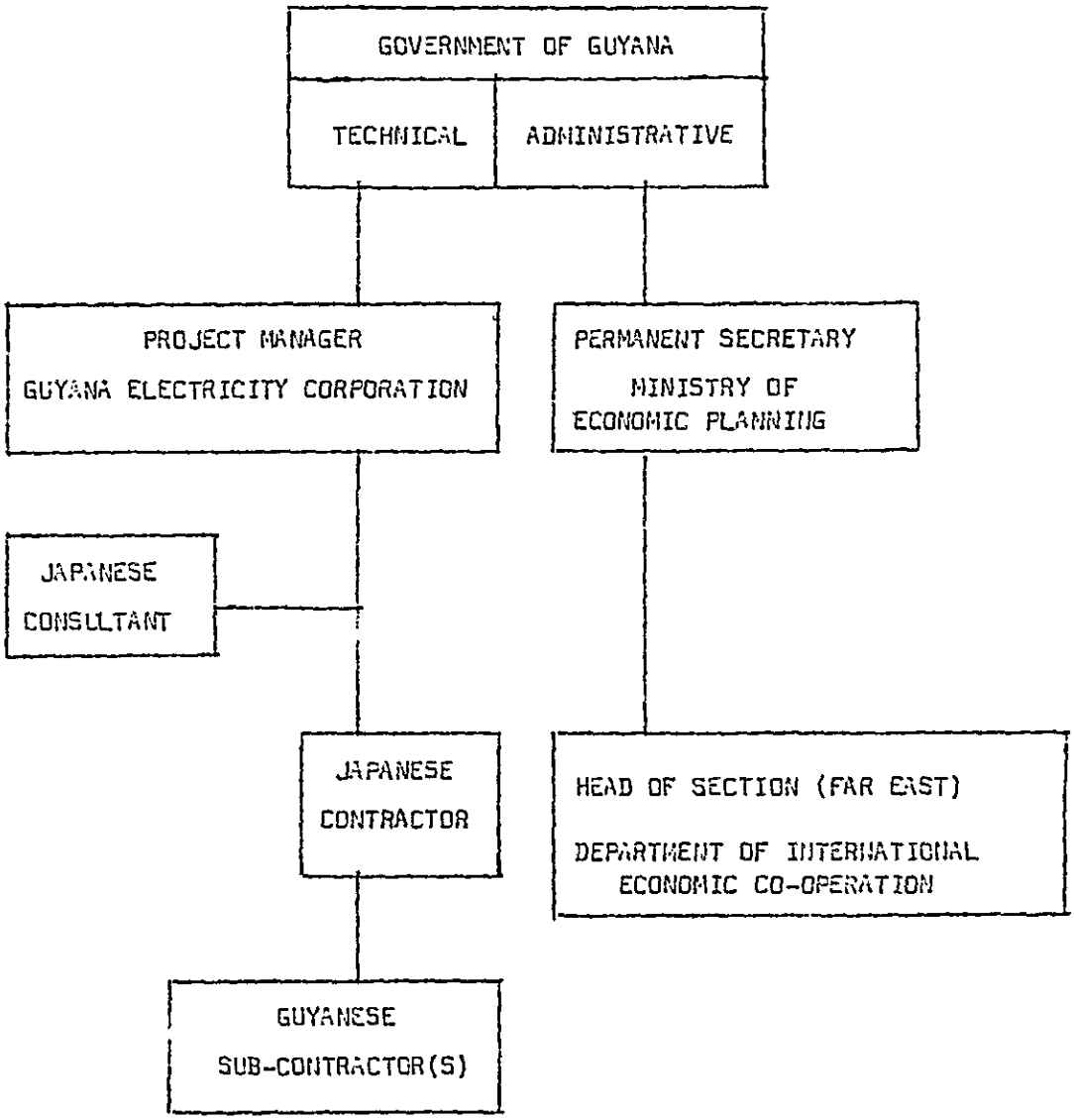
In summary, load shedding makes life very miserable for the people in the West Demerara area since apart from affecting production in industry and children's education, it is also an irritant to housewives who have to carry out their household chores when power is available.

ANNEX IV

List of Equipment And Devices

	Description	Quantity
1.	Generator 11/13.8KV, 50/60HZ 2,000KW (60HZ) P.F. 0.8, Brushless Exciter	3 Sets
2.	Diesel Engine Continuous Use Two Speed Fuel Oil Service Tank	3 Sets
3.	Control Panel Metering Instruments Protection Relays Indicators	3 Sets
4.	Station Service Transformer	2 Sets
5.	Circuit Breaker	7 Sets
6.	Other Necessary Devices	1 Lot
7	Spare Parts (To be agreed with GEC)	For 3 Years

ANNEX V


GOVERNMENT OF GUYANA
TECHNICAL
ADMINISTRATIVE
PROJECT MANAGER
GUYANA ELECTRICITY CORPORATION
PERMANENT SECRETARY
MINISTRY OF
ECONOMIC PLANNING
JAPANESE
CONSULTANT
JAPANESE
CONTRACTOR
HEAD OF SECTION (FAR EAST)
DEPARTMENT OF INTERNATIONAL
ECONOMIC CO-OPERATION
GUYANESE
SUB-CONTRACTOR(S)

POPULATION AND GNP

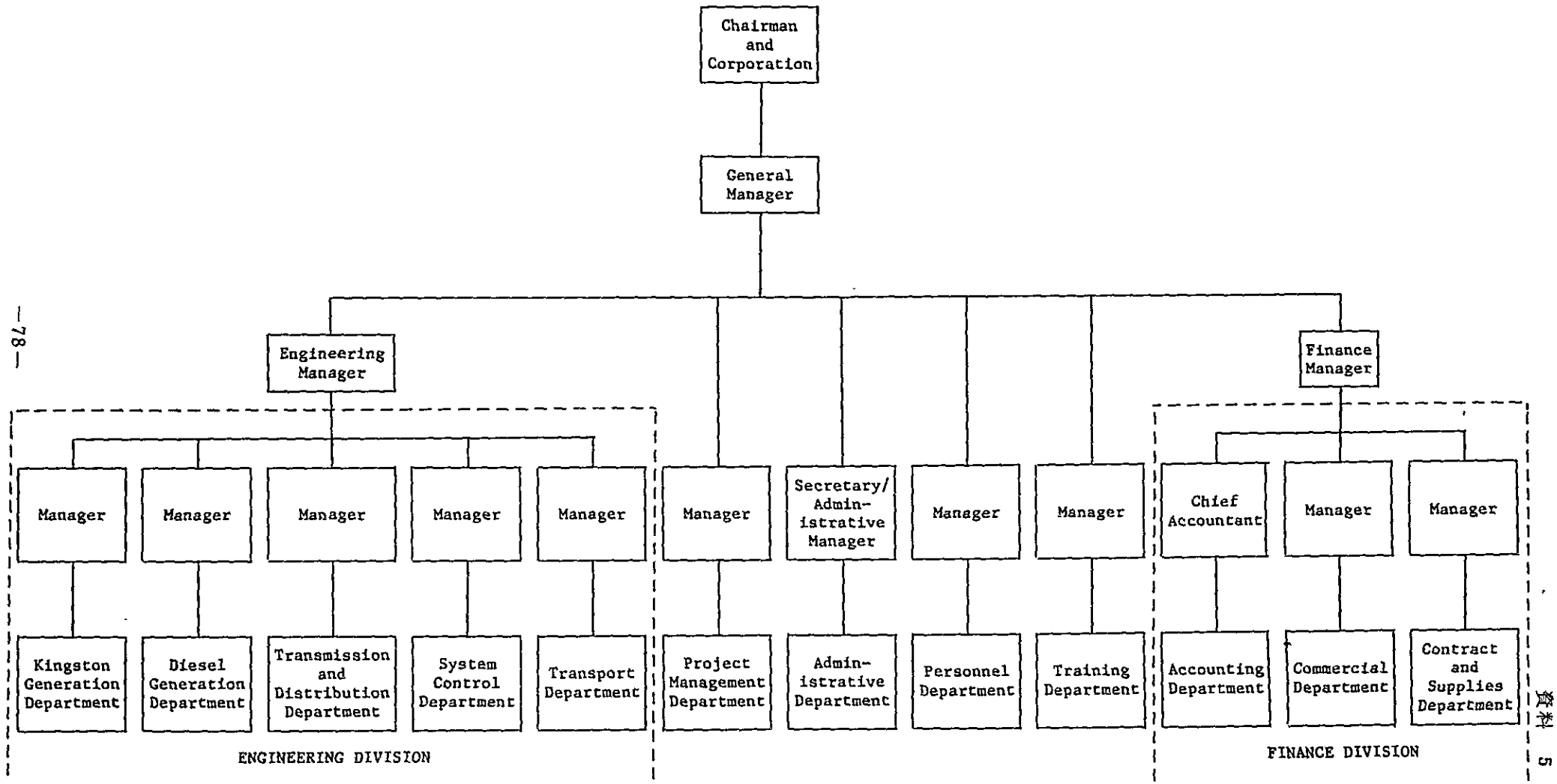
Year	Population (000)	GNP at Constant Price 10^6 Guyana Dollars	Note
1970	716	854	Actual
1971	729	884	- " -
1972	740	852	- " -
1973	750	872	- " -
1974	757	941	- " -
1975	766	1032	- " -
1976	775	1050	- " -
1977	783	1019	- " -
1978	786	990	- " -
1979	790	976	- " -
1980	793	994	- " -
1981	795	989	- " -
1982	797	886	- " -
1983	799	804	Projected
1984	815	n.a.	- " -
1985	831	n.a.	- " -

Note : In the case of the GNP shown above, 1977 is the base year.

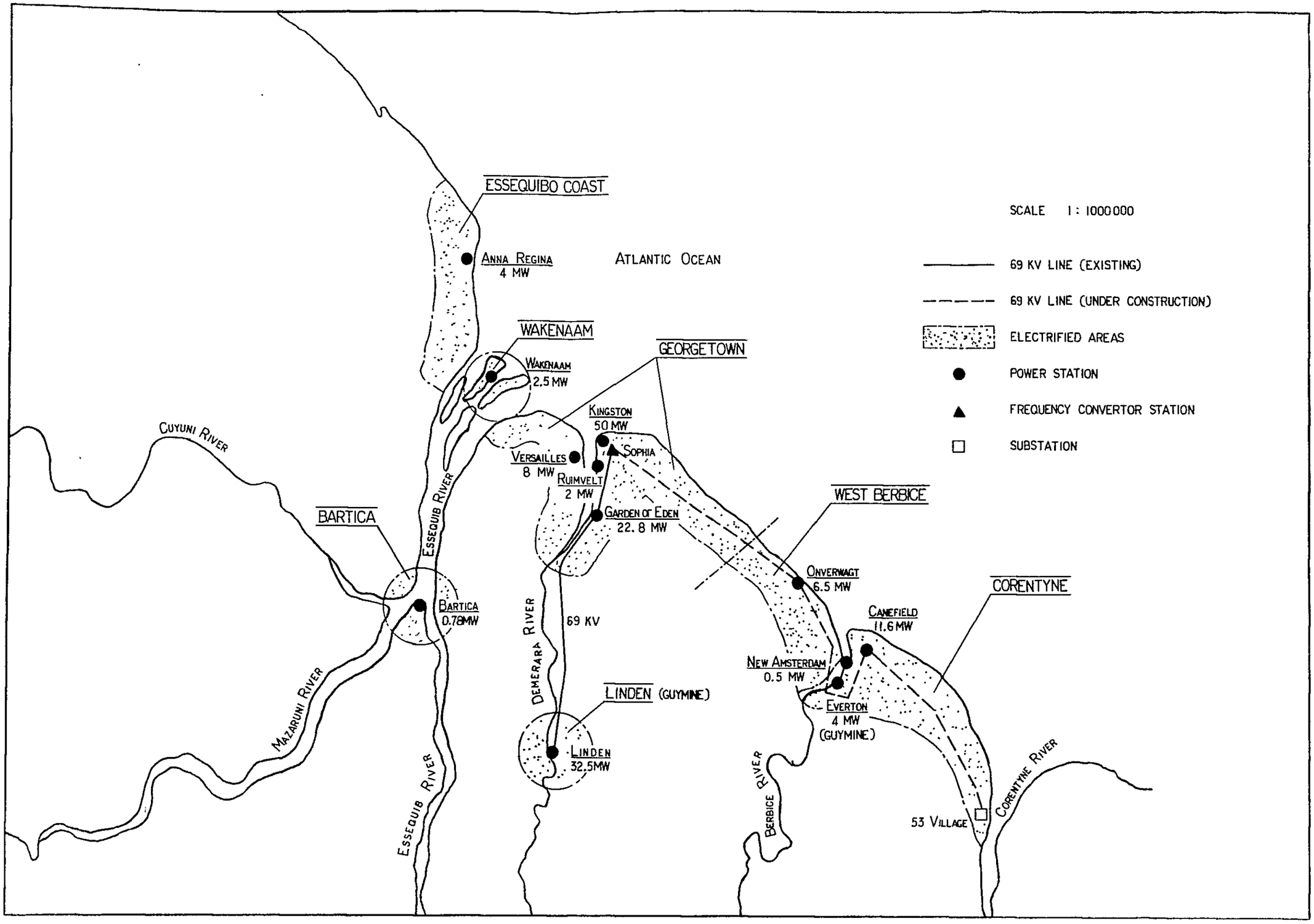
Source: Ministry of Economic Planning & Statistical Bureau

ORGANIZATION CHART OF GUYANA ELECTRICITY CORPORATION

EFFECTIVE AS OF SEPTEMBER 14, 1983



POWER SUPPLY AREAS

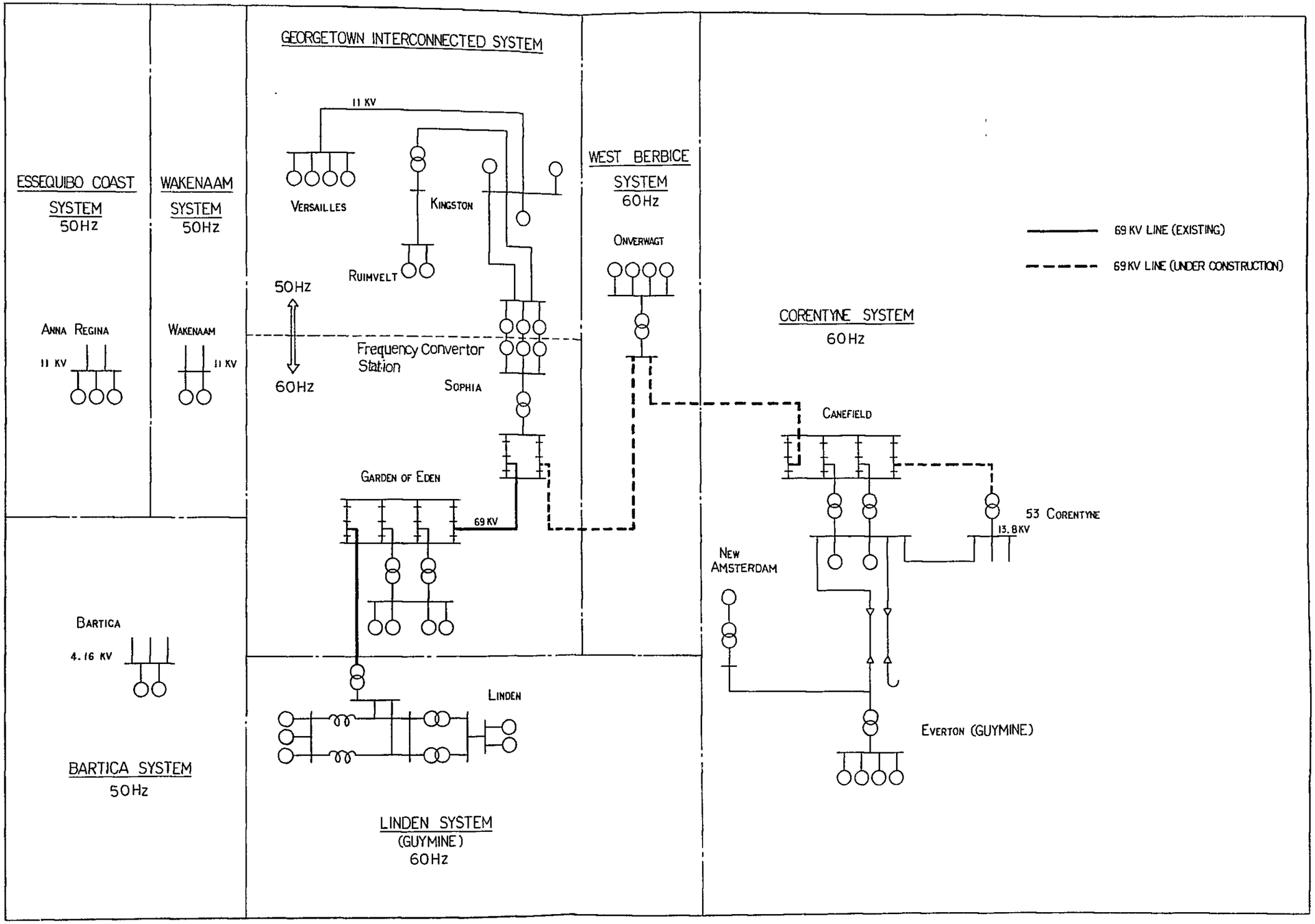


OUTLINE OF GEC-OWNED GENERATING FACILITIES

(As of September 1983)

Name of System	Power Plant	No.of Unit	Frequency (HZ)	Rated Capacity (MW)	Type	Commissioning Year	Max. Capacity (MW)	Remarks
Georgetown Interconnected System	Kingston B	1	50	10.0	Steam	1963	9.0	
		2	50	10.0	Steam	1963	-	Out of Order
		3	50	10.0	Steam	1963	9.0	
		1	50	10.0	Gas	1978	-	Out of Order
		2	50	10.0	Gas	1978	-	Out of Order
	Ruimveldt	1	50	1.0	Diesel	1959	-	Out of Order
		2	50	1.0	Diesel	1959	0.9	
	Versailles	1	50	2.0	Diesel	1972	-	Out of Order
		2	50	2.0	Diesel	1972	-	Out of Order
		3	50	2.0	Diesel	1972	1.0	
		4	50	2.0	Diesel	1972	0.8	
	Garden of Eden	2	60	5.7	Diesel	1975	4.0	
		3	60	5.7	Diesel	1975	4.0	
		4	60	5.7	Diesel	1976	-	Out of Order
		5	60	5.7	Diesel	1976	4.0	
Total of Interconnected System				82.8			32.7	
West Berbice System	Onverwagt	1	60	1.0	Diesel	1973	-	Out of Order
		2	60	1.0	Diesel	1973	0.75	
		3	60	1.0	Diesel	1973	0.75	
		4	60	1.0	Diesel	1980	0.75	
		5	60	2.5	Diesel	1980	2.0	
Corentyne System	New Amsterdam		60	0.5	Diesel	1960	-	Out of Order
	Canefield	3	60	5.8	Diesel	1978	-	Out of Order
		4	60	5.8	Diesel	1978	5.0	
Essequibo System	Anna Regina	1	50	1.0	Diesel	1972	0.78	
		2	50	1.0	Diesel	1972	-	Out of Order
		3	50	2.0	Diesel	1975	1.5	
Bartica System	Bartica	1	50	0.395	Diesel	1978	0.35	
		2	50	0.395	Diesel	1978	0.35	
Wakenaam System	Wakenaam	1	50	2.0	Diesel	1972	-	Out of Order
		2	50	0.5	Diesel	1952	0.5	
Total of Isolated Systems				25.89			12.73	
Grand-Total				108.69			45.43	

GUYANA POWER SYSTEM



TIMES OF LOAD SHEDDING

	MONDAY			TUESDAY			WEDNESDAY			THURSDAY			FRIDAY			SATURDAY			SUNDAY		
	83-09-12			83-09-13			83-09-14			83-09-15			83-09-16			83-09-17			83-09-18		
AREA	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1																					
2						⊠		⊠			⊠							⊠			
3								⊠					⊠								
4																					
5		⊠					⊠					⊠									⊠
6		⊠					⊠					⊠									
7																					
8					⊠					⊠											⊠
9					⊠					⊠			⊠								⊠
10					⊠					⊠			⊠								⊠
11																					
12			⊠						⊠						⊠						
13				⊠							⊠							⊠			
14																					
15						⊠									⊠						
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17																					
18			⊠						⊠		⊠		⊠								
19	⊠													⊠							
20																					
21				⊠								⊠						⊠			
22																					
23	⊠			⊠																	
(24)						⊠							⊠								
(25)			⊠						⊠						⊠						
26																					

⊠ — INDICATES A PERIOD OF LOAD SHEDDING

1. Cummings Street, Croal.
2. East & West La Penitence, East & West Ruimveldt, Albouystown, Charlestown (part), Alexander Village.
3. East Bank Public Road from Sussex Street to Rahaman's Turn.
4. Woolford Avenue, Vlissengen Road, Home Stretch Avenue.
5. Belair Park, Campbellville, Newtown (part) Sophia, Prashad Nagar, Subryanville, Belair Village Belvour Court, Kitty (part), New Haven.
6. Lodge, Wortmanville, Bourda, Alberttown (part), Lacytown (part), Queenstown (part).
7. Areas along Water Street from Sea Wall to Abattoir.
8. West Cummingsburg.
9. Robbstown.
10. Newtown (part) Stabroek (part), Werk-en-rust (part), Charlestown (part).
11. Camp Street, Hadfield Street - East of Camp Street.
12. 50 Hz. areas along East Bank from Rahaman's Turn, Lo Hope. (not in area 14) and 50 Hz. Industrial Site.
13. Belair Springs and Gardens, Liliendaal to L.B.I.
14. Meadow Bank, Houston, Agricola, Eccles, Bagotstown, Green field Park, Peters Hall, Providence.
15. Cummingsburg (South).
16. Stabroek (park) Lacytown (part), Werk-en-rust (part), Charlestown (part).
17. Kingston Thomas Land, Cummingsburg (part).
18. Queenstown (part), Alberttown (part), Kitty (part), Newtown.
19. 60 Hz. areas of industrial site.
20. Tucville, Meadown Brook Cardens, South Ruimveldt Gardens and Park, North Ruimveldt, Festival City, Roxanne Burnham Gardens, Guyhoc Gardens.
21. 60 Hz. areas along East Bank from Garden of Eden to Houston, Republic Park, No. 2 Canal Polder.
22. South Friendship.
23. Garden of Eden to Timehri & Linden Highway.

(24.) Versailles to Lookout. (West Coast)

(25.) Versailles to Vriesland. (West Bank)

26. Plaisance, Goedverwagting, Beterverwagting, Mon Repos to Nootenzuil.

METEOROLOGICAL DATA

BOTANIC GARDENS - GEORGETOWN

	Temperature (°C)			Rainfall		Ambient Pressure
	Max. Mean	Min. Mean	Mean	Precipitation mm	Humidity %	mbar
1970 - 1979						
Jan.	28.4	23.3	25.8	210.2	79	1,014.0
Feb.	28.9	23.7	26.3	105.0	75	1,014.4
Mar.	29.3	24.1	26.7	110.9	75	1,014.2
Apr.	29.4	24.2	26.8	170.2	77	1,014.1
May	29.3	23.9	26.6	315.3	80	1,014.2
Jun.	29.2	23.4	26.3	342.1	83	1,014.5
Jul.	29.4	23.2	26.3	283.0	82	1,014.7
Aug.	30.0	23.6	26.8	225.3	79	1,014.1
Sep.	30.6	23.9	27.2	133.1	76	1,013.8
Oct.	30.8	24.2	27.5	114.8	76	1,012.9
Nov.	30.3	24.0	27.2	224.1	78	1,012.6
Dec.	29.0	23.3	26.2	304.5	81	1,013.3
	Max. Temp. Recorded 31.6°C					
	Min. Temp. Recorded 22.5°C					

Source: Ministry of Works, Hydrometeorological Service.