1612

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

BRAZIL - COPEL (Electric Power System)

~~512-041~~ (048)

512-L-041
AID-DLC/P-298

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

AID-DLC/P-298
February 19, 1965

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Brazil - COPEL (Electric Power System)

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed $12,200,000 to the Companhia Paranaense de Energia Eletrica, COPEL, to assist in financing the U. S. dollar cost of electrical equipment and material, engineering services and technical assistance and training for the following purposes: (1) to expand and improve electrical generating and transmission systems in the State of Parana, and (2) to assist in establishing a training program in utility operations and maintenance, and in improving cost control and accounting procedures.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee at its meeting on February 24, 1965.

Helen E. Nelson
Secretary
Development Loan Committee

Attachments:
Summary and Recommendations
Project Analysis
Annexes I-V

COPEL - CIA. PARANAENSE DE ENERGIA ELETRICA

Table of Contents

COPEL - Power Expansion for the State of Paraná

I. Summary and Recommendations

1.01 1. The Borrower: Companhia Paranaense de Energia Elétrica (COPEL), a "mixed-capital" corporation, with majority government participation, engaged in the production, distribution, and sale of electric energy in the State of Paraná. It is also an instrument of the state government in the planning, coordination, and implementation of electric power development within the State. The loan will be guaranteed by the Government of Brazil (Ministry of Finance).

1.02 2. Amount: $12,200,000

1.03 3. Purpose of the Loan: The purpose of the loan is to assist in financing the foreign exchange costs of electrical equipment and material, engineering services, and technical assistance and training necessary (1) to expand and improve the generation and transmission system, "main system", in the northern and eastern part of the State of Paraná, (2) to expand and improve the generation and transmission facilities of five isolated electric power system in the western part of the State of Paraná, and (3) to assist in establishing a training program in utility operations and maintenance, and in improving cost control and accounting procedures.

1.04 4. Purpose and Background of the Overall Program: Most of the electric power in Paraná is distributed by a variety of isolated private concessionaires which serve limited areas or a specific industry. Because of restrictive rate control imposed by previous Federal Government, these concerns have found expansion unattractive. As a result the State Government, through COPEL, has taken the leadership with respect to planning and coordination of the various power systems. COPEL policy as outlined in this plan is to replace most of the existing small and inefficient power plants with more economic hydro plants, interconnect the various systems into one large "Main System", and to expand six smaller isolated systems which will be interconnected at some future date. The program has already been initiated; the Xavantes and Capivarí-Cachoeira plants are under construction and several smaller hydro projects and transmission lines have been completed and others are in the construction stage. However, COPEL requires external financing to complete the program.

1.05 5. The Overall Program: The overall program consists of the expansion and modernization of the power system in the State of Paraná over a five year period ending in 1970. The program includes:

/...

(1) increasing the generating capacity from the present capacity of 134,000 KW to approximately 400,000 KW in 1970 principally through the construction of the Xavantes and Capivarí-Cachoeira hydro plants. (Though the Xavantes and Capivarí-Cachoeira plants are important features of the overall plan, they are not directly the responsibility of COPEL; however, COPEL is required to contribute to their financing during the program period and will purchase wholesale power from them.) (2) interconnection of the Xavantes and Capivarí-Cachoeira plants by a 220 KV transmission trunk line which will link the Curitiba region in the Southeast with the Northern region of the State, thus permitting an interchange of power between these systems. (Included in this interconnection is the construction of additional transmission facilities which will extend the transmission system to nearly every city and town of these two important regions), and (3) the development of diesel generation capacity in six isolated systems in the western part of the state, where the market is smaller, and where it is not economically feasible, at this time, to construct long-range transmission lines.

Several major sections of the overall program including the Xavantes and Capivarí-Cachoeira and two smaller plants are already under construction. The construction and installation of the facilities included in the proposed loan will coordinate with and complement the lines presently in operation or under construction.

1.06 6. The Project: (See Appendix III, Exhibit 1) - A.I.D. loan funds will be utilized to finance 30,000 KWs of packaged diesels, 220 KV and 66 KV transmission lines and substations and engineering and professional services. The project for which A.I.D. loan funds are requested is a part of the overall program and consists of (1) the expansion and improvements to the existing generation and transmission system in the northern and eastern regions of Paraná (main system) through the construction of transmission lines and associated substations and switching stations, and the installation of five package type diesel electric generating units (totalling approximately 15,000 KW) to meet interim power needs, (2) expansion and improvements to the generation and transmission systems of five of the six isolated systems in Western Paraná through the installation of five package type diesel electric generating units (totalling approximately 15,000 KW) and the construction of transmission lines and associated substations. (As hydro electric power becomes available in the eastern part of the State, from plants now under construction, the packaged type diesel generator units initially installed in the main system will be transferred to the isolated systems, giving these systems 10 A.I.D.-financed units), and (3) the establishment of a training program in utility operations and maintenance, and the initiation of improved utility cost control and accounting procedures.

/...

1.07 7. Financial Plan: The total cost of COPEL's expansion program including the COPEL contribution to the Xavantes and Capivari-Cachoeira projects approximates $76 million. The total cost of the project proposed herein is estimated at $25.5 million. Financing is proposed as follows:

(thousands of dollars)

	A.I.D. Foreign Exchange Costs	COPEL Local Costs	Total
Diesel Units	$ 3,960	$ 470	$ 4,430
Substations	5,434	4,199	9,633
Transmission Lines	1,279	6,395	7,674
Isolated Systems	223	2,538	2,761
Engineering Services	290	200	490
Sub-total	11,186	13,802	24,988
Training	175		175
Accounting & Managerial Services	50		50
	$ 11,411*	$ 13,802	$ 25,213

1.08 8. Feasibility Study: The Feasibility Report on which this paper is based was prepared for COPEL by International Engineering Company, Inc., of San Francisco, California. An outline of the procedures followed by International Engineering in preparing this report is contained in Annex III, Exhibit 7.

1.09 9. Other Free World Financing: Clearance by Export-Import Bank obtained on February 26, 1965 (See Page 3b).

1.10 10. COCAP Approval was given on June 1, 1964.

1.11 11. Statutory Criteria: All Applicable Statutory Criteria have been met with the exception of clearance from Ex-Im Bank.

1.12 12. Recommendations: Authorization of a dollar loan to COPEL in an amount not to exceed $12.2 million, the loan to be subject to the following terms and conditions.

A. Terms

1. Amortization over a period of 20 years from the date of the first disbursement.

2. Grace Period of five (5) years on repayment of principal.

* The difference between the $11,400,000 and the $12,200,000 figures is accounted for by the deferment of interest during the construction period (as estimated by International Engineering).

3. Interest Rate to be 5-1/2% per annum on the disbursed balance, and to be capitalized during the grace period.

4. The two steps option will be offered to the Government of Brazil with repayment scheduled at forty years including a ten year grace period, with interest at 1% during the grace period and 2-1/2% thereafter.

B. Conditions

1. Equipment, materials, and services (except shipping which shall be procured from the United States, and Marine Insurance) financed under the loan shall be procured from the United States of America.

2. The loan shall be guaranteed by the Ministry of Finance of the Government of Brazil.

3. The loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

Project Committee:

Loan Officer: Dwight D. Johnson, USAID/B
Engineer: C. Schultz, CD; W. Reed, POW, USAID/B
Economist: A. Theodorides, PP/Econ, USAID/B
Legal Counsel: D. M. Trubek, LGA, USAID/B

Approved: DDOM, W. A. Ellis
DOM, S. H. Van Dyke

Drafting Officers: D. Johnson, C. Schultz, A. Theodorides

II. Place of the Loan in the Program

2.01 - An analysis of the Brazilian economy shows both the need and the opportunity for the United States to provide substantial support to the stabilization and development programs of the present government of Brazil. The present government which began life with inflation undermining the economy and foreign exchange reserves squandered, is making a concerted effort to attack the problem of inflation, to restart the process of economic development on a sound basis, and to institute vital economic and social reforms within the framework of a democratic society.

2.02 - The analysis of the economic situation indicates the areas in which U.S. assistance should be concentrated. First of all, assistance is needed in support of the government's program to fight the inflation which has had such a disastrous role in retarding economic development, contributing to recurring balance of payments deficits and distorting patterns of investment. Allied with this objective is the need to help Brazil meet its serious balance of payments difficulties. Second, the analysis shows that capital investment is needed to assist the economy of Brazil in eliminating economic bottlenecks and creating the infrastructure necessary to economic development.

2.03 - One of the sectors in which major investment can be applied to greatest economic advantage is the power sector. Lack of power is a principal bottleneck in the development of Brazil. The GOB is cognizant of this fact and has singled out the power sector as a recipient of substantial investment. Out of a total proposed investment expenditure of Cr$5,120.5 billion in 1965 and 1966, Cr$1,013.9 billion will be for electric power. The power sector has been comparatively well studied and investment in this sector is of high economic priority, making this sector one in which AID investments in high priority projects would substantially assist the economic development of Brazil.

2.04 - As the subsequent analysis demonstrates, the project under consideration is a project which meets the above criteria. The project is economically sound and will make a substantial contribution to the economic growth of one of the most rapidly growing states in Brazil.

III. Technical Analysis of the Project

A. The Borrower - COPEL

3.01 - The Companhia Paranaense de Energia (COPEL) is a mixed capital corporation with majority participation (over 99%) by the State of Paraná. COPEL was established on October 26, 1954, and is now the major power concessionaire in Paraná, and operates as a state-wide company engaged in the production, distribution, and sale of electric power. COPEL is also an instrument of the Government of Paraná in the planning, coordination and implementation of electric power development for the purpose of promoting the economic growth of the State. The history of COPEL shows that the company has been rapidly expanding over the last few years so that it is now the largest concessionaire in the electric power industry of Paraná. COPEL's generating capacity has increased from 4,400 KW in 1957 to 21,500 KW in 1963, and energy sales have increased from 9 million Kwh to 72.9 million Kwh during the same period. Private power companies were unable to provide this expansion because of inflation and restrictive rate controls. Furthermore, the integration of the many small privately owned systems has been hindered by the lack of coordination and planning among the many small companies. It has therefore been necessary for the State government to take an active part in the production, distribution, and sale of electric power. COPEL fills this function for the State of Paraná. As a result of its special relationship with the State government and the vacuum left by the other concessionaires, COPEL is now the largest concessionaire in Paraná, and is not only operating and expanding its own distribution system, but is also supplying power on a wholesale basis to a number of other concessionaires, and is the only company which has a positive program for the integration of all state power systems.

3.02 - 1. Organization

COPEL's operations are carried out with a staff of about 780 of which 240 are administrative personnel, 146 technical office staff, 236 operation and maintenance personnel and 158 construction supervisors. Overall direction and policy making is the responsibility of the Board of Directors, composed of the following members:

President	-	Pedro Viriato Parigot de Souza
Technical Director	-	Mauricio Schulman
Administrative Director	-	Gabriel A. N. Neiva de Lima
Director	-	Jayme de Camargo Simões

A Chart showing the organization of the company is included as Exhibit 1 of Annex II. The decrees and statutes establishing COPEL as a corporation are included as Exhibit 2.

2. COPEL's Capacity to Execute the Project and Operate a Power Utility

3.03 a. Execution of the Project

From a review of the data made available in the feasibility study, discussions with the Borrower's representative and discussions with the Consulting Engineers who prepared the feasibility study, it has been determined that COPEL has a technical staff which is enthusiastic and well trained, but lacking in depth and experience. This staff however, with the assistance and guidance of a qualified consulting firm, has the capacity to execute the project. A contract for the services of a qualified engineering firm will therefore be a condition of this loan. COPEL is now planning to contract for the services of International Engineering, the firm which prepared the feasibility report for this project. International is one of several qualified U.S. firms which has extensive experience as a power consultant in Brazil.

3.04 b. Operation of the System

COPEL has operated as a power utility since 1955 and during this period has developed a core of experienced personnel. During this period COPEL's operations have expanded many times. COPEL's managerial and operational capacity has to date been able to keep pace with the rapid growth, but observers feel that COPEL lacks depth in number of competent personnel. The scope of COPEL's operations will expand considerably as the large interconnected main system comes into being, and COPEL does not at present have the capacity to manage, operate and maintain the expanded system, and of necessity must start the process of acquiring and/or training personnel and planning for improved operations and maintenance procedures, and for improved cost control and accounting procedures. COPEL at present has a formal training program in operations and maintenance, but lacks an on-the-job training program. In regard to accounting and cost control, COPEL has plans to fully automate its

/...

accounting and cost control systems on a computor system being established by the state government.

To what extent COPEL will need external assistance in meeting its growth requirements is not known. Therefore included in the project is provision for management and training surveys to review and analyze COPEL's future requirements and to assist COPEL in developing an adequate program to meet these requirements. It is the judgement of the project committee that COPEL will be able to develop the capacity to operate the expanded system; however, it is felt that the assistance as included in the project, should be provided to assist COPEL in the process.

B. Background and Overall Program

3.05 - 1. Background

In the State of Paraná there has not been the overall planning for electric power production and distribution facilities as would be expected at this stage of development. The production of power and its distribution has been accomplished by the utilities and by industrial companies supplying themselves in their respective areas but operating more or less independently of each other. The expansion and integration of these companies was retarded by restricted rate control laws which made new investments unattractive, and by a lack of common purpose among the various suppliers. As a result there are a large number of small utilities and companies, each serving a restricted area or industry. The total installed capacity in the higher developed northern and eastern area is about 115,000 KW while in the isolated systems of the southern and western areas about 20,000 KW of capacity is installed.

3.06 There has not been until recently an opportunity for integration of the power facilities in the State. The generating plants in most of the various areas were small and were required to supply the demand within their own areas. At the same time none of the area loads were large enough to economically justify the cost of transmission lines to other sources of generation. Within the past few years the loads in the various areas have grown to a size where economical integration of facilities has been accomplished on a limited basis. Also, substantial blocks of power have been brought into the state from adjacent areas where a surplus of power exists temporarily.

/...

3.07 As the first step in overcoming the power deficiency in Paraná an overall state study was made by COPEL in 1963 in which plans were made for increasing the generating capacity in its own system from the present 134 MW to 400 MW by 1973, and to construct an extensive transmission network to take power to the many load centers in the State. This study has been updated into the present plan which is the basis of the proposed loan. The feasibility report prepared by COPEL, as assisted by International Engineering Co., presents a 5-year program of expansion and integration of the systems in the State. This feasibility study expands and brings up to date previous COPEL reports which together with this study represent tangible evidence of sound planning. Some of the work proposed in the plan has already been started. The work to be financed with A.I.D. loan funds is an integral part of the overall plan and must be completed so that the facilities already started will be effectively utilized. Long range planning is essential to a successful state-wide power complex needed to meet the power requirements as they develop throughout the State and Country. This fact has been recognized by the Government of Brazil which has requested funds from the United Nations Special Fund to assist in the financing of a long-range power study for all the southern area of Brazil of which the State of Paraná is a part. When such a study is completed there will be an overall plan of power development for all of the central area of Brazil from the State of Minas Gerais to the southern borders of the country. The construction proposed in the A.I.D. financed project can readily be incorporated into a future overall country program since the Paraná plan is basically a subtransmission network required in any case.

3.08 2. Overall Program

"The projected COPEL system in 1970, upon completion of the present program is shown schematically on Exhibit 2, Annex III. The overall system is divided into two basic components, (1) a large interconnected system serving the major markets in the eastern and northern part of the State, and (2) six isolated smaller systems serving the western and southern part of the State. The large system is hereinafter referred to as the Main System. The six isolated systems are designated after the major town in each system:

1 - Planaltina do Paraná
2.- Cruzeiro do Oeste
3 - Campo Mourão - Cianorte
4 - Cascavel
5 - Fôz do Iguaçu
6 - Pato Branco

/...

3.09 In addition to these systems, which cover all of the principal towns in the COPEL area, are a number of small systems serving villages and smaller towns. However, the expansion of these systems will be primarily the responsibility of the Paraná Department of Water and Power (DAEE) and local authorities, and is not considered part of this program.

3.10 a. Main System

The major elements of the Main system are the Xavantes and Capivari-Cachoeira power plants and a 220 kv transmission network. The Xavantes power plant is located in the northeast corner of the State, on the Paranapanema River, which forms the border with São Paulo. This 400,000 kw project is under construction by USELPA and is scheduled for completion in 1968. COPEL has an agreement with USELPA to buy up to 40 percent of the power produced by this plant. Capivari-Cachoeira is located in the southeastern part of the State about 60 kilometers northeast of Curitiba. This plant, which ultimately will have a capacity of 230,000 kw, is being constructed by Central Elétrica Capivari-Cachoeira (ELETROCAP), a mixed capital company in which COPEL holds the majority of the shares. The first two units are scheduled for installation in 1969 providing 115,000 kw by 1970. The last two units will be installed subsequently as needed.

3.11 The 220 kv transmission system will consist of a trunk line extending from Xavantes to Capivari-Cachoeira. The line is divided in four sections:

(1) Xavantes - Figueira, 115 km
(2) Figueira - Ponta Grossa, 133 km
(3) Ponta Grossa - Campo Comprido, 100 km
(4) Campo Comprido - Capivari Cachoeira, 85 km"

3.12 b. Isolated Systems

The isolated systems in 1970 will have been developed from expansions of existing systems and will all be rather similar in scope. Their power supply will be provided by new diesel units in addition to some existing plants. Their transmission systems will consist of 33 kv feeder lines and distribution lines of lower voltage except that the largest of these systems, Campo Mourão-Cianorte, will have three 66kv lines connecting the Mourão I power plant and the towns of Cianorte, Campo Mourão, Mamborezé and Barbosa Ferraz.

/...

3.13 The new larger Diesel units will replace a number of small and inefficient thermal and hydro units now in operation. A total of 39,000 kw will be installed by 1970, of which 15,000 kw are in new imported units, with the remaining units coming from the Main System as they come available upon completion of Xavantes and Capivari-Cachoeira.

C. Description of the A.I.D. Project

3.14 In order to present a project suitable for A.I.D. financing, COPEL separated a component of the overall program from the program in such a manner that a self-contained project (one containing the major share of the foreign exchange costs of the program) could be presented to A.I.D. for consideration. A.I.D. loan funds will be utilized to finance 30,000 KWs of packaged diesels, 220 KV and 66 KV transmission lines, substations, and engineering and professional services. The A.I.D. financed materials and equipment will be installed and/or incorporated into the project thru local cost construction contracts financed by COPEL. The project consists of (1) the main system, transmission lines to bring power into the main system, and to expand the existing internal transmission network, and the installation of five package type diesel electric generating units to meet interim power needs and (2) the expansion and improvement of five isolated systems in the western part of the state. During intensive review, the need for a program to assure COPEL's capability to operate the expanded system became apparent, and such a program was discussed with COPEL and incorporated into the project. (Detailed Cost Estimates for the Project are contained in Annex III.)

1. Main System - A.I.D. Project

3.15 a. Main System - Transmission Lines

These lines (see Exhibit 1, Annex III) consist of an 85 km double circuit 220 KV line from Capivari-Cachoeira to Campo Comprido, one circuit of a 115 km future double circuit 220 KV line on double circuit towers, from Xavantes to Figueira, and a 120 km single circuit 220 KV line from Figueira to Apucarana. In addition to these high voltage lines a double circuit 66 KV loop from Campo Comprido, a total distance of 58 km and single circuit 66 KV lines from Irati to Guarapuava, a distance of 83 km, and from Capivari-Cachoeira to Morretes to Atuba, a total distance of 100 km, and a 28 km line from Campo Comprido to Rio Branco do Sul will complete the transmission lines in the main system.

/...

The substations in the main system are complex to the extent that they are utilized as sectionalizing stations as well as step down substations to serve lines radiating from the load center at diverse voltages. Complete one-line diagrams of the transmission system and substation arrangements are included in the feasibility report. A description of the substations in the main system is contained in Annex III, Exhibit 3.

3.16 b. Main System - Diesel Generators

To alleviate impeding power deficits in the main system, before the new hydroelectric plants in the area are completed, it is planned to install immediately 15,000 KW of the package type diesel electric generating units in the main system. Load projections in the northern and eastern part of the state point up the urgent need for additional power in 1965 and 1966 before the Xavantes and Capivari-Cachoeira projects are completed. The local projections also show that after these two hydroelectric plants come into operation there will be sufficient power to allow the retirement of the emergency supply as well as some of the older existing hydroelectric and diesel generating plants that are expensive to operate. Consequently, the desirable solution to the immediate emergency power supply is the installation of generation that can be easily removed to another location and thus eliminate the capital investment of permanently installed capacity that is relatively expensive and not being used. Since an early installation of the emergency supply is important, it will be possible to install the first of this type generating units within 6 to 7 months as compared to 14 to 18 months for a fixed diesel plant of the same capacity, at a cost of approximately $240.00 per KW of comparable installed capacity as compared to the $147.00 per KW of capacity of the packaged type units. Plans now call for installation of 6,000 KW at Curitiba, 6,000 KW at Maringá and 3,000 KW at Paranaguá. As soon as power becomes available from the hydroelectric plants now being built, these units will be transferred to the isolated systems whose loads will have increased by that time to the point where the additional capacity will be needed. These transfers, as tentatively proposed, are indicated in the construction schedule for the isolated systems (Annex III Exhibit 16B).

3.17 2. Isolated Systems - A.I.D. Project

The five areas of the isolated systems are designed

/...

as Planaltina do Paraná, Cruzeiro do Oeste, Cascavel, Pato Branco and Fóz do Iguaçú. The A.I.D. financed portion of the COPEL 1970 system includes the installation of 3,000 KW of package type diesel generating units in each of the five areas. Each of the distribution systems, with the exception of Fóz do Iguaçu, will be expanded by the construction of 33 KV transmission lines from their respective power sources. The required 33 KV step-down substations will supply the 13.2 KV distribution lines being financed outside this loan.

The isolated systems will need more power by 1970 than is being provided in the first steps of the construction program. It is planned to provide for those increases through the transfer of the 15,000 KW of package type diesel generator units which are being installed immediately in the main system at Curitiba, Maringá and Paranaguá. The scheduling of these transfers is to be coordinated with both the availability of power from the hydroelectric plants now under construction, and the load growth in the isolated areas. No difficulty is anticipated with this planning since delayed completion of the hydro electric plants or a faster rate of load growth than is now anticipated in the isolated areas can be compensated for by delaying retirement of existing old hydro and diesel generating equipment. This scheduling of transfer of the units is shown in Annex III Exhibit 6B. A detailed description of each isolated system is contained in Annex III, Exhibit 3.

3. Program for Improvement of the System's Operations and Maintenance and the System's Accounting and Management Procedures

3.18 a. Operations and Maintenance

This portion of the project will consist of (1) a survey by the consulting engineers or by a Public Utilities Specialist to review and analyze COPEL's operations and maintenance program for present and future system requirements, and (2) on the basis of the above analysis to recommend a program to assist COPEL to establish an adequate operations and maintenance program to meet future requirements, to establish a comprehensive training program in all levels of operation and maintenance and to prepare procedural and training manuals.

The extent of the training program will depend on the recommendations developed in the survey; however, the program will consist of both a local training program to be carried

/...

out by COPEL and a participant training program for training of key personnel by U.S. Public Utilities, such as TVA, Bonneville, Pamar, and Private Utilities and equipment manufacturers. If participant training is recommended, it will be coordinated through the USAID training office.

3.19 b. Program for Establishing Improved Systems of Management and Accounting

This program will also consist of an initial survey by a consulting firm or by a U.S. Public Utility Controller assisted by a local accounting firm to determine future requirements and recommend procedures to be adopted in the areas of cost control, cost accounting, rate determination, materials and inventory control, and accounting procedures and mechanization needs. It is felt that COPEL has the capacity to implement and otherwise take advantage of such recommendations.

D. Construction and Execution of the Project

1. Manufacture of High Tension Overhead Lines

3.20 For the manufacture of high tension overhead lines, imported components represent a substantial portion of the total cost. Therefore COPEL will procure from the U.S. with A.I.D. funds and provide for the manufacturer (1) aluminum ingots for the conductors, and (2) extra high strength steel wires in the core and in the ASCR cables of the shielding wires for all transmission lines. Contracts for the manufacture will be procured by competitive bid and/or informal solicitation depending on schedule needs.

2. Construction and Installation

3.21 The construction of and erection, and installation of the project will be performed by contracts awarded by competition bids. These contracts will be local cost only and will contain escalation clauses to protect the contractors against cruzeiro depreciation. These contracts will be financed by COPEL. Qualified contractors who have performed similar work are available in Brazil. Local contractors are unable to obtain performance bonds, therefore it will be necessary that emphasis be placed on qualifying the contractors. COPEL for several years has done extensive construction of transmission

/...

lines, substations, and distribution systems and as a consequence has developed a staff of supervisory personnel which is familiar with this type of work. COPEL has by practice done all new construction work by contract awarded on the basis of competitive bids received from prequalified contractors. Since there are qualified contractors available COPEL plans to continue on this Project as on previous construction.

E. Technical Analysis of the Project

1. Technical Feasibility

3.22 The overall plan has been developed in a logical manner and is based on data obtained from reliable sources. A review of the plan indicates that the project is technically feasible. The plan develops a schedule for introducing new generating capacity into the State. This scheduling is based on market surveys which demonstrate that there will be a market for the power and that the generation scheduled to come into operation over the next five years will meet that demand. An extensive transmission system is also developed in the overall plan to transmit power from the several sources to the load centers throughout the State.

3.23 The schedule of construction is dependent upon completion of construction not a part of this A.I.D. financed Project. The construction of the transmission lines scheduled to bring power into the state-wide grid from hydroelectric plants which are in various stages of construction will be coordinated with the completion of the power plants. Lines not dependent on power from remote locations such as those lines being fed by newly installed packaged diesel electric generating plants can be scheduled for early completion in accordance with the anticipated early delivery and installation of those generating units. The schedule of construction given in Annex III Exhibit 6 is reasonable and capable of accomplishment. No unusual problems of construction are expected, the soil, the weather and transportation facilities being such as to not be a hindrance to construction.

3.24 The additional generating capacity has been properly coordinated with the expansion of the transmission system. The major sources of economical power for the main system will be the hydro-electric plants in the immediate area. Some of these are located in the State of São Paulo, alongside the Paranapanema river, which are being developed by USELPA, a mixed economy corporation. Salto Grande and Jurumirim were the two first developments on this river, and are already in operation. The 400 MW Xavantes Project is now under construction by USELPA and is scheduled for completion in 1968. The 68 MW Salto Grande and the 98 MW Jurumirim hydroelectric plants, both owned by USELPA, are completed and provide power into Parana over a double

circuit 88 KV line to the Londrina system. Although the Londrina system is not included directly in the COPEL expansion program, COPEL now purchases a total of 15,000 KW of power from USELPA at Londrina and transmits it over its own 132 KV line to Apucarana, and to Florestopolis also over its own 88KV line. The Capivari-Cachoeira hydroelectric plant is presently under construction by COPEL with the assistance of an IDB loan. The first two units having a combined capacity of 115 MW are scheduled for operation in mid 1969. The Salto Grande do Iguaçu, to start as a run of the river plant, is being built by COPEL and is expected to be completed in late 1965 with a capacity of 14 MW. This capacity can be increased to 150 MW in the future by the construction of a 30 meter high dam. The Mourão I is a 6.5 MW hydroelectric plant which will be completed by COPEL in early 1965 and will provide power to the presently electrically isolated area around Campo Mourão. It is expected that this system will be connected to the main system within a few years when the loads in the Campo Mourão area will justify such connection.

3.25 Several major sections of the 5-year plan are, by necessity, already under construction to permit COPEL to meet immediate power demands with power from various sources. The construction of the facilities included in this loan will coordinate with and compliment the lines presently in operation or being constructed. Consequently, this Project provides components of the construction program which are essential for its successful completion and operation. The lines are of good design and can be operated to transmit power at the most economic value possible.

3.26 With power being introduced into a system from many sources as in this case, it is not possible to allocate the costs of a specific line in arriving at the cost of power delivered to a specific distribution point; rather, the cost of all the transmission grid is shared by all the energy transmitted over the system. Using this concept it is estimated that the transmission costs for the COPEL system will approximate 0.5 U.S. mils per KWH per 100 Km of line. Assuming an average transmission of 200 Km the delivered cost of power will contain a transmission component of about 1 U.S. mil per KWH which compares favorably with U.S. experience.

3.27 The packaged diesel-electric generating plans are a proper solution to the need for immediate generating capacity in the main system. When the cheaper hydro-electric power becomes available then the packaged units can be easily moved to where they can be used advantageously until cheaper sources of power are available.

/...

3.28 In view of the type of service in which these packaged type generating units will be used any determination of a cost of power would be of doubtful value. There are no other comparable sources of generation in capacities required for this Project which can be installed within the time limits and also have the advantage of mobility when no longer needed at a particular location. Since in each case of use on this Project the generation is of an emergency, peaking or temporary basis until more economical power becomes available these units are ideally suited to the class of services. Utility experience in the U.S. has shown this type of generation to be an economical choice in such situations. Based on the experience in similar situations and making allowances for differences in cost of fuel it is estimated that power from these units can be produced for about 4¢ per KWH, a reasonable figure. It is estimated that after the large hydroelectric plants are operating the cost of power delivered to the load centers of the system will be about 1¢ (U.S.) per KWH.

3.29 Material and equipment for the Project will be obtained locally to the extent it is available. However, large items of equipment such as the packaged diesel-electric generators, circuit breakers, high voltage switching and control equipment are not produced in Brazil and as a consequence will be purchased in the U.S. In addition, certain components of items manufactured in Brazil will be obtained in the U.S., the major U.S. products being aluminum ingots and high strength steel cable. A list of the materials and equipment to be purchased in the U.S. is given in Annex III Exhibit 5.

3.30 The cost estimates for the transmission lines and substations are based on costs experienced on other similar projects by COPEL and other utilities in Brazil. The installed costs of the packaged diesel-electric units are based on other recent installations in Brazil. Summaries of the cost estimates for the Project are given in Annex III, Exhibit 4.

3.31 The information presented in support of the application for the A.I.D. loan indicates that sufficient planning and investigations have been made to insure a satisfactory project. Such planning has therefore met the requirements of FAA-611.

2. Studies

3.32 A load flow study was made to investigate load flows and voltage levels from no-load to full load conditions. From this study was determined the transmission line capacities and the need for a synchronous condenser at Campo Comprido to control voltage regulation as the loading on the transmission system increases. The study as made is adequate for the purpose intended. However, before there is a disbursement of A.I.D. funds, a network analysis must be made to determine interrupting capacities for breakers, transient and steady state stability, and selection of line protective relays. COPEL states that it has already made preliminary studies and is prepared to make the final study as soon as there is an assurance of funds.

3. Engineering

3.33 The design of the steel transmission towers and substation structures will follow the design previously used and tested by experience in other lines of COPEL. As a result, a substantial amount of the design engineering has already been done and only the changes required to meet specific conditions will be necessary. COPEL does not have a sufficiently large technical staff to perform the engineering services in connection with the construction of the project and such services will be contracted with a U.S. consultant. Little engineering services will be required for installation of the packaged type diesel generating units since their installation does not require extensive site preparation or work in making connections to the system. In such installations the manufacturers provide installation supervisors as a part of their contract.

3.34 Load flow studies have been made in sufficient detail to satisfy the requirements for preliminary engineering. However, before the detailed engineering can be completed a network analysis must be made. This analysis should be made prior to the disbursement of A.I.D. funds. COPEL is prepared to make this analysis as soon as funds are assured.

The schedule for performance of engineering services will coordinate with the construction schedule (Annex III Exhibit 6) of the project components.

4. Design Criteria

3.35 The design of the transmission lines follow standards used by COPEL in its present transmission lines. These designs are based on U.S. standards. The 220 KV circuits will be placed on steel towers. In the single circuit design the conductors are carried in horizontal configuration while in the double circuit design the conductors of each circuit are in vertical configuration. All the 220 KV lines have two shield wires carried the entire length of the lines. One 65€ MCM ACSR conductor will be used per phase and the shield wires will be 3/8" extra high strength steel. Insulators will be 10" glass discs. The structural design will be according to the U.S. National Electric Safety Code for Light Loading Districts.

3.36 The 66 KV circuits will be placed on steel towers in triangular configuration. One 266.8 MCM, 397.5 MCM, or 2/0 ACSR conductor will be used per phase, depending upon design capacity. The lines will be shielded their entire length with one 5/16" extra high strength steel cable. Insulators will be 10" glass discs. The 33 KV lines will use concrete or timber structures with steel crossarms carrying the conductors in flat configuration. Insulators will be pin-type porcelain on tangent line and 10" porcelain discs on corners and deadends. Conductor will be 1/0 ACSR and no shield wire will be used.

3.37 The substation structures will be of steel and in general of unitized type, each designed for its particular application. The designs follow practice common in the utility industry in the U.S.

3.38 The package type diesel generating units of 3,000 KW nominal capacity each include engine, generator and control cabinet, low voltage switch gear and housing. They will operate at system frequency of 60 cycles and their output will be connected to their respective systems through a step-up substation at each location. Fuel storage of 120,000 liters will be provided at each location, equivalent to one week's consumption. Lubricating oil will be stored in a tank of 8,000 liters capacity. Installation of the units does not involve extensive work. However, concrete foundations for the substation transformers and oil storage tanks, grading and surfacing of the area and workshop and office facilities will be provided as required in each case. Normally neither concrete foundations nor cooling water reservoirs are required for the units.

5. Local Laws and Regulations Which May Affect Costs

3.39 The Law of Similars prevents the importation of items which may be manufactured by local industry and delivered in time to meet the project completion schedule. This law has, in the past, raised problems concerning the importation of certain equipment including portable diesels for the Fortaleza Project. However, an examination of the problem reveals that package diesel units as proposed for the COPEL project are not manufactured in Brazil. This class of equipment follows the locomotive construction and are generally manufactured by companies for whom the manufacture of diesel electric locomotive is a major product.

3.40 To successfully produce an enclosed package diesel unit, special consideration is given the size, shape, capacity and location of the auxiliary equipment so that it can work efficiently in a confined and limited space. The piping hook-ups are critical and have undergone careful design analysis. The mechanical and electrical components are assembled and installed within the unit housing by the manufacturer and tested before delivery. They are shipped from the factory as complete units only requiring a fairly level site on which to set a connection to a fuel supply and an electrical connection into the electric system. This generally requires but a few hours work at the site and the unit is ready to produce power. The only possible item generally considered as possible Brazilian supply is the electric generator. It would be impractical to ship this unit from the USA for later installation of a generator as it would require major disassembling and reinstallation of a major component. This would split responsibility for satisfactory operation and prevent the assurance by the manufacturer that he is delivering a unit ready for satisfactory operation.

3.41 The diesel engines so far available in Brazil are built under European or Japanese license and are for marine propulsion. Possibly in

the licensing arrangements these medium duty diesel engines can be supplied, however they would be an assembly of major components obtained under third country license.

3.42 Therefore, the opinion of the Borrower, the Consultant and the USAID is that if the specifications are carefully written to reflect the features described above, authorization to import will be received. The approval procedures of CACEX might, of course, delay the project to a certain extent; however, it is planned that as soon as the loan is authorized, the consulting engineers will write the specifications and undertake to obtain import authorization.

3.43 The importation of certain other items, such as 33 KV lightning arresters, may be affected by this law, but it appears that prompt procurement and careful preparation of specifications will minimize such problems.

IV. Economic Analysis

A. Place of Power in Brazil's Economic Development

4.01 With the gradual transformation of the structure of the Brazilian economy, through development, adequate supplies of electric power have increasingly become of decisive importance for sustaining a suitable rate of national economic growth. Since electricity is the cheapest source of power for mechanization and industrialization, high electric power consumption becomes a determining factor in the rate of acceleration of both, and indispensable to the attainment of higher productivity levels. Under such conditions, the power supply must not only meet current needs but must lead economic growth, if it is not to become a bottleneck which discourages new investment and impedes the mechanization process.

4.02 In Brazil, a principal bottleneck to economic development has been and continues to be the lack of an adequate supply of electric power. Cognizant of this fact, the Castelo Branco Administration, under its 1964 - 1966 Economic Action Program, proposes to spend larger sums of money for the development of electric power than for any other sector. Out of a total proposed expenditure of Cr$5,120.5 billion in 1965 and 1966, under the national development program, Cr$1,013.9 billion will be for electric power (these figures include foreign currency requirements equivalent to Cr$1,096.5 billion and Cr$258.8 billion, respectively). According to government estimates, increasing industrialization, plus the growth in urban population will require a cumulative annual expansion of power supply of 11.4%. Plans call for the doubling of the 1963 capacity of somewhat less than 6 million KW to 12.7 million KW by 1970. This will require a total expenditure of Cr$3,731.4 billion (at 1964 prices, including Cr$981.5 billion in foreign exchange) for generating capacity, transmission lines and other power facilities, during this period, country-wide.

4.03 The power situation noted above is especially critical in the faster growing areas of the country, notably the triangle Rio de Janeiro, São Paulo - Belo Horizonte, which is Brazil's most industrialized region, and the southern region of Brazil, which includes the States of Rio Grande do Sul, Santa Catarina and Paraná, the country's fastest developing area and second in economic importance. The COPEL project is located in and will serve the last State. While a great deal of effort and large sums of money (both domestic and foreign) have been expanded in recent years and new large investments are planned over the next several years for the improvement of the electric power situation in the Rio-São Paulo-Belo Horizonte region (installation of generating, transmission and other facilities in Furnas, CEMIG, CHEVAP, USELPA and URUBUPUNGA)

/...

comparatively little has been done so far to alleviate shortages which exist in the southern region, especially in the State of Paraná. However, this project and the Capivari-Cachoeira and Xavantes projects are designed to meet the needs of this state.

B. The State of Paraná - The Project Zone of Influence

4.04 The Brazilian State of Paraná covers a total area of 200,000 square kilometers. Its Capital, Curitiba, is a bustling City of 400,000 inhabitants. Climatically the State is a transition zone between tropical central Brazil and temperate south Brazil.

With only 2.3 percent of Brazil's area, the State had, in 1960, a total population of 4.3 million, or 6.3 percent of the country's total. Even more significant is the fact that between 1950 and 1960 the State's population recorded an increase of 102.2 percent, compared with a 36.6 percent increase in the country's total population in the same period. According to all indications, this rapid rate of growth in population has continued and will continue. As a result, the State has a total population of about 6 million persons (7.3 percent of the total for the country) at the present time and is expected to have some 8.5 million persons (or almost 9 percent of the country total) by the end of the present decade, according to official estimates. The State is expected to rank third in population in the country, after the States of São Paulo and Minas Gerais, by 1967.

4.05 Because of lack of power and other infra-structure, economic development of the State has lagged behind population growth. Average per capital income in the State is very low and in relation to per capita income in the country, has tended to decline over the years; it was 111 percent in 1960 as against 118 percent in 1950 of average per capita income in the country. In absolute terms, per capita income in 1960 averaged no more than Cr$29.7 thousand (or $156 at the then prevailing official rate of exchange of Cr$190 per $1) in the State. No up-to-date income data are available, but it is doubtful that the situation has improved much in more recent years.

4.06 The State is predominantly agricultural but it has made considerable progress toward industrialization. In 1960 (the latest year for which figures are available) 63.5 percent of the State's local income came from agriculture and 10 percent from industry; trade, services transport and communications accounted for most of the rest. Some 69 percent of the population lived in rural areas in that year but the trend has been toward urbanization and the growth of cities and towns. Between 1950 and 1960 the population of Curitiba grew by 149 percent (to a total

/...

of 345 thousand in the latter year), Ponta Grossa by 82 percent, Londrina by 74 percent, Maringá by 481 percent, the port of Paranaguá by 76 percent and Paranavaí by 1,082 percent. These are the State's largest cities, in the order given, and the rates of growth are typical of those experienced by other cities and towns in the State.

4.07 In terms of production, the State of Paraná is one of the most important agricultural States in the country. It is the leading producer of coffee, accounting for more than one half of Brazil's total production and exports of the commodity. (Coffee normally earns as much foreign exchange for Brazil as all other exports). The State is also a leading producer of such other basic commodities as cotton, cereals, potatoes, meat, fats and wool and a variety of fruits and vegetables. In 1963, the State accounted for some 12 percent of the total value of crops and vegetables produced in the country. The new rich lands of northern and western parts of Paraná are fast becoming the principal centers of such production. These areas presently are among the important areas in Paraná which suffer from serious shortages of electric power.

4.08 Industrially, Paraná is growing in importance. Industries established in the State are largely engaged in the transformation of raw materials produced in the area. The most important products of local industry are foodstuffs, lumber (Paraná pine), textiles, non-metallic minerals, paper and paper products and chemicals. Together these accounted for 88 percent of the total value of industrial production in the State in 1960. The State accounted for only 4 percent of total value of industrial production in Brazil in that year; however, between 1950 and 1960 such production multiplied fourteen times, as compared with a ten-fold increase of industrial production in the country as a whole. The bulk of industrial capacity is located in and around Curitiba although important installations exist in other growing cities and towns in the East and North of the State. Among the important industrial establishments are several paper mills, including Indústrias Klabin do Paraná de Celulose, S.A., the country's largest producer of paper and cardboard; the Cement Company of Rio Branco; Metalúrgica Eletrodínamo, S.A., producing electric appliances; Siderúrgica Guaira Ltda. (iron foundry) and others. Established industries continue to expand and new industries are being added to the list of those planning to locate in the State, according to information supplied by CODEPAR, the State's bank for economic development. The greatest relative increase in the demand for power in the State in the years to come is likely to be in the industrial sector, especially in the Curitiba area which has in the past and will continue to suffer from shortages until the COPEL project is in operation.

C. Present Power Supply Situation

4.09 The past and present electric power situation in the State calls for the installation of additional generating and transmission facilities sufficient to provide minimum power in large areas of the State which lack

proper facilities at the present time (largely in the western and northwestern part of the State) and to increase the supply of power in those areas where critical shortages have existed and still exist today (notably in and around the capital city of Curitiba and some of the other larger towns in the State). Complete and detailed information on the electric power situation is not available but what there is fully supports the conclusion that the State lags behind and is far worse off than the country as a whole in electric power supply. With 7.3 percent of the country's population, the State of Paraná presently has only about 3 percent (about 210,000 KW) of the country's total installed power. In 1963, it produced only 2.8 percent and consumed 3.6 percent of the national total. There has been no significant change in these ratios for a number of years.

4.10 Production and distribution of electric power in the State over the years have been provided by a large number of utility companies operating more or less independently of each other. Most of these systems are quite small serving only a limited area or one specific industry (a list of the principal producers in the area is contained as Exhibit 3 of Annex IV). All of the companies started out with the operation of small isolated systems and most of them have remained more or less isolated up to the present time. The largest private system is that of CFLP, a subsidiary of the American and Foreign Power Company which the Brazilian Government recently agreed to purchase. The State imports a considerable amount of electric power from the neighboring States of São Paulo and Santa Catarina. The number of power plants in Paraná is relatively large, partly because the various concessionaires and some of the larger manufacturing establishments in the State are provided with their own power plants, and partly because the demand has developed so rapidly that there has been little time to develop an integrated system. Most of the plants are, therefore, quite small, less than 2,000 KW supplying power to isolated systems. About 60 percent of total available capacity is in hydro plants, 30 percent in Diesel plants, and 10 percent is contributed by a coal-fired steam plant. About 20 percent of this total generating capacity is in one-hundred and eleven small plants between 50 and 2,000 KW. Many of these smaller plants are in rather poor condition, due to inadequate maintenance, and their efficiency is far from that of modern standards.

4.11 Most of the transmission networks now in operation in Paraná have been planned and designed to serve a specific and limited area only. Consequently, there are few interconnections between and among the various systems. A notable exception is in the north where the COPEL and Londrina systems are connected with the São Paulo network. The system of CFLP covers the Curitiba area quite extensively but is isolated from any other system and can hardly be classified as a major network.

/...

D. The Market

4.12 Official statistics on total energy consumption in the State in the period 1960-1963 are as follows:

Year	KWh (in millions)	Percent change from preceding year
1960	560.8	-
1961	649.2	15.8
1962	710.5	9.4
1963	807.7	13.7

Consumption during this period was limited by availability of electric power generating and transmission facilities in the State. Even so, the increase from year to year was significant. The lower percent increase in 1962 from 1961 was entirely due to the drought conditions which prevailed in the area in that year.

4.13 In a study of its market (which includes all but two urban areas in the State, in the North, which are supplied by concessionaires from power produced by USELPA, State of São Paulo) COPEL has estimated that the annual average increase in total demand of electric power in this market will increase by 14 percent in the period 1960-1965, by 12 percent during the period 1965-1970 and by 10 percent during the first half of the next decade (from a total of 315 MKwh in 1960 to a total of 636 MKwh in 1965, to 1,098 MKwh in 1970 and 1,710 MKwh in 1975). Industrial demand for power, will increase at higher rates (20, 20, and 12 percent, respectively) during that period, according to this study. In the light of past consumption records and from other known facts concerning the State, these estimates appear to be reasonable. They were based on official population and related data, company records of total and per capita sales of electric power in the various regions of the market, and field investigations among major industrial users of electric energy in the State on unsatisfied demand and prospective additional requirements for electric power, and on other sources.

E. Relationship of the Project to Paraná's Economic Development Program

4.14 The COPEL electric power development plan is a part of the State's over-all economic development plan (which includes transportation, agriculture, education and other sectors, as well as electric power) in the implementation of which considerable progress has been made to-date. The first of such plans covers the period 1963 - 1965 and the second covering the period 1965 - 1970 is presently under preparation. Development of electric power in the State occupies in them a prominent position. In

/...

the 1963 - 1965 overall plan out of a total expenditure of Cr$151 billion, Cr$36.4 billion were programmed for electric power generation, transmission and distribution. The program for electric power development in the State under these over-all plans has been prepared by the State's planning authorities, largely with the cooperation of COPEL's technical personnel. The essential features of this program for 1965 and later years are those already discussed. In addition to providing needed power and integrating the various local power systems in the State, the program will also bring about a larger measure of integration of the electric power complex of the State of Paraná with those of adjacent States than is the case today. A more complete integration of the systems of these States and of the regions and the rest of the country are still many years away. The COPEL project appears to be a stepping stone in the right direction. Another and undoubtedly a more significant step in this direction are the studies presently under way with U.N. help commonly referred to as the Canambra studies.

Estimates of unit cost of production of electric energy by the new hydro plants and the economies to be obtained by the transmission of this cheaper power point to the conclusion that the program of which this project is a part will assist in supplying the State of Paraná not only with an ampler, but also with cheaper electric power. Under the circumstances, the project should prove to be an important factor in the further economic development of this important area.

V. Financial Analysis

5.01 - The financial plan as proposed for the project calls for AID funding in the amount of $11.5 million for foreign exchange costs and COPEL funding in the amount of $13.8 million equivalent in cruseiros for local costs. Under this proposal, AID will finance 100% of the foreign exchange costs representing 45% of the total cost of the project, and COPEL will finance 100% of the local costs representing 55% of the total cost of the project. Source and application of funds over the five year life of the program are projected as follows:

Thousands of U.S. Dollars

YEARS

	1st	2nd	3rd	4th	5th	Total
AID Funds	5,699	1,074	2,760	1,878		11,411*
COPEL Funds	4,301	4,108	2,529	2,589	274	13,801
	10,000	5,172	5,289	4,467	274	25,212

A. Analysis of the Local Contributions

5.02 - COPEL is committed not only to finance the COPEL-AID project but also the overall expansion program, including contributions to the Xavantes and Capivarí-Cachoeira projects. COPEL's projected application of funds shows COPEL financing the overall program, thru 1969, as follows: (additionally, COPEL, in 1964, expended approximately $7.8 million on the Program).

(Thousands of U.S. Dollar Equivalents)

	1965	1966	1967	1968	1969
COPEL-AID Project	4,301	4,108	2,529	2,586	274
Other Program Construction	6,973	4,076	2,361	2,400	2,265
Xavantes Contribution	600	1,000	1,000	400	
Capivari-Cachoeira Contri.	1,500	2,500	3,000	1,500	1,000
	13,374	11,684	8,880	6,886	3,539

5.03 - In addition, COPEL must meet debt service obligations during the construction period. To finance its program and debt service comitments, COPEL has the following sources of funds: (1) profit plus depreciation allowance, (2) the Government of Paraná, (3) the Federal Government, and (4) loans. COPEL's projected investment schedule shows the following major receipts during 1964 and the construction period:

* The difference between the $11,411,000 and the $12,200,000 figures is accounted for by the deferment of interest during the construction period. (as estimated by International Engineering).

(Thousands of U.S. Dollar Equivalents)

	1964	1965	1966	1967	1968	1969
Profit before interest	610	360	1,730	1,240	1,020	1,580
Depreciation Allowance	140	210	580	950	1,320	1,620
Increases in Paid-in-Capital						
Min.of Mines and Energy	1,500	1,000	1,000	800	500	500
Revenue from United Tax	650	800	880	910	800	585
Gov.of Paraná	4,000	4,200	4,400	4,100	3,600	2,500
CODEPAR	4,000	4,200	4,400	4,100	3,600	2,500

5.04 - Attached to this paper as Exhibit 1 of Annex IV is a detailed ten year projection of profit and loss, and source and application of funds for COPEL and a discussion thereof as prepared by International Engineering; these projections show COPEL as having sufficient resources to execute the project. An analysis of this projection follows:

1. Analysis of Sources of Funds

a. Profit Plus Depreciation Allowance

5.05 - During the first few years of the project, COPEL will purchase power from a multitude of sources, but once the new plants come into production and the system is interconnected, power will come from three main sources (1) the new diesel units (2) Xavantes (USELPA) and (3) Capivari-Cachoeira (Electrocap). As discussed in the financial annex, the complicated regulations governing power rates made it exceedingly difficult to project the cost of power from the many sources from which power will be procured during the first few years; therefore, for simplification, all power was costed and all sales prices were projected as if all power were to be acquired from these three major sources. Because the three sources represent new investment, the depreciation expense and therefore the cost of power are projected at a higher amount than will actually be the case during the first years of the project. This, however, is offset by higher sales price projections whose calculations include (as allowed by law), a 5% depreciation reserve, and a 3% investment retirement fund. Recent legislation permits the utilities to revalue their assets for purposes of the depreciation reserve and so it is now possible for the utilities to operate at the profit allowed by this formula. General operating and maintenance expenses were projected on the basis of historical costs and the planned expansion, and sales prices were

calculated to allow COPEL a modest profit. Because of its desire to make power available for industrial development at rates which will encourage industrial growth and increased power utilization, COPEL intends to sell power at rates which will tend to fully develop the power market. Therefore, COPEL undoubtedl will not sell power at the highest allowable rates, but will attempt to set rates on the basis of development rather than profit considerations. It is anticipated therefore, that COPEL will not attempt to operate at the highest allowable profit (10% of investment), but will attempt to generate the profits as projected in the application. Such a rate policy would be comparable to those of the cooperatives which developed power markets in the less developed areas of the U.S., and will be consistent with COPEL's responsibilities for economic development.

While USAID/Rio concurs that COPEL as a state owned corporation should not attempt to maximize profits over all other considerations, the USAID does take the view that COPEL should gradually move in the direction of having its income support all operations without the benefit of a government subsidy. The USAID proposes that a continuing covenant to this effect be included in the loan agreement.

5.06 - The projections show that COPEL will operate at a reasonable profit, with capacity for repayment of this loan, and though year end statements are not yet available, it appears that COPEL operated at a profit in 1964, thoug probably not of the magnitude projected in the feasibility study. This profit was achieved through several rate increases during 1964. The rate structure wou be periodically revised over a period of years to achieve the position whereby COPEL's revenues would cover all operating costs, depreciation, interest on debt and, to the extent not covered by depreciation, amortization payments. In addition, there would be generated a surplus to pay a reasonable portion of the cost of expansion of facilities. What would constitute a reasonable portion would be subject for discussion between A.I.D. and COPEL from time to time.

5.07 - The method used to project revenues appears to be a reasonable one, and inasmuch as recent legislation will enable COPEL to adjust rates to cover cost increases caused by inflation, the projections are considered to be reasonably firm in terms of purchasing power though increases will undoubtedly lag slightly behind the cost of living increases. It is therefore recommended that the projections be accepted as reasonable estimates of the project funds to be derived from profits and depreciation allowance.

b. Funds from the Federal Government

5.08 - Funds from the Federal Government consist of (1) federal appropriations through the Ministry of Mines and Energy, (2) Parana's share of the united tax on electric power and (3) loans from BNDE.

(1) Ministry of Mines and Energy (MME)

5.09 - COPEL has received a commitment from the MME for the contributions as projected. This commitment is not however irrevocable and depends upon appropriations. USAID/B has however received assurances from both

MME and Eletrobras that dollar funded projects will be given priority in the allocation of Federal funds. Agreement by the MME to provide the contribution, as projected herein, in real terms will be a condition precedent to disbursement.

2. The Unity Tax

5.10 - The unity tax is a special tax on the sale of electric power in Brazil. Until 1963 this tax was levied on consumers at the rate of 20 centavos per KWh for lighting and 10 centavos for power. By Law No. 4,156 of November 28, 1962, effective January 1, 1963, the tax was changed to an ad valorem rate on power bills as follows: 10% for rural consumers, 35% for residential consumers and industrial consumers, and 40% for others. Of the collections, 40% goes to the Federal Government, 50% to the States, and 10% to the municipalities. The change to an ad valorem tax caused the tax receipts to increase from Cr$2,166 million in 1962 to Cr$11,937 million in 1963 with receipts projected at 19 billion for 1964 (data on actual receipts not available). The Government of Paraná receives about 2% of the total tax collected, and the entire amount is made available to COPEL as an increase in share capital. On the basis of the 1964 tax projection, it would appear that the amount of COPEL revenue from this source has been underestimated. In view of the fact that COPEL's power rates will be adjusted to cover cost increases, and in view of the fact that the unity tax is expressed as a percentage of the power bill, it is reasonable to expect that the contributions from this source will be realized in real terms.

3. BNDE Contribution

5.11 - The BNDE (National Development Bank) will provide in 1965 cruzeiros in an amount stated as equivalent to $290,000. There is, however, no method of escalating the cruzeiro amount to compensate for the value of the cruzeiro. Assuming that the funds are disbursed evenly over a 12-month period, and assuming that the GOB policies hold the cost of living increases to 40%, the shortfall in this contribution will approximate 20%.

c. Contributions from the State of Paraná

5.12 - The funds from the State of Paraná are obtained from a general sales tax and are provided in the form of (1) increases in paid-in capital and (2) loans from CODEPAR, a State development bank. The increases in share capital are provided from the Paraná normal sales tax, 10% of which is allocated by law to COPEL. The CODEPAR loans are provided from a special 2% sales tax. A table showing combined total receipts from these taxes in constant 1964 prices is included as Annex IV, Exhibit 2. This table shows that the receipts from this tax increased in real terms at an average of 19.9% per year from 1953 to 1962. Projections of these receipts thru 1968 at the rate of 19.9% show that the receipts allocated to COPEL will in real terms exceed the projections of the COPEL cash flow. 10% of this sales tax is allocated by law to COPEL, and COPEL has definite commitments from CODEPAR in real terms for the loans as projected in the source and application of funds. The financing to be derived from this source appears to be reasonably certain.

B. Financial Position of COPEL

5.13 - COPEL is a mixed capital corporation with majority participation by the State of Paraná. A list of COPEL shareholders is available in Annex IV, Exhibit 1. The fact that COPEL is established as a corporation rather than as a State Power Commission is important to its future financial solvency; for as a corporation COPEL is allowed to operate at a profit whereas the Power Commissions must, by law, sell power at cost, with no margin for profit or depreciation.

1. Assets

5.14 - COPEL's Balance Sheets since 1959 are included as Exhibit 1 Annex IV, and projections of assets and liabilities are also included in Exhibit 1 Annex IV. Qualitatively, the Balance sheets show that (1) the majority of COPEL's assets are in the form of fixed assets (operating facilities, and construction in progress) and holdings in other mixed capital power companies in the State of Paraná and (2) that liabilities are composed mostly of long term debt and capital. Estimates at the end of 1964, converted to dollars at Cr$500:1 dollar (medium rate for 1963) show fixed assets of $3.5 million, however International Engineering estimates that the real value of fixed assets approximates $28 million. Because of past inflation, it is almost impossible to assess, from Balance Sheets, the real worth of a Brazilian company. Additionally, the repayment of the loan and the viability of the company depends on its earning capacity and not on the value of its assets. The importance of asset valuation is that according to Brazilian law, COPEL's rates may include in addition to a 10% profit, a 5% depreciation allowance and a 3% investment retirement fund. As stated previously, a recent Brazilian decree (No. 54,936 of November 4, 1964) allows power companies to adjust fixed assets for cruzeiro depreciation, thus permitting profitable utility operations in accordance with the formula.

2. COPEL Operations

5.15 - Attached profit and loss statements (Annex IV) show that COPEL operated at a loss from 1959 through 1963; however, a profit was earned in 1964. No analysis of the reason for previous year losses has been made, but inflation, federal rate regulation which almost prohibited profitable operation, and political considerations during that period were undoubtedly the cause. The projections of revenues from future operations was discussed previously. In addition to the previous discussion, it should be pointed out that the overall program as described herein will, through the economies of an interconnected system and the introduction of cheaper hydro electric power, substantially reduce the real cost of power to COPEL and thereby contribute to COPEL's profitability. On the basis of the analysis of the proposed projects, as discussed herein, it appears reasonable to expect that COPEL will operate at a profit sufficient to assure repayment of the proposed loan.

C. The A.I.D. Loan

5.16 - A.I.D. funds will be utilised under standard disbursement procedures to finance the importation of U.S. goods and services for the project. It is estimated that A.I.D. funds will be committed for purchases according to the following schedule with actual disbursements lagging according to delivery:

Thousands of U.S. Dollars

Project Years Starting at the Date of Fulfillment of Conditions Precedent

Item	1st.	2nd	3rd	4th	Total
Direct Costs					
Diesel Generators	3,300	-	-	-	-
Transmission Lines--Main System	644	111	325	9	
Transmission Lines--Isolated System	32	13	3		
Substations--Main System	388	574	1,807	1,490	
Substations--Isolated System	84	32	14		
Total Direct Costs	4,448	730	2,149	1,499	8,826
Shipping, freight, insurance	404	75	205	139	823
Eng. & Inspection	125	71	70	50	316
Contingencies	472	79	231	149	931
Management & Training Provision	100	60	65		225
Administration & General	150	60	40	40	290
	$5,699	$1,075	$2,760	$1,877	$11,411

1. Terms of the Proposed Loan

5.17 - Terms proposed are twenty years at 5 1/2% with a five year grace period coinciding with the project construction period. It is recommended that interest be capitalized during the construction period. The five year grace period will coincide with the construction schedule for the overall program, and is considered justified. A guaranty by the Ministry of Finance will be required. A two step option is proposed.

2. Prospects for Repayment

5.18 - The prospects for repayment are dependent on two factors: (1) the ability of the enterprise to generate sufficient cash to repay the loan and (2) the ability of the enterprise to obtain dollars for the repayment.

5.19 - As regards the first factor, it was concluded in paragraph 5.15 of this section that COPEL will have the capacity to repay the loans from earnings. Additionally, the Federal Government (Ministry of Finance) will guarantee the loan.

5.20 - With respect to the ability to obtain dollars for loan repayment, a condition of the loan will be registration of the loan with SUMOC with appropriate arrangements for remittance of dollars to AID. Additionally, to ease dollar needs, it is proposed that the loan be two-stepped through the Ministry of Finance with repayment subject to the following terms:

(1) Repayment of the loan within forty years including a ten year grace period.

(2) Interest payable at 1% during the grace period and 2 1/2% thereafter.

(3) Repayment to be in U.S. dollars.

5.21 - In regard to the availability of dollars for repayment of the loan, it must be recognized that Brazil still faces serious balance of payments problems. (For a complete discussion see the $150 million program loan paper AID-DLC/P-291 as revised December 8, 1964). Debt service will however lighten before principal repayments commence under the 2-step option. Thus, it is anticipated that the two step terms including a ten year grace period and thirty years of repayment will be within Brazil's capacity to repay.

3. Impact on U.S. Economy

5.22 - The total $11.5 million dollars will be utilized for the procurement of goods and services from the U.S. Therefore the impact will be beneficial to the U.S. Economy, and will not adversely affect the U.S. balance of payments.

4. Availability of Other Free World Financing

5.23 - Other free world financing is not available for procurement of this equipment from the U.S. On February 26 at the Export-Import Bank - AID Coordinating Committee meeting, the Bank representative stated that the Bank was not prepared to consider this loan application.

5. Competition with U.S. Enterprises

5.24 - The financing of this project will not foster competition with U.S. enterprise.

D. General Financial Considerations

1. Inflation

5.25 - The cost of living in Brazil increased by 80% in 1963. In the first quarter of 1964, the cost of living index in Rio de Janeiro rose at an annual rate of 140%, however, the initiation of a stabilization program by the present administration hold cost of living increases for 1964 to approximately 85%, and it is hoped that the rate will be reduced to 40% in 1965. Because of this inflation, all construction contracts contain an escalation clause tying unit prices to the cost of living index, and suppliers prices for local materials and equipment are firm for only short periods of time. This makes the projection of accurate costs estimates over a period of more than one year extremely difficult if not impossible unless certain assumptions are accepted. In an attempt to eliminate the inflation factor, the Consulting Engineers converted all local costs to dollars at the free market exchange rate on the date estimates were made or prices received. Commitments for financing were similarly converted to dollars. The method of preparing cost estimates assumes that the increase in local construction costs will be matched by compensating increases in local funds to be made available for the project. Any analysis of the sources of funds indicates that with the exception of the BNDE loan funds, this assumption is more or less the case; however, there is no method of ascertaining that the increases in local contributions will exactly compensate for increases in local costs.

Eletrobras is investing in the Capivari-Cachoeira project and is concerned that the COPEL transmission system be built on schedule so that the power from the Capivari-Cachoeira project can be effectively utilized. Eletrobras in pledging assistance to the Capivari-Cachoeira project reportedly obtained commitments from the State of Parana and from COPEL to adequately finance the transmission system. Additionally, Eletrobras has agreed in principal to lend COPEL additional resources to assure financing of the transmission system. USAID/R is currently negotiating a PL 480 local currency program loan to support Eletrobras' investment and lending program. In pre-loan negotiations, an agreement has already been obtained that Eletrobras will in its allocation of resources give priority to those projects which are financed by dollar loans; this agreement will be formalized in the local currency program loan agreement.

Further, A.I.D. proposes as a condition precedent to disbursement to obtain such commitments as are necessary to assure the local contribution from the State of Parana, Eletrobras and the Minister of Mines and Energy.

It also should be understood that shortfalls due to inflation would not result in failure of the project, but would result in a stretchout of the

construction period. This situation has, in the past, adversely affected project construction in Brazil, and will continue to so affect them until inflation is brought under control. In spite of the deficiencies in the financing plan caused by inflation, it is the opinion of the USAID that the projections are as firm as can be obtained under the circumstances and should be accepted as giving reasonable assurance of financing.

2. Status of the Financing for the Capivarí-Cachoeira and Xavantes Projects

a. Capivarí-Cachoeira

5.26 The IDB has granted a $5.5 million loan to Eletrocap for the financing of the project. The loan is scheduled for signing in March of this year. In granting the loan, the IDB concluded that "the foregoing (analysis) indicates that adequate financing, with substantial amounts of State money in reserve to cover possible contingencies, has been mobilized for the project. Therefore, it would appear that the financial plan has been well studied and soundly conceived along conservative lines".

5.27 In approving the A.I.D.-COPEL project for intensive review, AID/W requested that USAID/B investigate Eletrobras' ability to fulfill its commitments with respect to the Capivarí-Cachoeira project. A review of this indicates that Eletrobras pledged Cr$5.0 billion to the project over a five year period and has already oversubscribed its first year's quota by 500%.

5.28 Under the terms of the IDB loan agreement, COPEL has committed itself (1) to give first priority to transferring Electrification Fund resources (COPEL's share of State Sales Tax) to the project and (2) to purchase 100% of all power produced by Capivarí-Cachoeira. These commitments are within the financial plan of the overall program, which have been analyzed herein; it appears that these commitments will not adversely affect the A.I.D. project.

5.29 Construction of this project started in 1963 by initiative of COPEL. The administration and execution of the project has subsequently been transferred to Eletrocap, a subsidiary of COPEL and recipient of the IDB loan. The installation of the first unit will be accomplished in January 1969, the second unit will follow in six months, and the remaining two units will be installed as required by demand.

b. Xavantes

5.30 The Xavantes hydroelectric project is the responsibility of USELPA, and the IBRD has made a commitment to finance a portion of the project. The project is presently under construction and is programmed to have the first unit in operation by July 1968. The full capacity of the plant is scheduled to be in operation by 1970.

5.31 It appears that the financing for this plant is firmly committed.

VI Project Implementation Plan

6.01 A schedule for the implementation of this loan is contained in this section. It is anticipated that initial conditions precedent to disbursement including the contracting of consulting engineers will be accomplished within one month after authorization of the loan.

1. Implementation

6.02 The loan agreement and implementation letter will be drafted, negotiated and signed by USAID/B, and the USAID will take responsibility for monitoring the loan.

2. Procurement

6.03 Procurement will be carried out by both formal competitive bidding and by informal solicitation of quotations as appropriate for the goods to be procured. The consulting engineers will assist and supervise in this procurement, and procurement will be subject to A.I.D. approval procedures.

3. Construction Contracts

6.04 Construction contracts will be awarded on the basis of formal competitive bidding. The preparation of IFB, opening of bids, and evaluation of bids will be carried out with the assistance of the consulting engineers, who will also supervise construction.

4. Disbursement

6.05 Disbursement of funds will be in accordance with standard A.I.D. disbursement procedures.

5. Reports

6.06 (1) Progress reports will be prepared by the consulting engineers.

6.07 (2) Annual audits will be conducted by a CPA firm from the A.I.D. list. If the borrower desires to use its own auditing firm, this will be acceptable providing the firm is approved by A.I.D. and a firm on the A.I.D. list reviews the work of the other firm.

6. Training Survey

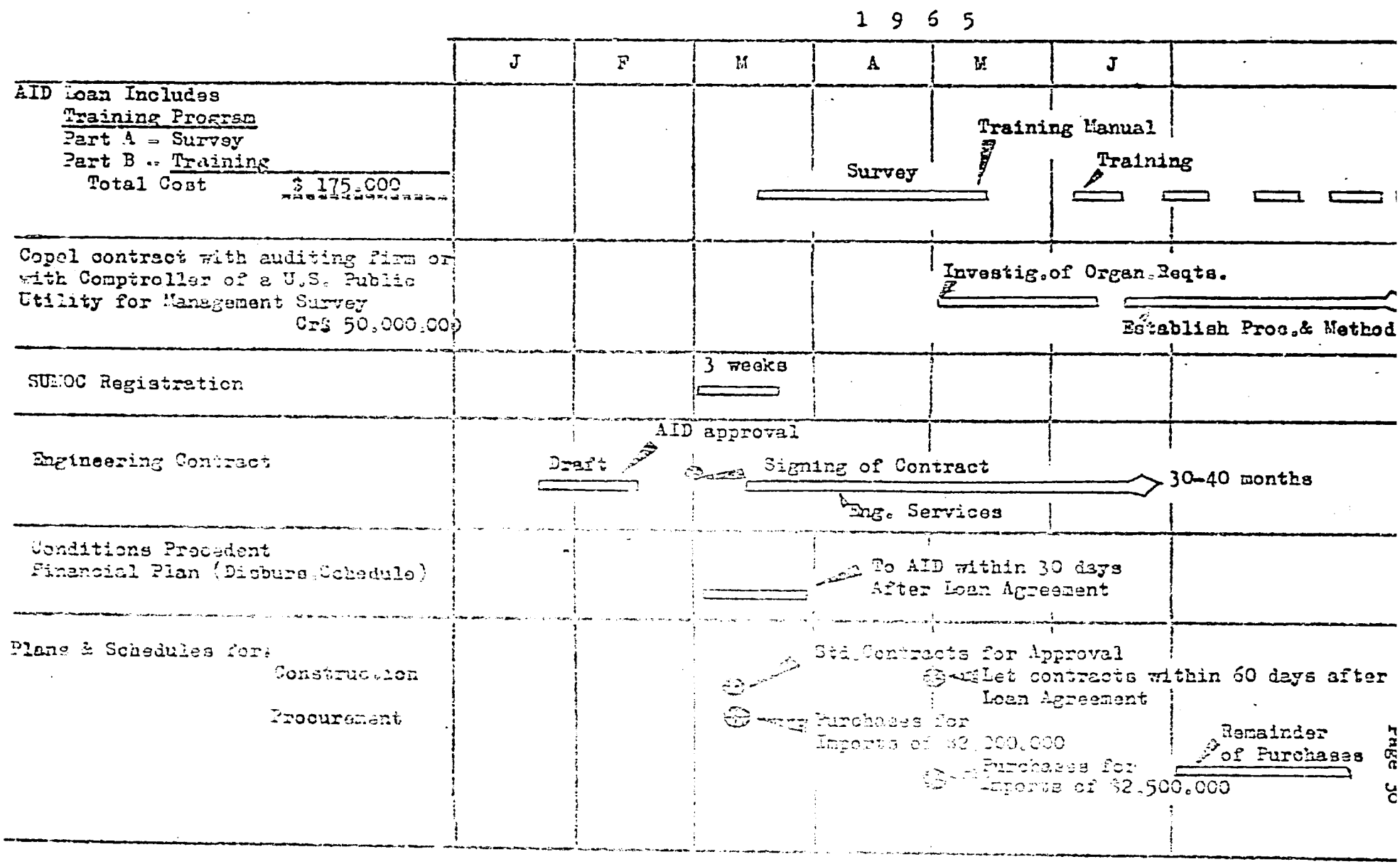
6.08 This training survey will be carried out by the consulting engineers, perhaps with the assistance of a training expert from a large U.S. public utility. The contract for such a man may be included in the consultants contract or may be financed as a separate contract. Participant training will be coordinated by the USAID Training Office.

7. Management Survey

6.09 This survey will be carried out either by a U.S. consulting or accounting firm, or by a U.S. Public Utility Controller assisted by an accounting or a consulting staff.

IMPLEMENTATION OF COPEL EXPANSION PROGRAM

TENTATIVE SCHEDULE



CHECK LIST OF STATUTORY CRITERIA (ALLIANCE FOR PROGRESS)

* 1. Foreign Assistance Act of 1961, as amended (hereinafter "FAA"), Section 102. The loan will further the policy of the Act, as stated in this Section. Every possible precaution is being taken to assure that loan proceeds are not diverted to short-term emergency purposes (such as budgetary balance of payments, or military purposes) or any other purpose not essential to Brazil's long-range economic development.

* 2. FAA Section 201 (d). Loan funds are not to be loaned or reloaned at rates of interest which are excessive or unreasonable for the Borrower, or higher than the applicable legal rate of interest in Brazil. See "Section V "Financial Analysis".

* 3. FAA Section 251 (a). The loan will promote economic development in Brazil and will contribute to the welfare of its people. See Section IV "Economic Analysis".

* 4. FAA Section 251 (b) (1). Account has been taken of the extent to which Brazil (including its political subdivisions) is adhering to the principles of the Act of Bogota and Charter of Punta del Este, is showing a responsiveness to the vital economic, political, and social concerns of its people, and of the extent to which Brazil has demonstrated a clear determination to take effective self-help measures.

* 5. FAA Section 251 (b) (2). The activity to be financed is economically and technically sound. See Section III "Technical Analysis of the Project" and Section IV "Economic Analysis".

---

* Affirmative finding required by law.

6. FAA Section 251 (b) (3). The activity is consistent with and is related to other development activities being undertaken or planned and will contribute to realizable long-range objectives. See Section II "Place of the Loan in the Program".

7. FAA Section 251 (b) (4). The loan will have no foreseeable adverse effect on the U. S. economy. See "Section IV C 5 "Competition with U. S. Enterprise".

8. FAA Section 251 (b) (5). Financing from other free world sources (including private sources within the United States) on reasonable terms for the project is not available.

9. FAA Section 251 (b) (6). The terms of the loan (interest, grace period and amortization) are reasonable under circumstances affecting the loan and the capacity of Borrower to repay. Similar judgments will be made in case the loan is assumed by another Borrower.

10. FAA Section 251 (b) (7). Account has been taken of the extent to which Brazil is making reasonable effects to encourage repatriation of capital invested in other countries by its own citizens.

11. FAA Section 251 (b) (8). There are reasonable prospects that the loan will be repaid. See Section V C 2 "Prospects for Repayment".

12. FAA Section 251 (e). An application has been received for this loan which gives sufficient information and assurances to indicate reasonably that the funds will be used in an economically and technically sound manner.

13. FAA Section 251 (g). In view of the nature of the project, it is not appropriate to utilize the loan to assist in promoting the cooperative movement in Latin America.

14. FAA Section 252 (a). The total amount of the loan is going to be used to finance imports of equipment and services from private sources. See Section V C "The AID Loan".

15. FAA Section 601. The loan will encourage efforts of the country to improve technical efficiency of industry and agriculture. See Section IV B "The Project Zone of Influence".

16. FAA Sections 601 (b); 621. The loan will be administered in such a manner as to encourage and facilitate participation by private enterprise to the maximum extent practicable.

17. FAA Section 601 (d). AID's general practice is applicable to this loan and is identical with Congressional policy that engineering and professional services of U. S. firms and their affiliates are to be used in connection with capital projects to the maximum extent consistent with the national interest.

18. FAA Sections 601 and 602. American small business shall be assisted to the maximum extent practicable to participate equitably in the furnishing of goods and services for the project, in accordance with the procedures described in these sections of the Act.

19. FAA Section 604 (a). Equipment, materials, and services financed with dollars under the loan shall be procured from the United States.

20. FAA Section 604 (b). Any commodities financed by the loan and purchased in bulk will be purchased at prices no higher than prevailing U. S. market prices.

21. FAA Section 604 (d). Marine Insurance on commodities shipped will be required to be placed with a U. S. company unless A.I.D. agrees otherwise.

* 22. FAA Section 611 (a) (1). Necessary substantive technical and financial planning for the project has been completed, and a reasonably firm estimate of cost of the project to the United States has been obtained. See Section V "Financial Analysis" and Section III "Technical Analysis of the Project".

* 23. FAA Section 611 (a) (2). No legislative action in Brazil is required for implementation of the project which cannot reasonably be anticipated to be completed in time to permit the orderly accomplishment of the purposes of the loan.

* 24. FAA Section 611 (b), App. Section 101. The project is not a water or water-related land resources construction project.

* 25. FAA Section 611 (c). Construction contracts financed by the loan will be made on a competitive basis to the maximum extent practicable.

* 26. FAA Section 619. Not applicable. Brazil is not a newly independent country.

* 27. FAA Section 620 (a); Foreign Aid and Related Agencies Appropriations Act of 1965 (Hereinafter "App.") Section 107. No assistance will be furnished under this loan to the present government of Cuba, nor does Brazil furnish assistance to the present government of Cuba. Brazil has taken appropriate steps to prevent ships or aircraft under its registry from engaging in any Cuba trade.

* 28. FAA Section 620 (b). The Secretary of State has determined that Brazil is not controlled by the International Communist Movement.

* 29. FAA Section 620 (c). AID knows of no complaint under this section to the effect that Brazil is indebted to any U. S. citizen for goods or services furnished or ordered, where such a citizen has exhausted available legal remedies or where the debt is not denied or contested by Brazil or the indebtedness arises under an unconditional guaranty of payment given by Brazil.

* 30. FAA Section 620 (d). Loan funds will not finance construction or operation of any productive enterprise which will compete with United States enterprise.

* 31. FAA Section 620 (e). Neither the government of Brazil nor any governmental agency or subdivision thereof has, on or after January 1, 1962, nationalized, expropriated, or seized ownership or control of property of any U. S. citizen or firm, taken steps to repudiate or nullify existing contracts with such citizens or firms, or imposed or enforced discriminatory taxation or other exactions or restrictive nationalizing, expropriating or otherwise seizing ownership or control of property owned by U. S. citizens or firms, as specified in this section of the Act, without taking appropriate steps to discharge its obligations, as specified in this section of the Act.

* 32. FAA Section 620 (f), App. Sections 109 (a), 109 (b). Assistance provided by this loan will not be furnished to any Communist country.

* 33. FAA Section 620 (g). Assistance provided by this loan will not be used to compensate for expropriated or nationalized property.

* 34. FAA Section 620 (h). Assistance provided by this loan will not be used in a manner which promotes or assists foreign aid projects or activities of the Communist bloc countries.

* 35. FAA Section 620 (i). The President has not determined that Brazil is engaging in or preparing for aggressive military efforts directed against the United States, or any country receiving assistance from the United States, or against any country to which sales are made under PL 480, nor is any basis for such determination known to A.I.D.

36. FAA Section 620 (k). The aggregate value of assistance to be furnished by U. S. on this productive enterprise does not exceed $100 million.

* 37. FAA Section 620 (l). The country is expected to have complied within the required period i.e. before December 31, 1965.

38. FAA Section 636 (h); 612 (c). Brazil will contribute Brazilian currency in the amount of $13.8 million to meet the cost of contractual and other services to be rendered in conjunction with the project. Foreign currency owned by the United States will, to the maximum extent practicable, be utilized to meet the costs of contractual and other services for the project.

* 39. App. (Section Unnumbered). None of the funds appropriated for this loan will be used for IDA.

* 40. App. Section 102. Obligations of funds in excess of $25,000 for engineering fees to any firms or group of firms financed under the loan will be reported to the committees on appropriations of the Senate and House.

* 41. App. Section 104. Funds obligated by the loan, will not be used to pay pensions, annuities, etc., as prohibited in this section.

* 42. App. Section 111. U. S. personnel to serve under contracts for services financed by the loan shall have security clearance.

* 43. App. Section 112. Firms which provide engineering, procurement, and construction services financed by the loan for the project, and the terms of their contracts, shall be approved by A.I.D.

* 44. App. Section 114. Loan funds will not be used to make any payment to the U. N.

* 45. App. Section 117. USAID Brazil is looking into the question whether compliance is lawful in Brazil and unless a waiver is duly obtained, construction contracts will provide for compliance with these requirements.

* 46. App. Section 401. The funds provided by this loan will not be used for publicity or propaganda purposes within U. S. not heretofore authorized by Congress.

Clearances:

Jerome I. Levinson, USAID/B_____
Peter Hornbostel, LA/GC_____

ANNEX II - EXHIBITS

EXHIBIT 1 - Organization Chart

EXHIBIT 2 - Statutes Governing COPEL's Operations

ORGANIZATION CHART - COPEL

UNCLASSIFIED
ANNEX II,
Exhibit 1

The following statutes govern COPEL's operations and bear directly on COPEL's financial position.

(1) COPEL was established on October 26, 1954 by State Decree No. 14,947, which is based on the authority invested in the executive powers by State Law No. 1,384 dated November 10, 1953.

(2) Authority to operate as an electric power company in accordance with the Water Code (Decree No. 24,643 of July 1934) and subsequent legislation was granted by the President of the Republic on May 27, 1955 by Decree No. 37,399.

(3) The operation of COPEL was further regulated by State Decree No. 1,412 of March 26, 1966.

(4) The statutes by which COPEL governs itself were adopted on the general meeting of the constitution held on March 28, 1955.

All of the above documents except the Water Code are included in this exhibit.

LAWS AND DECREES

LAW Nº 1384

SYNTHESIS : Institution of Electrification Fund and other steps.

The Legislative Assembly of the State of Paraná decreed and I sanction the following law :

Art. 1 - The Electrification Fund of the State of Paraná is h re by instituted for the purpose of providing financing, construction, enlarging and maintenance of electrical works owned by the State.

Art. 2 - The Electrification Fund mentioned in the above article shall have as income the following resources .

a - The amounts allocated annually in the State budget;

b - As of the year 1954, the allocations mentioned in Article 4, paragraph c, combined with Article 2, paragraph IV, of Law Nº 105 of September 30, 1948

c - The proceeds of the sale of public titles issued by the State for electrification works,

d - The tax created by Article 4 of this Law;

e - Supplementary and additional credits for financing and execution of electrification works of the State;

f - The allocations and subsidies instituted and distributed by the Federal Government for electrification works.

Art. 3 - The Electrification Fund shall be used exclusively in the planning and execution of electrical works in the State, subscriptions of capital of corporations of mixed economy, or providing subsidies foreseen by law to concessionaries of electric power supply in the State of Parana.

Art. 4 - An electrification tax is created to incide on the sales, consignment and transaction tax, the proceeds of which shall be used in the planning or execution of the electrical works in the State.

Art. 5 - The tax mentioned in the above article shall be computed on the basis of 10% over the amounts of the sums due by the tax payer on account of sales, consignment and transaction tax.

§ 1 - The tax shall be collected by the Departamento de Arrecadação de Rendas do Estado and its dependent agencies in conformity with the regulation to be issued by Secretary of Finance and approved by the State Governor.

§ 2 - The fines for demurrage in payment of this tax shall be incorporated in the same Fund.

Art. 6 - The amounts received from the collection of the tax mentioned in this law shall constitute a special fund with independent accounting and shall be applied as mentioned in Article 1, all pertinent laws and regulations being duly observed.

§ 1 - The proceeds of the tax may be served in total or in part as a guarantee to financing or credit operations at the criterion of the State Government.

Art. 7 - The resources obtained for the Electrification Fund shall be deposited in a special account under the same denomination in the Banco do Estado do Paraná.

Art. 8 - The Electrification Fund shall be used by the Departamento de Águas e Energia Elétrica within the terms of the present law.

Art. 9 - The executive power is hereby authorised to organise in the State of Paraná corporations of mixed economy for construction and exploitation of electric power generating stations and to participate in these enterprises.

Art. 10 - For the constitution of the corporations referred to in the aforementioned article, the properties and installations existing for production, transmission, transformation and distribution of electric power in the State of Paraná shall be incorporated in these corporations.

Art. 11 - The State may participate in corporations that have concessions of public utility and electric power in the State, provided that these corporations are agreeable to transform themselves into corporations of mixed economy.

SOLE PARAGRAPH - The Director of the Departamento de Águas e Energia Elétrica will request in writing and in due time the necessary allocations destined to the Electrification Fund herein mentioned submitting a work program to be carried out within the subsequent year.

Art. 12 - This law is to become effective on the date of its publication, all dispositions to the contrary being revoked.

Curitiba, November 10, 1953.

Signed : Bento Munhoz da Rocha Neto
Eugênio José de Sousa
Rivadavia B. Vargas

(Published in Official Gazette Nº 199 of November 11, 1953)

DECREE Nº 1 412

SYNTHESIS : Disposes on execution of Law Nº 1 384 of November 10, 1953, and Decree Nº 14 947 of October 26, 1954, as well as other questions.

The Government of the State of Paraná using powers conferred to him and within the authorization contained in Law Nº 1 384 of November 10, 1953, considering dispositions of Decree Nº 14 947 of October 26, 1954, hereby decrees :

Art. 1 - The planning, construction and exploitation of systems of production, transmission, transformation, distribution and commerce of electric power and correlated services at the present time being carried out directly by the State shall be transferred to Companhia Paranaense de Energia Elétrica - COPEL, in accordance with the dispositions of Article 1, of Decree Nº 14 947 of October 26, 1954.

§ 1 - The State shall take the steps required within 120 days for the transfer of the concessions of hydro development, generation, transformation and distribution of electric power, which are now under title of Companhia Paranaense de Energia Elétrica - COPEL.

§ 2 - All properties, services and works herein mentioned and at the present time under the control of the State, shall be tranrferred to Companhia Paranaense de Energia Elétrica - COPEL, which shall take their inventory assisted by a State representative designated by the executive power, for posterior incorporation within the terms of Article 10, Law Nº 1 384 of November 10, 1953, and proper register at the Accounting Tribunal.

Art. 2 - In the realisation of stock capital subscribed by the State in Companhia Paranaense de Energia Elétrica - COPEL, the resources of the Electrification Fund created by Law Nº 1 384 of November 10, 1953, shall be used in accordance with the dispositions of Article 2;

furthermore, the amount equivalent to the movable and fixed assets inventoried and transferred to Companhia Paranaense de Energia Elétrica - COPEL, may be incorporated in conformity with Article 4 of Decree Nº 14 947 of October 28, 1954 and the legislation in force, applicable to the matter.

§ 1 - The resources of the Electrification Fund, as foreseen in paragraph b, Article 2, of Law Nº 1 384 of November 10, 1953, allocated to industrial services already contracted by the State or transferred to Companhia Paranaense de Energia Elétrica - COPEL, shall not be used for realization of capital stock.

§ 2 - By contract celebrated with the State Government, Cia. Paranaense de Energia Elétrica may take over new industrial services.

Art. 3 - The budget of the State shall confine every year the allocation of Cr$ 40 000 000 (forty million cruzeiros) destined to cover charges with the execution of works, services, pioneering works or other non-profitable services in the interest of the State and transferred to Companhia Paranaense de Energia Elétrica - COPEL.

Art. 4 - The stock capital referred to in Article 2 shall be paid in by requisitions of accounts payable issued by the authority mentioned in Article 8, Law Nº 1 384 of November 10, 1953, and under receipt of requests from Companhia Paranaense de Energia Elétrica - COPEL, duly approved by the State Governor.

SOLE PARAGRAPH - The authority mentioned may furnish funds to COPEL for the account of the Electrification Fund by prepayment of stock capital in the cases of express authorization by the State Governor and on the basis of duly supported requests from the interested entities.

Art. 5 - The proceeds of the Electrification Tax created by Article 4, of Law Nº 1 384 of November 10, 1953, shall be paid directly by the collection agencies of Finance Secretary to the Banco do Estado do Paraná and shall be deposited in a special account under the name "Fundo de Eletrificação do Estado do Paraná" within the terms of Article 7, Law Nº 1 384 of November 10, 1953.

Art. 6 - This decree shall become effective on the date of its publication.

Curitiba, March 26, 1956, 135th year of Independence, 68th year of Republic.

Signed : Moysés Lupion
Eurico Baptista Rosas

(Published in Official Gazette of the State, on March 28, 1956)

DECREE Nº 14 947

SYNTHESIS : This decree disposes on the Organization of a corporation of mixed capital under the name of Companhia Paranaense de Energia Elétrica - COPEL, and initiates other action.

The Government of the State of Paraná in the use of its power and within the authorization contained in Law Nº 1 384, of November 10, 1953, hereby decrees :

Art. 1 - Companhia Paranaense de Energia Elétrica is constituted as a corporation for the purpose of planning, constructing and exploiting systems of production, transmission, transformation, distribution and commerce of electric power and correlated services through its own organisation or through companies which it may organise or in which it may participate.

Art. 2 - The capital of the corporation shall be Cr$ 800 000 000,00 (eight hundred million cruzeiros) of which up to 49% may be represented by preferred shares without voting rights.

Art. 3 - The State shall subscribe at least 60% of the capital stock.

Art. 4 - For the purpose of paying in stock capital, the State shall utilize resources received under the Law of Electrification Fund, Nº 1 384 of November 10, 1953, and may furthermore incorporate in the property of the corporation, in total or in part, the fixed and movable assets destined to the production, transmission and distribution of electric power now existing and owned by the State.

Art. 5 - The corporation shall be governed by the statutes to be approved in the act of its constitution.

Art. 6 - The Governor shall nominate his representative to take all steps required for the constitution of the corporation.

Art. 7 - This decree shall become effective on the date of its publication, all dispositions to the contrary being hereby revoked.

Curitiba, October 28, 1954; 133rd year of Independence, 66th year of the Republic.

Signed : Bento Munhos da Rocha Neto
Antonio Joaquim de Oliveira Portes

(Published in the Official Gazette, of October 27, 1954)

DECREE Nº 37 399 of May 27, 1955

Conceding authorization to function as electric power company to Companhia Paranaense de Energia Elétrica - COPEL.

The President of the Republic, using power attributed to him by Article 87, paragraph 1, of the Constitution, and considering the terms of Article 1, Decree-Law Nº 938 of December 8, 1938, and the terms of the petition of Companhia Paranaense de Energia Elétrica - COPEL, hereby decrees :

Art. 1 - Authorization is granted to Companhia Paranaense de Energia Elétrica - COPEL, with headquarters in Curitiba, Paraná, to function as electric power company in accordance with the terms of Decree-Law Nº 938 of December 8, 1938, combined with Decree-Law Nº 2 627 of September 26, 1940; it will be the obligation of COPEL to satisfy all requirements of the Water Code (Decree Nº 24 643 of July 10, 1934), subsequent legislation and instructions, lest this Act be revoked.

Art. 2 - This Decree shall become effective on the date of its publication.

Art. 3 - All dispositions to the contrary are revoked.

Rio de Janeiro, May 27, 1955; 134th year of Independence and 67th year of the Republic.

Signed : João Café Filho
Munhos da Rocha

(Published in Official Gazette Nº 126, June 4, 1955)

STATUTES

CHAPTER I

Of the name, headquarters, purposes and duration

Art. 1 - Under the denomination Companhia Paranaense de Energia Eletrica - COPEL abreviated COPEL, there is hereby constituted, within the terms of State Law 1384 of November 10, 1953 and the authorization contained in State Decree 14 947 of October 28, 1954, a corporation of mixed capital for the purpose of planning construction and exploitation of systems of production, transmission, transformation, distribution and commerce of electric power and correlated purposes in the regions granted to the corporation by federal concession. The corporation is to function either directly or through other companies which it may constitute or in which it may participate.

Art. 2 - COPEL shall have headquarters and legal domicile in the city of Curitiba, however, at the criterion of the Board of Directors, COPEL may create or extinguish subsidiaries, agencies or offices in the same city or in any other part of the national territory, or abroad.

Art. 3 - The duration of the company shall be for an unlimited term.

CHAPTER II

Of the Capital and the Shares

Art. 4 - The capital of the corporation shall be eight hundred million cruzeiros represented by eight hundred thousand shares of nominal value of one thousand cruzeiros each, of which 60% shall be ordinary shares and 40% shall be preferred shares.

Art. 5 - The ordinary shares shall be nominative and the voting rights shall be reserved to ordinary shares. The preferred shares shall be nominative or to the bearer, whichever the shareholder may elect. These shares may also be reconverted at request of their owners, provided the reconversion expense runs for the account of the interested shareholder.

SOLE PARAGRAPH - Until fully paid up the shares shall remain nominative.

Art. 6 - The preferred shares shall have priority in the distribution of a minimum dividend of 8% and shall participate furthermore under equal conditions with the ordinary shares after these have been paid dividends equal to the preferred shares.

Art. 7 - The capital subscribed by the State shall be paid in through annual amounts never less than eight percent of the income received from the Electrification Tax created by law 1 384 of November 10, 1953. In addition, the State may incorporate other property in the capital of the corporation. The Capital subscribed by other shareholders shall be paid in by a down payment of 10 % at the act of subscription and the remaining 90% shall be realised in five equal half yearly installments.

Art. 8 - The corporation may issue multiple titles representative of a minimum of two shares and a maximum of 100 000 shares. It is optional to shareholders to have simple titles of shares substituted by multiple titles at any time, provided the expenses are running for the account of the interested party.

Art. 9 - At the General Assembly each share shall be entitled to one vote.

CHAPTER III

Of the Administration

Art. 10 - The corporation shall be administrated by a Board of Directors constituted by from three to five directors, shareholders or not, resident in the country and elected by the General Assembly, every three years. Reelection of directors shall be permissible.

Art. 11 - The Board of Directors shall have obrigatorily one President, one Administrative Director and one Technical Director and, at the option of the General Assembly, two more directors without special designation.

Art. 12 - The remuneration of directors shall be determined annually by the General Ordinary Assembly; in case of no specific mention, the remuneration in force in the previous year shall prevail.

Art. 13 - The directors shall mortgage 100 shares of their own property or of third parties in guarantee of their performance and may not be installed in office before this mortgage is processed. This mortgage shall be returned to them only after all accounts have been approved.

Art. 14 - During temporary absences or impediments the absent members of the Board of Directors shall be substituted by the Director designated by the President.

Art. 15 - In case of death, resignation or definitive impediment of any member of the Board of Directors, the Board shall call for a General Assembly within 30 days, requesting a decision on the substitution of the vacancy.

§ 1 - The Assembly may not be called in case the vacancy occurs after December 31st, of the year immediately before completion of the term of office of the Director who is to be substituted.

§ 2 - Before the General Assembly of shareholder takes place, the President shall be substituted by the Administrative and Technical Directors acting jointly; these two Directors and the Directors without special function shall be substituted by the Director indicated by the President.

§ 3 - The substitute shall carry out the functions for the time left of the term of office that became interrupted.

Art. 16 - The Board of Directors shall have the following functions and duties:

I - carry out the statutes of the corporation and directives of the General Assembly;

II - establish policy for internal work organization of the company;

III - decide on policy regarding works and outside business of the corporation;

IV - decide on the creation or extinction of functions or jobs, deciding on salaries and organizing the personnel directives of the company;

V - distribute and reinvest profit obtained in the form established in these statutes;

VI - authorize participation of COPEL in other corporations within the terms of Art. 1 of these statutes;

VII - call through the Director President or through two other Directors for General Assemblies;

VIII - settle all extraordinary cases;

IX - decide on company business not subject to General Assembly decisions.

Art. 17 - The decisions of the Board of Directors shall be taken by majority vote. In case the Director President is not in agreement with the decision taken the effects of this decision may be suspended and a General Assembly shall be called in five days to decide on the matter.

SOLE PARAGRAPH - The Director that is impeded to take part in the meetings of the Board of Directorsshall be represented by any other Director sending his vote in writing and the respective document shall be transcribed in a special book and filed with the corporation.

Art. 18 - The functions of the Director President shall include:

I - supervize and direct company business;

II - hire, transfer, take disciplinary action or release employees, granting them legal absence within all legal dispositions;

II - represent the corporation actively or passively in court or elsewhere in a general manner in relations with third parties; for this purpose he may constitute proxy, designate and authorize delegates (see article 21).

IV - sign jointly with one of the other Directors all documents that entail corporate liabilities;

V - call for Ordinary or Extraordinary General Assembly according to the dispositions of the law;

VI - submit to the Ordinary General Assembly the yearly report of company business.

Art. 19 - The functions of the other Directors shall be determined by Internal Ordinances of the corporation.

Art. 20 - The corporation may constitute proxy with special and express powers for specified operations and missions and also proxy with powers adnegotia to sign any documents of corporate responsibility.

CHAPTER IV

Of the General Assembly

Art. 21 - The General Ordinary Assembly shall be held until the 30th day of April of each year, at the location, day and hour announced for the purpose of accepting the accounts of the Board of Directors, examine, discuss and deliberate on the yearly report, the balance sheet and on the demonstration of profit and loss, as well as on the opinion issued by the Fiscal Council and, furthermore, proceed with the election of the members of the Fiscal Council and, whenever the case, of the members of the Board of Directors.

Art. 22 - The General Assembly shall be called extraordinarily whenever the Board of Directors may deem convenient, as well as in all other cases foreseen by law.

Art. 23 - The General Assembly shall be considered as legally installed whenever in first roll call there are sufficient shareholders present to represent at least 1/4 of the capital stock with voting rights, excepting the cases where the law requires a major percentage.

§ 1 - In second roll call the General Assembly shall be considered installed with any number of shareholders present excepting the cases where the law requires a bigger number.

§ 2 - The General Assembly shall be presided by the President of the corporation or by a shareholder selected at the time by the shareholders present. The President of the General Assembly shall invite among those present one or two shareholder to serve as secretaries of the meeting.

CHAPTER V

Of the Fiscal Council

Art. 24 - The Fiscal Council shall be constituted by three effective members and three deputy members elected yearly by the General Assembly, reelection being permissible.

Art. 25 - The functions of the Fiscal Council shall be as determined by law and the fees to be paid shall be established yearly by the General Assembly that elects the members of the Fiscal Council.

Art. 26 - Among their effective members, the Fiscal Council shall elect a President whose functions shall be delegated in case of impediment or absence to another councillor, seniority of age being given precedence.

Art. 27 - In case of vacancy of the President of the Fiscal Council, one of the deputy councillors shall be called and a new President shall be elected among the councillors.

Art. 28 - In the case of resignation, death or impediment of any other effective member of Fiscal Council, he shall be substituted by one of the deputies as designated by the President.

CHAPTER VI

Of the Fiscal Year, Balance sheet and of the Profit & Loss Statement

Art. 29 - The Fiscal year shall coincide with the calendar year and shall terminate on December 31, of each year.

Art. 30 - After conclusion of the fiscal year, the general balance shall be taken under observation of all legal dispositions.

Art. 31 - Of the net profit shown for each year, the following deductions shall be made:

a) - 5% for the constitution of the legal reserve fund until such time as the legal limit has been reached;

b) - up to 10% at the criterion of the General Assembly for constitution of a reserve fund to cover labor legislation and social legislation requirements;

c) - up to 10% for distribution to the Directors as a bonus;

d) - up to 5% for distribution among the members of the Fiscal Council as a bonus;

e) - up to 15% for distribution to company employees as a bonus payment at the criterion of the Board of Directors.

§ 1 - None of the deductions foreseen in letters "b", "c", "d" and "e" shall be made before distribution of the minimum dividend on preferred shares.

§ 2 - The deductions authorized in letters "c" and "e" of this article shall be made only after distribution of a minimum dividend of 6% to the shareholders of ordinary shares.

§ 3 - Any balance available after the deductions and distributions foreseen in this article have been made, shall be distributed as dividends under observation of the terms of Art. 6 of these statutes.

Art. 32 - The dividends shall be paid at the time and place established by the Board of Directors and if not claimed within a period of five years, shall be considered prescribed in favor of the corporation.

CHAPTER VII

General and transitory dispositions

Art. 33 - The dissolution and liquidation of the corporation shall be made in accordance with decisions taken by the General Assembly and in accordance with all prevailing dispositions of the law.

Art. 34 - The Directors elected at the time of the constitution of the Corporation shall complete their terms of office with the installation of the Board of Directors elected by the first General Ordinary Assembly.

From minutes of general meeting of constitution held on March 28, 1953.

ANNEX III - EXHIBITS

EXHIBIT 1 - Map - Existing Power System

EXHIBIT 2 - Map - 1970 Power System

EXHIBIT 3 - Technical Description of Project

EXHIBIT 4 - Cost Estimates

A. A.I.D. Project Total-Summary

B. Detail Estimates

C. Summary of Unit Costs

D. Training Program

EXHIBIT 5 - Imported Equipment and Material-Total A.I.D. Project

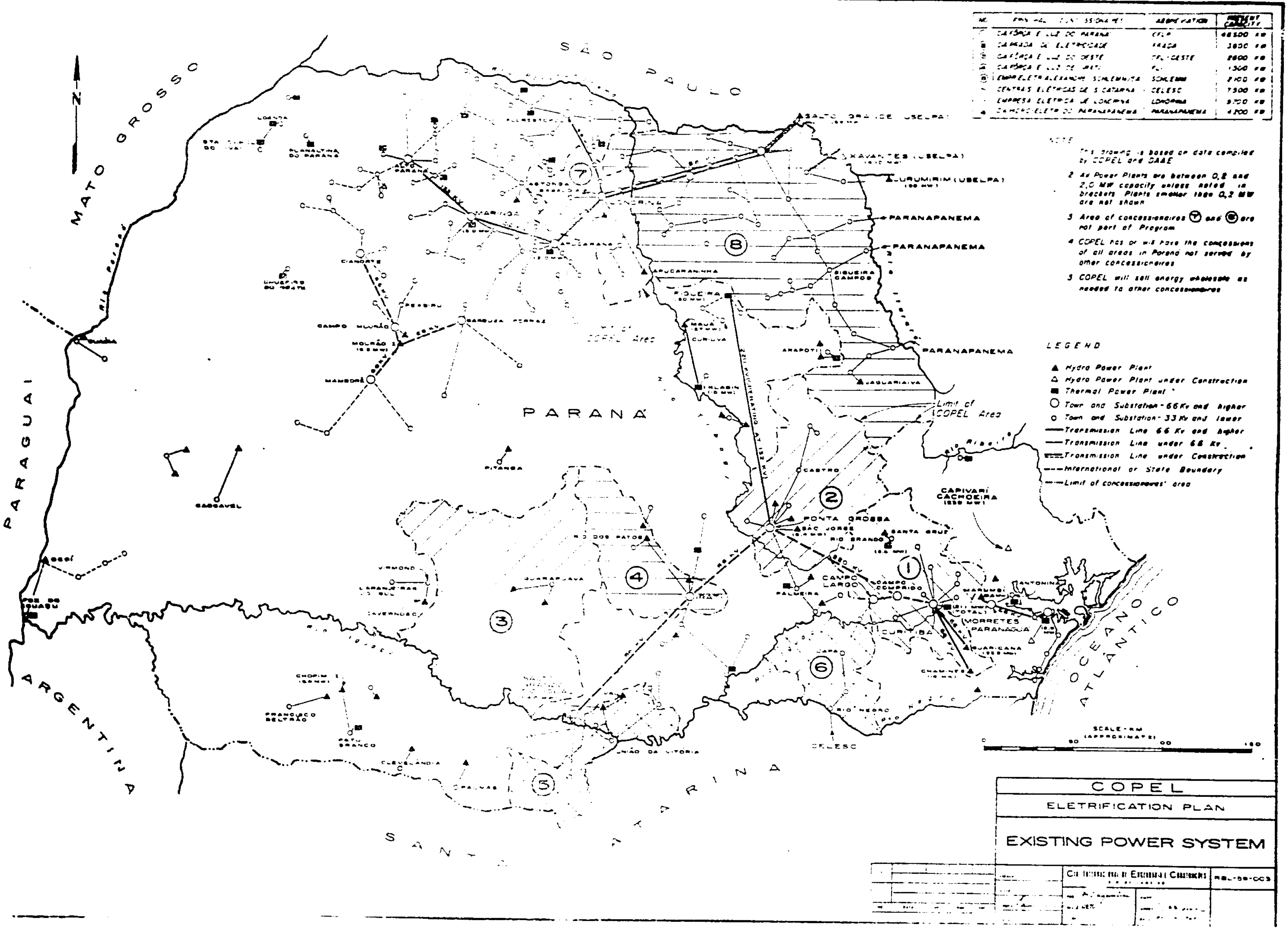
EXHIBIT 6 - COPEL Construction Schedule

A. Main System

B. Isolated Systems

EXHIBIT 7 - Work Performed by International Engineering in Preparing Report

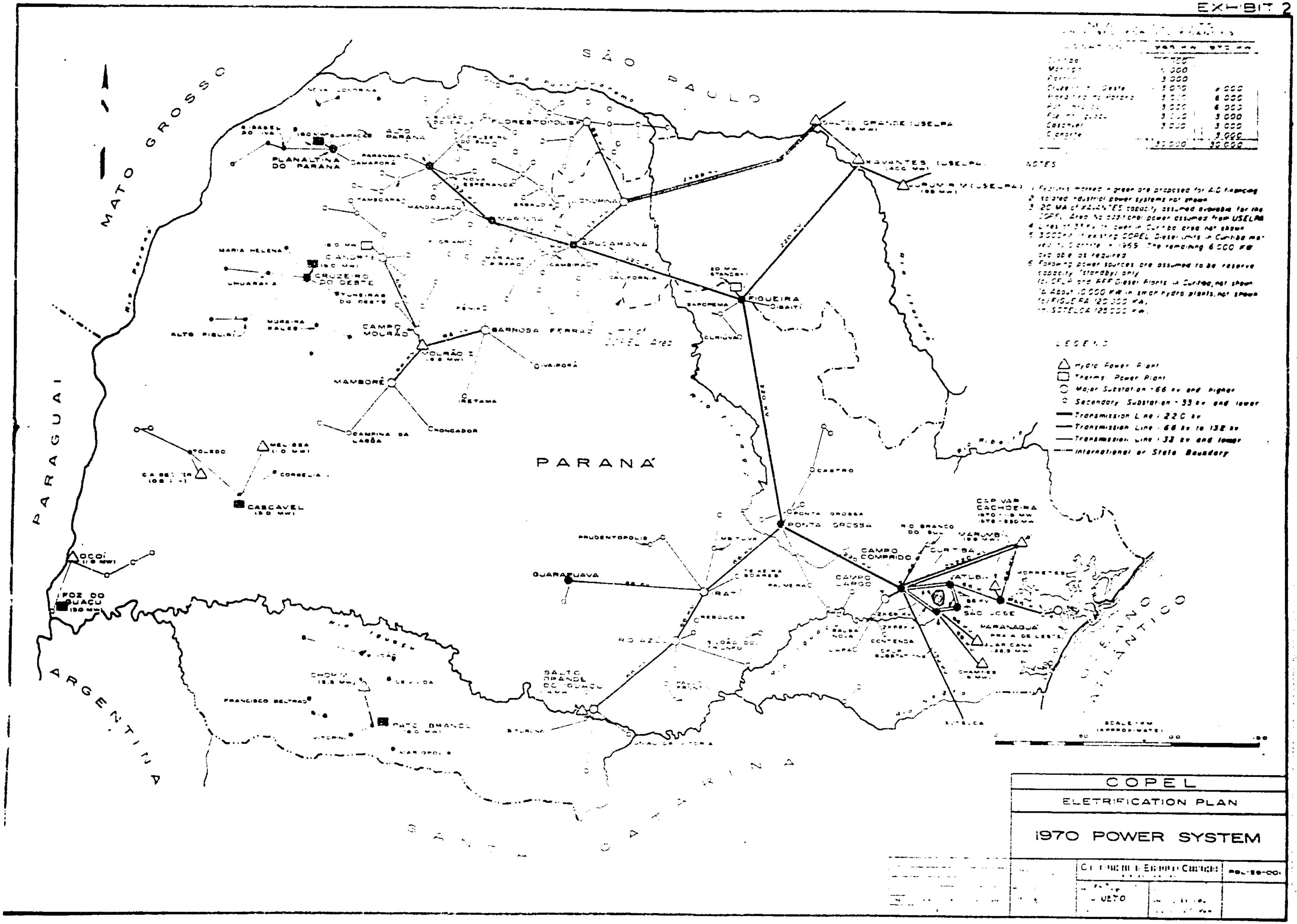
ANNEX III
EXHIBIT 1



COPEL

ELETRIFICATION PLAN

EXISTING POWER SYSTEM


SÃO PAULO
MATO GROSSO
PARAGUAI
ARGENTINA
PARANÁ
SANTA CATARINA
OCEANO ATLÂNTICO
PLANALTINA DO PARANÁ
ALTO PARANÁ
FLORESTÓPOLIS
APUCARANA
FIGUEIRA
SALTO GRANDE (USELPA)
XAVANTES (USELPA)
JURUMIRIM (USELPA)
CRUZEIRO DO OESTE
MARIA HELENA
CAMPO MOURÃO
BARBOSA FERRAZ
MAMBORÊ
CAMPINA DA LAGÔA
RONCADOR
IRETAMA
IVAIPORÃ
TOLEDO
CASCAVEL
CORBÉLIA
OCOÍ
FOZ DO IGUAÇU
ALTO PIQUIRI
PONTA GROSSA
CASTRO
GUARAPUAVA
PRUDENTÓPOLIS
CAMPO COMPRIDO
CAMPO LARGO
CURITIBA
SÃO JOSÉ
PARANAGUÁ
MARUMBI
CAPIVARI CACHOEIRA
CHAMINÉS
SALTO GRANDE DO IGUAÇU
PATO BRANCO
FRANCISCO BELTRÃO
LEGEND
Hydro Power Plant
Thermal Power Plant
Major Substation - 66 kv and higher
Secondary Substation - 33 kv and lower
Transmission Line - 220 kv
Transmission Line - 66 kv to 132 kv
Transmission Line - 33 kv and lower
International or State Boundary
NOTES
COPEL
ELETRIFICATION PLAN
1970 POWER SYSTEM

DESCRIPTION OF SUBSTATIONS

Figueira 220 Kv. Substation:

A 220 Kv. Substation equipped with double operating bus, bus tie breaker and with four 220 Kv. transmission line bays to control the following feeders:

1. Xavantes - Figueira 220 Kv. line
2. Ponta Grossa - Figueira 220 Kv. line
3. Apucarana - Figueira 220 Kv. line
4. Local feeder

The local feeder will interconnect with the USELFA system which now provides electric power at 13.2 Kv. thru 4 distribution feeders.

Apucarana No. 1 Substation Expansion

The existing Apucarana No. 1 Substation consists of a 132 Kv. switchyard of the double operating bus type where the Maringá and Londrin 132 Kv. lines terminate. There is a Substation transformer bay which supplies power to a 132/33/13.2 Kv 9,375 KVA power transformer. The 33 Kv. winding of the power transformer serves the 33 Kv. substation bus, from where four 33 Kv. subtransmission feeders are served. A 13.2 Kv tertiary winding serves power to three 13.2 Kv distribution feeders for local power distribution.

It is proposed to expand the 132 Kv. switchyard with the addition of three 132 Kv. feeder bays. Two of these bays will be used to dead end and control the two 132 Kv. Apucarana 1 - Apucarana 2 transmission lines. The third 132 Kv. bay will be used to supply additional power to the 33 Kv. substation. A 9,375 KVA, 132/33/13.2 Kv. power transformer duplicate of the existing transformer will be provided. An additional 33 Kv. switchyard bay will also be constructed to tie the power transformer to the 33 Kv. substation. Three additional 13.2 Kv. substation bays will be constructed, one to connect the tertiary winding of the new transformer to the 13.2 Kv. substation and two bays to control two additional 13.2 Kv. local feeders.

Apucarana No. 2 Substation

This is a new substation needed to interconnect the 220 Kv. system from Figueira to the existing 132 Kv. substation at Apucarana. The substation is rated 220 Kv. and is of the single operating bus type. Each 220 Kv. power circuit breaker is equipped with by-pass air disconnect to permit maintenance of the power circuit breaker. There are three 220 Kv. switchyard bays, one of which serves to dead end and control the Apucarana-Figueira 220 Kv. line. The other two bays are each connected to one 220/132 Kv., 50,000 KVA autotransformer from which the Apucarana No. 1 Substation is interconnected at 132 Kv. A 13.2 Kv. tertiary winding in each power transformer serves auxiliary power to the substation.

Maringá Substation

The substation transformer capacity at the existing Maringá substation will be doubled. It is proposed to add a 9,375 KVA, 132/33/13.2 Kv. power transformer. An additional 132 Kv. control bay will be provided to connect the transformer to the existing 132 Kv. substation bus. A 33 Kv. substation will be constructed to distribute power to the region at this subtransmission voltage. The substation will be of the single bus type and provided with one transformer bay and four 33 Kv. feeder bays. The 13.2 Kv. tertiary winding of the new transformer will be connected to the 13.2 Kv. distribution substation to provide additional power supply and three additional feeder bays will be constructed.

Alto Paraná Substation

This is an existing 132/33/13.8 Kv. substation equipped with one 9375 KVA transformer which transforms the power received by the substation at 132 Kv. for distribution at 33 Kv. and at 13.2 Kv. It is proposed to double the capacity of the substation with the installation of a duplicate 9,375 KVA, 132/33/13.8 Kv. power transformer. A 138 Kv. and a 33 Kv. substation bays will be provided to control the transformer. Three feeder bays will be added to the 13.2 Kv. distribution substation, one to connect the transformer tertiary and two for the control of local distributions feeders.

Ponta Grossa Substation

The existing Ponta Grossa Substation will be expanded to permit interconnection with the main 220 Kv. transmission network and the substation capacity will be increased from 5000 KVA to 25,000 KVA. It is proposed to construct a 220 Kv. switchyard with three 220 Kv. switchyard bays, one to dead end and control the Figueira-Ponta Grossa 220 Kv. line, one to dead end and control the Campo Comprido-Ponta Grossa 220 Kv. line and one to control the high tension side of the main power transformer.

The switchyard will be of the double operating bus type and will be equipped with a bus tie breaker. A 20,000 KVA, 220/33 Kv. power transformer will be installed and four additional 33 Kv. feeder bays will be added to the substation. The power transformer will be equipped with a tertiary winding which will be connected to the existing 13.2 Kv. distribution substation. Three additional local feeders will be provided at the distribution substation.

Campo Comprido Substation

The existing Campo Comprido Substation is equipped with a 220 Kv. switchyard, a 100,000 KVA, 220/66 Kv. power transformer bank, a 66 Kv. subtransmission substation and a 13.2 Kv. distribution substation for local distribution of power. Both the 220 Kv. and the 66 Kv. substation are of the double operating bus type, equipped with bus tie breakers. The existing substation has provision for two 220 Kv. feeders, for interconnecting the two Ponta Grossa-Campo Comprido lines and there are two outgoing 66 Kv. feeders.

It is proposed to expand the 220 Kv. substation with three additional switchyard bays, to provide a duplicate 100,000 KVA, 220/66 Kv. power transformer, to expand the 66 Kv. substation to permit the control of five additional feeders and to provide a 30 MVA synchronous condensed.

This expansion will permit interconnection with the two Capivari-Campo Comprido 220 Kv. lines and will provide five 66 Kv. outlets from which to expand the 66 Kv. subtransmission system.

Atuba Substation

The existing Atuba Substation is 66/13.2 Kv, 20,000 KVA distribution substation equipped with a 2 bay 66 Kv. switchyard, a 20,000 KVA 66/13.2 Kv. power transformer and with a 3-feeder bays 13.2 Kv. substation. The existing 66 Kv. Campo Comprido line is dead ended and controlled at the existing switchyard. A 20,000 KVA power transformer derives power from the 66 Kv. bus and supplies power at 13.2 Kv. to the distribution substation. The 66 Kv. bus is of the double operating bus type. It is proposed to expand the 66 Kv. switchyard with the addition of six 66 Kv. switchyard bays to control the following 66 Kv. feeders:

Two	66 Kv. transmission lines São José-Atuba
The	Campo Comprido 66 Kv. line
The	Morrentes 66 Kv. line
One	bus tie bay
One	transformer bay

A 66/13.2 Kv. 20,000 KVA power transformer will be added to double the substation capacity to 40,000 KVA. A 13.2 Kv. switching station will be constructed, with the main bus tied to the existing 13.2 Kv. bus thru a power circuit breaker, equipped with three outgoing 13.2 Kv. feeder bays and one substation auxiliary power bay.

São José Substation:

This is a new substation intended to interconnect the 66 Kv. sub-transmission system around the Capital city of Curitiba and to provide distribution of power within the city of Curitiba. It is proposed to construct a 66 Kv. substation of the double operating bus type and equipped with a bus tie breaker to provide control to four incoming 66 Kv. lines and to two power transformers. The two Campo Comprido and the two Atuba 66 Kv. lines will terminate at this substation. Two power transformer banks each rated 66/13.2 Kv., 20,000 KVA will be installed to make available 40,000 KVA from the main transmission system for distribution within the city of Curitiba. A 13.2 Kv. substation section will be constructed with the main bus sectionalized through a power circuit breaker and equipped with six 13.2 Kv. distribution feeders.

Guaranapuva Distribution Substation:

A 66 Kv. transmission line will be constructed from Iratí to Guaranapuva to supply power to the Guaranapuva region. The Guaranapuva Distribution Substation will be constructed at the transmission line terminal in the city of Guaranapuva to distribute the electric power transmitted thru the 66 Kv. line. It consists of a 5000 KVA 66/13.2 Kv. distribution transformer with two 13.2 Kv. local feeders. The main 66 Kv. line will be sectionalized at the substation with a 66 Kv. air disconnect. There will be a 13.2 Kv. circuit breaker at the low tension side of the power transformer. The two 13.2 Kv. feeders will also be controlled with power circuit breakers.

Morrentes Substation:

There is at present a 1000 KVA 66/13.2 Kv. distribution substation at Morrentes which receives power at 66 Kv. from the Murumbí Hydro Plant and serves the town of Morrentes at 13.2 Kv. A 66 Kv. feeder from the substation serves the Paranaguá section. It is proposed to add two additional 66 Kv. substation bays to the Morrentes Substation to interconnect the Capivari-Cachoeira Plant and the Atuba Substation to the existing facilities at Morrentes. The substation is of the single bus type, each feeder being controlled thru power circuit breakers.

DESCRIPTION OF ISOLATED SYSTEMS

1. Planaltina do Paraná System

Many of the municipalities in the Northwestern section of the State of Paraná are not being served at present with electric power. COPEL plans to install a 6000 KW diesel-electric power plant in the city of Planaltina do Paraná and to construct a 33 Kv. subtransmission radial system to serve the various municipalities within the region. The thermal plant will produce power at 2400 volts. A 7500 KVA stepup transformer will deliver the power generated to the 13.2 Kv. substation from which the city of Planaltina do Paraná will be served. A 7500 KVA, 13.2/33 Kv. transformer will be installed and a 33 Kv. substation bus will be provided from which 33 Kv. transmission lines will extend to Nova Londrina, Santa Isabel do Ivaí and to Guariaçú. A total of 170 Km of 33 Kv. subtransmission lines will be constructed. Three distribution substations will be constructed, one at each terminal point of the transmission lines. Londrina will have a substation capacity of 300 KVA, Santa Isabel do Ivaí will have a capacity of 1000 KVA, and Guairaçú will have a capacity of 500 KVA. At these substations power will be made available at 13.2 Kv. for distribution. Distribution systems will be constructed with local funds to serve the customers in each town.

In early 1965 only one diesel electric unit of the two ordered will be installed at Planalto do Paraná, because only one will be required initially and the second will be installed temporarily in the main system to alleviate the power shortage until the new hydro developments are completed. At that time there will be adequate power supply in the main system while the Planaltina do Paraná system will require the installation of the second unit. The 33 Kv. system may originally operate at 13.2 Kv. distribution substations. When the 13.2 Kv. feeders become overloaded, the 33 Kv. substations will be installed and the lines will be operated at 33 Kv.

2. Cruzeiro do Oeste Electric System

The Cruzeiro do Oeste region in Western Paraná does not have extensive electric service at present. COPEL plans to construct a 9000 KW diesel electric plant at the city of Cruzeiro do Oeste which is the principal city in the region and from there serve ten municipalities through a 33 Kv. subtransmission radial system. The diesel-electric units generate power at 2400 volts. Three 3000 KVA, 2400/13200 volt power transformer will supply power to the powerplant 13.2 Kv. bus from which three distribution feeders will serve Cruzeiro do Oeste, Maria Elena and Torneiras do Oeste. A 2000 KVA, 13.2/33 Kv. power transformer will energize the substation 33 Kv. bus which will in turn supply power to three 33 Kv. feeders. Feeder No. 1 extends to Moreira Sales and terminates in a 300 KVA 33/13.2 Kv. substation from which power is distributed to the towns of Moreira Sales, Giorênne and Janiopolis. Feeder No. 2 extends from Cruzeiro do Oeste to Ipora, routed thru Alto Piquirí where it is tapped. The Piorã substation will be rated 1000 KVA 33/13.2 Kv with a local feeder to serve the town of Piorã. The Alto Piquirí Substation will have a 3000 KVA 33/13.2 Kv. substation to serve that town. Feeder No. 3 will extend from Cruzeiro do Oeste to Xambré routed thru Umurama. The distribution substation at Umurama will have 1000 KVAcapacity and the distribution substation at Xambré will have 300 KVA capacity.

A total of 215 Km of 33 Kv. transmission lines will be constructed utilizing AID financing. Distribution systems will be constructed with local funds in ten municipalities to serve the town customers.

Only one 3000 KW diesel-electric unit will be installed initially until the load develops. This will permit installing the other two units in the central system to alleviate the shortage of power. As soon as the large hydro developments are placed in operation the two units will be transferred to Cruzeiro do Sul. The 33 Kv. system may initially operate directly at 13.2 Kv. until the feeders are overloaded when they will be converted to 33 Kv. operation.

3. Cascavel System

The city of Cascavel in Western Paraná is now served from the 1000 KW Melisa hydro plant and the town of Toledo is served from the existing 800 KW hydro plant. COPEL proposes to install a 3000 KW diesel-electric plant at the city of Cascavel and extend power to the municipalities within the region through a 33 Kv. sub-transmission radial system. A local 13.2 Kv. distribution feeder from the plant substation will distribute power to Cascavel. Two 33 Kv. transmission lines will be constructed from the diesel plant 1500 KVA, 33 Kv. substation with a total length of 90 Km. The first feeder will extend from Cascavel thru Toledo and terminates at Mal. Rondón. A 33/13.2 Kv. 300 KVA distribution substation at Toledo will supply power to that municipality and a 1000 KVA distribution substation at Mal. Rondón will serve that town. The second 33 Kv. feeder extends from Cascavel to Cochelia and terminates in a 300 KVA distribution substation to serve that town.

The Cascavel service area will be extended with the proposed system expansion. A distribution system will be constructed at Toledo, Mal. Rondon and Corpelia and the existing distribution systems will be revamped and improved using local funds. It is probable that the system would start operations with all 33 Kv. lines operated at 13.2 Kv. for direct local distribution until the load growth justifies converting the system to 33 Kv. operation.

4. Pato Branco System

The Pato Branco System serves the Southern section of the State of Paraná, South of Rio Iguaçú. Service at present is extended from the 2,200 KW Chopin hydro plant which serves the city of Pato Branco thru a 33 Kv. line. COPEL proposes to install a 3000 KW diesel-electric plant at Pato Branco and extend a 33 Kv. transmission system with 155 Km. of lines to serve ten municipalities within the region.

A 4000 KVA, 2400/13,200 volt distribution substation at the thermal plant will provide power for distribution at Pato Branco and at Vitorino. A 13.2/33 Kv. 1500 KVA transformer installed at the diesel plant substation will provide power at 33 Kv. for subtransmission. A 33 Kv. line will be constructed from Chopin I Hydro Plant to F. Beltrão terminating in a 33/13.2 Kv., 300 KVA distribution substation from which this town will be served. A 33 Kv. line will be constructed from the Chopin Plant to Cel. Vivida terminating in a 33/13.2 Kv., 300 KVA distribution substation to serve the town. A 33 Kv. line will be constructed from the Chopin Plant to São João and Dois Vizinhos with 500 KVA distribution substations at São João and a 300 KVA substation at Dois Vizinhos. A 33 Kv. line will be constructed from Pato Branco to Mariópolis terminating in a 33/13.2 Kv. 300 KVA distribution substation from where power is distributed to Mariópolis.

Distribution systems will be constructed at all towns to be served and the existing systems will be improved using local funds.

5. Foz do Iguaçú

The southwestern tip of the State of Paraná is at present served from the 1000 KW Ocoí hydro plant thru a 33 Kv. transmission system which serves Foz do Iguaçú and three other municipalities in the region. COPEL proposes to install a 3000 KW diesel-electric powerplant at Foz do Iguaçú to cope with the load growth of the region.

ANNEX III
Exhibit 4A

COST ESTIMATE - SUMMARY

AID PROJECT TOTAL

No.	Item	Imported US$	Local Eqv. US$	Total US$
G	DIESEL UNITS			
1	Total Direct Cost	3 300 000	300 000	3 600 000
to	Shipping, Freight, Insurance	300 000	60 000	360 000
8	Engineering and Inspection	60 000	60 000	120 000
	Contingencies	300 000	50 000	350 000
	Total Diesel Units	3 960 000	470 000	4 430 000
S	SUBSTATIONS			
1	Total Direct Cost	4 259 980	3 171 310	7 431 290
to	Shipping, Freight, Insurance	426 000	175 700	601 700
11	Engineering and Inspection	255 510	470 520	726 030
	Contingencies	491 910	381 760	873 670
	Total Substations	5 433 400	4 199 290	9 632 690
T	TRANSMISSION LINES			
1	Total Direct Cost	1 080 020	5 667 446	6 747 466
to	Shipping, Freight, Insurance	80 630	100 729	181 359
10	Engineering and Inspection	-	14 750	14 750
	Contingencies	118 700	611 600	730 300
	Total Transmission Lines	1 279 350	6 394 525	7 673 875
R	ISOLATED SYSTEMS			
1	Total Direct Cost	186 600	2 070 380	2 256 980
to	Shipping, Freight, Insurance	16 080	55 250	71 330
4	Engineering and Inspection	-	198 150	198 150
	Contingencies	20 570	214 405	234 975
	Total Isolated Systems	223 250	2 538 185	2 761 435
	ADMINISTRATION AND GENERAL			
	Administration and Overhead	-	150 000	150 000
	System Engineering	150 000	50 000	200 000
	Contract Supervision	140 000	-	140 000
	Total Adm. and General	290 000	200 000	490 000
	TOTAL PROJECT			
	Direct Cost	8 826 600	11 209 136	20 035 736
	Shipping, Freight, Insurance	822 710	391 679	1 214 389
	Engineering and Inspection	315 510	743 420	1 058 930
	Contingencies	931 180	1 257 765	2 188 945
	Administration and General	290 000	200 000	490 000
	TOTAL	11 186 000	13 802 000	24 988 000

DETAIL COST ESTIMATES - A.I.D. PROJECT

SUMMARY

I T E M	FX	LC($)	TOTAL
DIESEL PLANTS			
G1 - Paranaguá (3000KW)	330,000	30,000	360,000
G2 - Curitiba (6000KW)	660,000	60,000	720,000
G3 - Maringá (6000KW)	660,000	60,000	720,000
G4 - Planaltina do Paraná (3000KW)	330,000	30,000	360,000
G5 - Cruzeiro do Oeste (3000KW)	330,000	30,000	360,000
G6 - Cancavel (3000KW)	330,000	30,000	360,000
G7 - Foz do Iguaçu (3000KW)	330,000	30,000	360,000
G8 - Pato Branco do Sul (3000KW)	330,000	30,000	360,000
Total direct cost	3,300,000	300,000	3,600,000
Shipping, freight & insurance	300,000	60,000	360,000
Engineering & Inspection	60,000	60,000	120,000
Contingencies	300,000	50,000	350,000
Total Diesel Generators	3,960,000	470,000	4,430,000
MAIN SYSTEM SUBSTATIONS			
S1 Figueira	726,200	136,040	862,240
S2 Apucarana I, Stage 2	247,370	218,200	465,570
S3 Maringá State 2	82,450	148,680	231,130
S4 Alto Paraná Stage 2	74,530	119,120	193,650
S5 Apucarana II	545,740	473,300	1,019,040
S6 Ponta Grossa Stage 3	628,710	258,230	886,940
S7 Campo Comprido Stage 2	1,735,520	651,410	2,386,930
S8 Atuba	93,280	523,420	616,700
S9 São José	58,390	504,930	563,320
S10 Guarapuava	28,010	67,330	95,340
S11 Morretes	39,780	70,650	110,430
Total direct costs	4,259,980	3,171,310	7,431,290
Shipping freight & Insurance	426,000	175,700	601,700
Engineering & Inspection	255,510	470,520	726,030
Contingencies	491,910	381,760	873,670
Total Main System Substations	5,433,400	4,199,290	9,632,690

I T E M			FX	CL($)	TOTAL
ISOLATED SYSTEMS SUBSTATIONS					
Planaltina do Paraná			48,900	311,453	360,353
Cruzeiro do Oeste			30,810	222,076	252,886
Cascavel			18,750	157,882	176,632
Pato Branco			30,810	213,469	244,279
		Total direct costs	129,270	904,880	1,034,150
Shipping, freight & Insurance			12,930	17,450	30,380
Engineering & Inspection			8,000	87,900	95,000
Contingencies			14,270	101,005	115,275
		Total Isolated Systems Substations	164,470	1,111,235	1,275,705
MAIN TRANSMISSION SYSTEM					
		220KV			
T1	115 km	Xavantes-Figueira 1 circuit 636 MCM, dble circuit towers	240,120	1,610,000	1,850,120
T2	120 km	Figueira-Apucarana - 1 circuit 636 MCM	250,560	1,316,880	1,567,440
T3	85 km	Capivari-Cachoeira-Campo Comprido 2 circuit 636MCM common towers	288,660	1,341,300	1,629,960
		66KV			
T4	20 km	Campo Comprido-Atuba, 397.5 MCM double circuit common towers	45,080	188,080	233,160
T5	16 km	Atuba-São José 297.5 MCM double circuit common towers	40,572	169,272	209,844
T6	20 km	Campo Comprido-São José 397.5 MCM double circuit common towers	45,080	188,080	233,160
T7	26 km	Campo Comprido-Rio Branco Sul 2/0 single circuit	13,328	107,212	120,540
T8	83 km	Irati-Guarapuava 266.8 MCM single circuit	64,740	324,302	389,042
T9	60 km	Atuba-Morretes 266.8 MCM single circuit	46,800	234,240	281,040
T10	40 km	Capivari-Cachoeira-Morretes 297.5 MCM single circuit	45,080	188,080	233,160
		Total direct cost	1,080,020	5,667,446	6,747,466
Shipping, freight & Insurance			80,630	100,729	181,359
Engineering & Inspection			268,000	14,750	282,750
Contingencies			118,700	611,600	730,300
		Total Main Line Transmission	1,547,350	6,394,525	7,941,875

I T E M	FX	CL($)	TOTAL
ISOLATED SYSTEMS TRANSMISSION			
33 KV. 1/0 Single Unit			
R1 170 km Planaltina do Paraná	15,470	314,500	329,970
R2 215 km Cruzeiro do Oeste	19,565	397,750	417,315
R3 90 km Cascavel	8,190	166,500	174,690
R4 155 km Pato Branco	14,105	286,750	300,855
Total direct cost	57,330	1,165,500	1,222,830
Shipping, freight & Insurance	3,150	37,800	40,950
Engineering & Inspection	14,000	110,250	124,250
Contingencies	6,300	113,400	119,700
Total isolated systems transmission	80,780	1,426,950	1,507,730

SUMMARY:

Diesel Plants	3,960,000	470,000	4,430,000
Main System Substations	5,433,400	4,199,290	9,632,690
Isolated Systems Substations	164,470	1,111,235	1,275,705
Main Transmission System	1,547,350	6,394,525	7,941,875
Isolated Systems Transmission	80,780	1,426,950	1,507,730
Administration and General Supervision	-	200,000	200,000
	11,186,000	13,802,000	24,988,000

SUMMARY OF UNIT COSTS

Unit of Construction	1 3,000 KW Diesel			1 KM 220 KV/Circuit 636 MCM			1 KM 220 KV/Circuit 636 MCM Double Circuit Towers		
Item	FX	LC	Total	FX	LC	Total	FX	LC	Total
Equipment	330,000	8,000	338,000						
Structure & Storage	-	22,000	22,000						
Aluminum ingot, steel core, high strength steel cable				2,088	-	2,088	2,088	-	2,088
Hardware, insulators, structures, cable fabrication, labor				-	10,974	10,974	-	14,000	14,000
Shipping, Freight & Insurance	30,000	6,000	36,000	147	185	332	147	243	390
Engineering & Inspection	6,000	6,000	12,000	-	145	145	-	175	175
Contingencies	30,000	5,000	35,000	210	1,120	1,330	210	1,430	1,640
Total Cost per Unit	396,000	47,000	443,000	2,445	12,424	14,869	2,445	15,848	18,293

ANNEX III
Exhibit 4C, Page 1

SUMMARY OF UNIT COSTS

Unit of Construction	1 Km 220 KV 2 Circuit 636 MCM, ACSR, Common Towers			1 KM 66 KV 397.5 MCM, ACSR			1 KM 66 KV 266.8 MCM, ACSR			1 KM 66 KV 2/0 ACSR			1 KM 33 KV 1/0 ACSR		
Item	FX	LC	Total	FX	LC	Total	FX	LC	Total	FX	LC	Total	FX	LC	Total
Equipment															
Structure and Storage															
Aluminum ingot, steel core, high strength steel cable	3,936		3,936	1,127		1,127	780		780	476		476	91		91
Hardware, insulators, structures, cable fabrication, labor	-	15,780	15,780	-	4,702	4,702	-	3,904	3,904	-	3,829	3,829	-	1,850	1,850
Shipping, Freight, insurance	276	302	578	80	104	184	55	70	125	35	60	95	7	55	62
Eng. and inspection	-	175	175	-	96	96	-	96	96	-	96	96	-	60	60
Contingencies	420	1,630	2,050	114	620	734	84	464	548	50	403	453	10	180	190
TOTAL Cost per Unit	4,632	17,887	22,519	1,321	5,522	6,843	919	4,534	5,453	561	4,388	4,949	108	2,145	2,253

ANNEX III
Exhibit 4D

COST ESTIMATE SUGGESTED TRAINING PROGRAM

A DETERMINATION OF EXTENT OF TRAINING PROGRAM

1 - Review and analyze operation and maintenance program for present and future system requirements.

2 - Establish comprehensive training program in all levels of operation and maintenance organization.

3 - Prepare training manuals and procedures.

1 Utility operating dept. chief (3-4 months + expenses)	$ 12 000

B TENTATIVE OUTLINE TRAINING PROGRAM

1 - Training of key personnel from various levels of Copel's division in U.S. public utilities (TVA, Bureau, etc.)

10 men at $ 1200 round trip	$ 12 000	
Travel & living expenses 10 men at average $ 800/mo 5 months	$ 40 000	$ 52 000

2 - Training Instructors, U.S. for

18 months $ 5 500 x 18	$ 99 000	
2 Rd trips, travel $ 5 500 x 2	$ 11 000	$110 000
TOTAL B		$162 000

BUDGET ESTIMATE TRAINING $174 000

COST ESTIMATE - TOTAL AID PROJECT

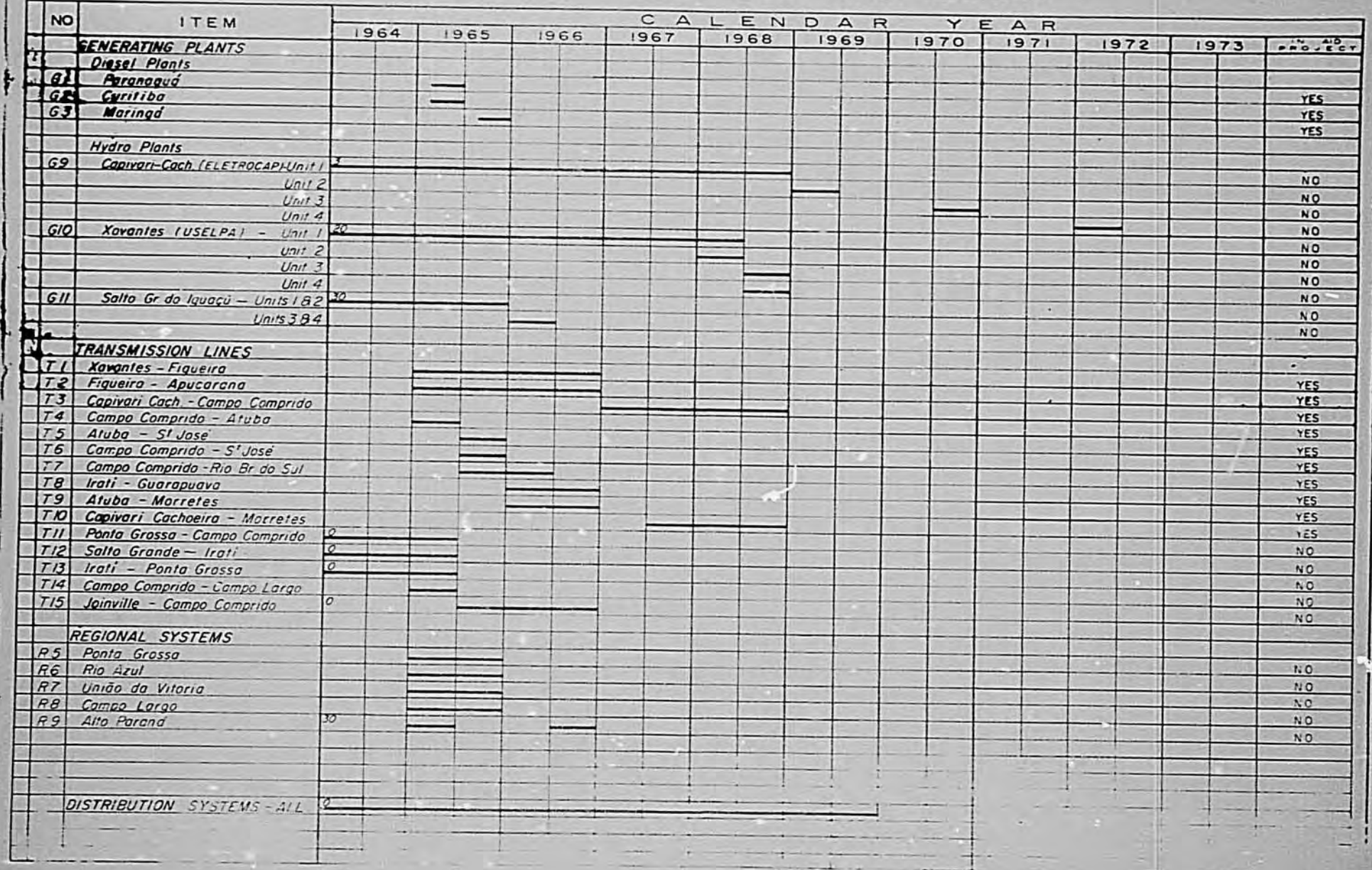
IMPORTED EQUIPMENT AND MATERIAL

Item	Quantity	Cost (US$)
1 - Aluminum ingots for fabrication of ACSR cables of the following sizes: 636 MCM; 397,5 MCM 266.8 MCM; 2/0; 1/0	1 775 058 kg	887 529
2 - Steel cables, extra high strength (NS) for Item 1		
9.27 mm dia (for 636 MCM)	960 km	107 936
6.00 mm dia (for 266.8 MCM)	429 km	17 875
8.76 mm dia (for 397.5 MCM)	468 km	29 172
3.78 mm dia (for 2/0)	84 km	1 764
2.67 mm dia (for 1/0)	1 890 km	10 080
3 - Steel cable, extra high strength (NS) for shielding wire		
3/8 " (for 220 kv Lines)	640 km	60 280
5/16" (for 66 kv Lines)	327 km	13 670
4 - Steel cable, Siemens Martin grade, 3/8" for counter poise	647 km	9 044
5 - Circuit Breaker, 220 kv	18 ea	1 530 000
6 - Circuit Breaker, 132 kv	5 ea	210 000
7 - Disconnecting Switch, 220 kv	38 ea	512 180
8 - Disconnecting Switch with earthing contact 220 kv	9 ea	166 500
9 - Disconnecting Switch, 132 kv	19 ea	76 320
10 - Grounding Switch, 132 kv	2 ea	5 220
11 - Lightning Arrester, 220 kv	45 ea	125 040
12 - Lightning Arrester, 132 kv	18 ea	29 520
13 - Lightning Arrester, 66 kv	66 ea	59 400
14 - Lightning Arrester, 33 kv	207 ea	77 130
15 - Lightning Arrester, 13.2 kv	57 ea	12 540
16 - Capacitive Potential device 220 kv	42 ea	120 100
17 - Coupling Capacitor 132 kv	6	6 900
18 - Coupling Capacitor 66 kv	30	21 000
19 - Control Switchboard	59 ea	390 000
20 - Control Cubicle	76 ea	68 400
21 - Carrier Equipment	21 ea	210 000
22 - Synchronous Condenser & auxiliary equip. 30 MVAR	1 ea	715 000
23 - Diesel Units, 3 000 kv	10 ea	3 300 000
24 - Miscellaneous Equipment		54 000
TOTAL		8 826 600

COPEL

CONSTRUCTION SCHEDULE — MAIN SYSTEM

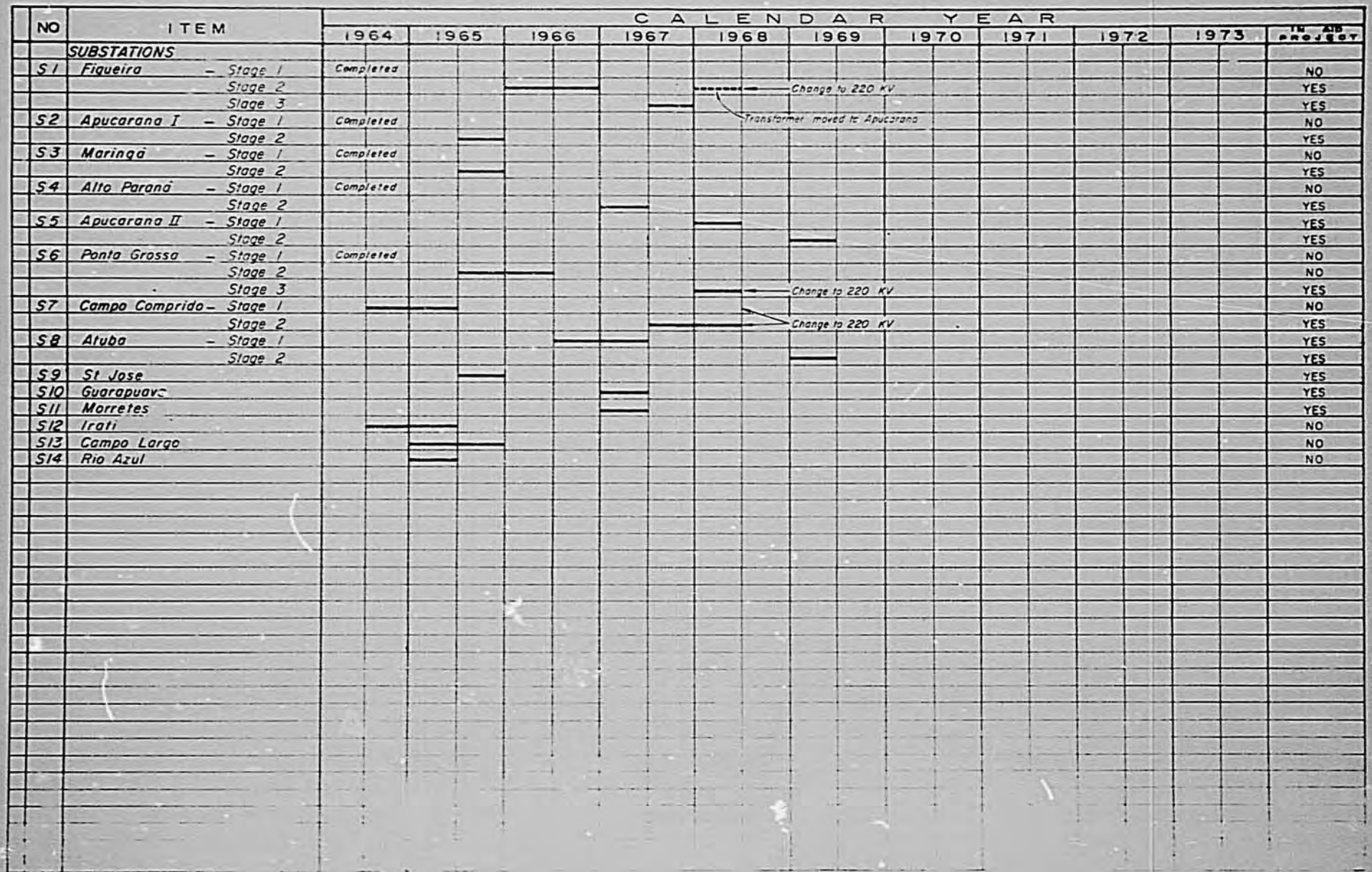
ANNEX III
Exhibit GA(1)



ANNEX III
Exhibit 6A(2)

COPEL

CONSTRUCTION SCHEDULE – MAIN SYSTEM



NO	ITEM	IN AIB project
	SUBSTATIONS	
S1	Figueira – Stage 1	NO
	Stage 2	YES
	Stage 3	YES
S2	Apucarana I – Stage 1	NO
	Stage 2	YES
S3	Maringá – Stage 1	NO
	Stage 2	YES
S4	Alto Paraná – Stage 1	NO
	Stage 2	YES
S5	Apucarana II – Stage 1	YES
	Stage 2	YES
S6	Ponta Grossa – Stage 1	NO
	Stage 2	NO
	Stage 3	YES
S7	Campo Comprido – Stage 1	NO
	Stage 2	YES
S8	Atuba – Stage 1	YES
	Stage 2	YES
S9	St Jose	YES
S10	Guarapuava	YES
S11	Morretes	YES
S12	Irati	NO
S13	Campo Largo	NO
S14	Rio Azul	NO

ANNEX III
Exhibit 6B

COPEL

CONSTRUCTION SCHEDULE – ISOLATED SYSTEMS

NO	ITEM	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	IN AS CONTRACT
	PLANALTINA DO PARANÁ											
	Power Plants											
G4	Diesel Unit		—									
(G2)	Diesel Unit						From Curitiba					YES
R1	Transmission Lines		—	—	—	—						NO
	Substations		—	—	—	—	—					YES
												YES
	CRUZEIRO DO OESTE											
	Power Plants											
G5	Diesel Unit		—									
(G3)	Diesel Unit						From Maringá					YES
R2	Transmission Lines		—	—	—	—	—					NO
	Substation		—	—	—	—	—					YES
												YES
	CASCAVEL											
	Power Plants											
G6	Diesel Unit			—								
R3	Transmission Lines			—	—	—						YES
	Substation			—	—	—						YES
												YES
	FOZ DO IGUAÇU											
	Power Plants											
G7	Diesel Unit			—								
R11	Transmission Lines			—	—	—						YES
	Substation			—	—	—						NO
												NO
	PATO BRANCO DO SUL											
	Power Plants											
G8	Diesel Unit			—								
(G2)	Diesel Unit						From Curitiba					YES
R4	Transmission Lines			—	—	—	—					YES
	Substation		—	—	—	—	—					YES
												YES
	CAMPO MOURÃO - CIANORTE											
	Power Plants											
G12	Mourão I (Hydro)											
	Unit 1	Completed										
	Units 2 & 3	—										NO
(G3)	Diesel Unit					From Maringá						NO
(G2)	Diesel Unit						From Curitiba					NO
(G1)	Diesel Unit							From Paranaguá				NO
T17	Transmission Lines	—	—	—	—							NO
P10	Regional Systems											NO
S5	Substations		—	—	—							NO
												NO
D2	DISTRIBUTION SYSTEMS - ALL	—	—	—	—	—	—	—				NO

IECo
Cia. Internacional

CONSULTING ENGINEERING SERVICES AND STUDIES PERFORMED IN THE Preparation of Feasibility Report of COPEL's 5-Yr Power System Expansion Program

Duration of Specific Services	June 1964 to October 1964	5 months
Follow-up	Nov. 1964 to Dec. 1964	2 months
		7 months

Time spent on Project	Specialized	862 hours
	Gen. Engineering	3,423 hours
	TOTAL	4,285 hours

The services performed were

A - GENERAL

1 - Assembly of available statistics within COPEL organization

2 - Gathering statistics and information from federal state agencies and other utility companies

3 - Inspection of principal substation and transmission lines

4 - General review of major generating plants Capivari-Cachoeira, Chavantes, Curitiba Emergency Diesel Plant, Salto Grande H.E. Plant, etc.

B - SPECIFIC

1 - Restudy of power market, using existing studies and determining principal parameters. - Subdivision of COPEL's system area into 11 market areas. - Establishing rational growth data. - Comparison with neighboring areas as investigated by the CANAMBRA Mission.

2 - Engineering and technical review of system interconnection and adequacy of design including

- review and selection of most suitable transmission and subtransmission voltages
- review of already adopted design criteria for adequacy
- establishing construction schedule
- projection of system requirement to 1970 in specific terms and to 1975 in general terms.

3 - Economic analysis in dividing the COPEL expansion system into logical components for AID financing and COPEL's self-financed construction expenditures, including

- preparation of detailed material and equipment listing
- review of manufacturing facilities in Brasil
- breakdown for imported components and locally available materials
- cost estimating of system expansion based on current prices
- cost estimating of current production costs

4 - Preparation of a comprehensive bound report of 140 pages, 20 exhibits.

Additional information as requested by AID program officers and engineers.

ANNEX IV - EXHIBITS

EXHIBIT 1	-	Financial Projection
EXHIBIT 2	-	Revenues from the Sales, Consignment and Transactions Tax, 1953-1964
EXHIBIT 3	-	Principal Power Systems in Paraná

CHAPTER X

FINANCIAL PROJECTION

10.1 - GENERAL

An attempt has been made to estimate the financial relationships of COPEL for the next ten years. The results of this financial forecast are presented in Tables X-1 and X-2, attached.

It has been necessary in the analysis to make many assumptions of general economic and financial nature as well as on specific conditions related to COPEL and the proposed electrification program. These assumptions have been made primarily on a judgement basis for the purpose of obtaining a reasonably realistic view of the financial development of COPEL during the forecast period.

Many of the problems of the forecast are caused by the strong depreciation of the Brazilian currency which has occured in the past and is continuing at the present. This trend will probably continue also in the immediate future, but it will be pure speculation to make any predictions of what will happen through the entire 10 years period. It was therefore decided to base the forecast on a theoretical condition of no inflation and to express all estimates in US Dollars. This procedure eliminates some of the problems, but it also creates new ones as will be discussed later in the chapter. However, it places the forecast on a firm basis and facilitates a more realistic evaluation of the program.

Another general assumption which has been made is that developments beyond the proposed program have not been included in the forecast. This assumption imposes limits on the income from sale of energy and operation costs during the last few years of the forecast period. However, the main effect on the forecast is that no expenses on new construction, nor funds from outside sources, have been included following the completion of the program.

The forecast has been developed in five major parts, A through E. Part A, designated "Earnings from Operations", deals with COPEL's income and expenses from all of their operations. Part B, designated "Sources of Funds" show the total funds which are expected to be available each year. Part C is designated "Use of Funds" and shows the estimated construction expenditures, debt service, and other expenditures such as payment of shares in other Companies. A comparison between the total "Sources of Funds" and the total "Use of Funds", which indicate the ability of COPEL to pay for the program, is included at the end of Part C. Part D, designated "Cash Flow", shows the cash balance at the end of each year. Finally, Part E, designated "Balance Sheet" shows the COPEL assets and liabilities at the end of each year.

17.2 - EARNINGS FROM OPERATIONS

.1 - Revenue - The major source of income for COPEL is the sale of electric power and energy. A portion of their total sales is to other concessionaires and will be sold at a lower rate than the remainder which will be sold directly to the consumers.

An estimate has been made of the energy sales during the 10 year period 1964 through 1973 on the basis of the estimated demand and the available COPEL generating capacity, including purchased power.

Total losses were assumed to be 15 percent for energy sold retail and 7,5 percent for energy sold wholesale. A reduction in total sales were also assumed, because the distribution systems will take some time to be developed fully with the result that only a portion of the potential market in a specific area can be reached. These reductions in sales of energy due to limited distribution systems were assumed to be 15 percent in 1964, 1965 and 1966; 10 percent in 1967 and 1969; and 5 percent during the remaining four years of the period. The estimated total sales of energy for the main System and for the Isolated Systems are shown under A.1 in the forecast. Energy sold wholesale has been estimated to average about 40 percent of the total COPEL energy sales in the Main System.

The sales price of energy will vary from year to year depending on the sources of supply. During the first few years there will be a multitude of sources, some new and some old, and it is

more or less impossible to estimate accurately what the average sales price will be. It is determined by Federal Law that the sales price of electric energy may include annual capital costs estimated as follows:

a - Amortization of Investment - three percent

b - Depreciation of Assets in Operation - five percent for hydro power plants and transmission systems and eight percent for thermal plants.

c - Profit and Return on Investments - ten percent of the total investment less depreciation.

These annual costs amount thus to 18 percent of the net investment for hydro plants and transmission systems, and 21 percent for the thermal power plants. However an important feature is that the investment is considered to be the historic amount in Cruzeiros. The result is that the estimated annual capital costs, and consequently also the energy prices, have become increasingly smaller in real value during recent years. The effect is especially noticeable for hydro plants where the capital costs are a relatively, large portion of the total annual costs. The sales price of energy produced from hydro plants only a few years old is very low, and does not provide a reasonable return on the original investment.

Normal operation and maintenance costs are, of course, also included in the sales price of energy. These operating costs are re-estimated every three months to take into account changes of such components as salaries of personnel and the cost of fuel.

The net result of the procedure of estimating energy costs, combined with the strong inflation during the recent years, is that energy from hydro plants is prices several times lower than energy from thermal plants. The entire rate structure at the moment is highly artificial, and was therefore not used for the purposes of this financial forecast. Instead was adopted a simplified method based on the estimated cost of production from the following three sources:

1 - New Diesel Units
2 - The Xavantes Hydro Powerplant
3 - The Capivari-Cachoeira Powerplant

The cost of energy from new Diesel Units was assumed to be applicable also to COPEL's production from their own existing plants to the purchased power from UTELFA and SOTELCA. The cost of energy produced at Xavantes was assumed to be applicable to all energy purchased from USELPA. This method results in higher sales prices during the first few years of the forecast period, as compared to the actual sales prices based on existing laws. However, operating costs are also estimated to be correspondingly higher so that the net result in the forecast is considered to be reasonable accurate and will provide a realistic basis for evaluation of the economics of the overall program. Estimates of average sales price of energy was made for each year of the program period based on the amounts of energy purchased and produced from the various sources of supply, and including the cost of transmission and distribution, which were estimated to be three US Mills and ten Mills per kilowatt-hour, respectively. Distribution costs were not included in the price of energy sold wholesale. The basic price of energy produced by a new Diesel plant was estimated to be between 20 and 25 Mills per kilowatt-hour depending on the load factor and the year of operation. Energy from Xavantes was estimated to cost 17 Mills in 1969 and 15 Mills in 1973, whereas energy from Capivari-Cachoeira was estimated to cost 12 Mills in 1969 and nine Mills in 1973, when all four units were assumed to be in operation. These relatively high costs are the result of the high annual capital charges which have been estimated in accordance with the present laws as discussed above. The average estimated sales prices for the Main System and the Isolated Systems are shown under A.2 in the forecast. The total revenue from sales of energy is shown under A.3.

COPEL will have considerable investments in the Xavantes and Capivari-Cachoeira power plants when they are completed. A return of five percent of these investments has been assumed as other income during the last four years of the program period.

10.3 - COST OF OPERATIONS

The total cost of COPEL's operations has been divided into three major components for the purposes of this forecast:

1 - Purchases of Energy
2 - Fuel Costs
3 - All other Operation and Maintenance, and General Administration

The first two components were easily obtained from the estimates of sale of energy as discussed above. The third component has been estimated primarily on a judgement basis using information on historic cost and anticipated future growth of the company as a guide. No attempt was made to estimate these general operating costs in detail, because future costs will depend on many factors which can not be reasonably foreseen at this time. The total operating costs have been shown under A.6 in the forecast.

A depreciation allowance estimated at five percent of the value of the fixed assets in operation has been included as an operation expense. The value of the fixed assets were obtained from COPEL's Balance Sheet for 1963 and to which were added investments in the project features which were assumed to be completed and placed in operation in accordance with the construction schedules.

No taxes were included in the analysis since COPEL is essentially a government operation.

The estimates show that COPEL will have a reasonable profit from operations in all years as shown under A.9 in the forecast. These profits will be considerably reduced, however, if interest payments on long-term debts are considered as an operating expense, as shown under A.11 and A.13, which indicate that COPEL may incur a slight loss in 1965 and again in 1968 when interest on long-term debt is included.

10.4 - SOURCES OF FUNDS

.1 - General the sources of funds for the construction proposed in the program period will come from four main sources:

1 - COPEL's profit from operations and depreciation allowances.

2 - Government of Paraná

3 - Federal Government

4 - AID Loan proposed herein

The profit from operations and the depreciation allowances have been estimated under "Earnings from Operations", and need no further elaboration.

2 - Government of Paraná - The funds from the Government of Paraná are obtained from general sales taxes and are provided in two ways:

1 - As increases in paid-in share capital and

2 - As loans provided by CODEPAR.

The increases in share capital come from the State Electrification Fund as provided for by Law No. 1384 of November 10, 1953 and Decree No.1412 of March 26, 1956. Law No. 1384 provides that the Electrification Fund shall receive 10 percent of the total revenue from the Sales Tax in Paraná, and Decree No.1412 designates COPEL as the sole beneficiary of the Fund.

CODEPAR administrates the Economic Development Fund of Paraná which was instituted by law No. 4 529 of January 12, 1962. The Fund obtains its capital from a special two percent Sales Tax. The portion of the funds designated for electric power developments, and made available to COPEL as loans, is expected to be about 30 percent during the program period.

Both of the State contributions obtain their funds from taxes on sales and contribute approximately equal amounts to COPEL. The total income from the normal sales tax, which is the basis for the Electrification Fund, has averaged about US $ 40 000 000 during the last few years, increasing at a rate of about five percent per year. However, the tax on coffee sales constitutes a large portion of the total tax which results in some variations from one year to the next depending on the coffee crop in each year. The sales tax this year is estimated to be about 15 percent less than normal, because of the frost which occurred in 1962. It is anticipated that the

total revenue from Sales Tax during the five year program period will be between US$ 40 000 000 and US$ 50 000 000 per year. The increase in the COPEL share capital from the Electrification Fund was accordingly assumed to be the equivalent of US$ 4 200 000 in 1965, increasing to US$ 5 000 000 in 1969. Funds provided with loans from CODEPAR have been included with similar amounts. These values are comparable with the amounts proposed for the electrification of Paraná in the Invesment Plan 1963-65, as shown in the "Alliance for Progress Report" of May 1963 (3), page 1/20.

3 - Federal Government - The funds from the Federal Government will be provided from two sources.

1 - the Federal Budget and
2 - the Unity Tax (Impôsto Único).

The funds from the Federal Budget are made available as share capital in COPEL by the Ministry of Mines and Energy, mostly for the purpose of construction of specific projects. COPEL has previously not received any funds in this manner but it is expected that the equivalent of US$ 1.500 000 will be received in 1964, one half of which is earmarked for the construction of the Ponta-Grossa Campo Comprido transmission line and the remainder for various regional systems and the Salto Grande do Iguaçu power plant. It is anticipated that the equivalent of US $ 1 000 000 will be made available from the Federal Budget each year on a similar basis.

The Unity Tax is a special tax on the sales of electric energy in Brazil in accordance with Law Nº 4156 of November 1962. The funds thus obtained are to be used for power development in Brazil. The Government of Paraná receives about 2 percent of total tax collected, and the entire amount is made available to COPEL as increase in share capital. It is estimated that the funds available from this source will amount to about US $ 650 000 in 1964, and that they will increase by about ten percent each year as a result of general increases in the sale of electric energy.

The funds provided by the State and Federal Governments will be used entirely for projects in the program proposed herein during the two first years, 1965 and 1966. Starting with 1967 it will be necessary, however, for COPEL to invest in new

projects to be completed between 1970 and 1975 as discussed previously. Ten percent of the funds available from the above sources have been assumed used for such other developments in 1967, 25 percent in 1968, and 50 percent in 1969. From 1970 and there-after no special funds will be necessary for the present program.

.4 - AID Loan - The loan from AID applied for herein has been assumed available in accordance with the required expenditure for construction. A disbursement schedule for this loan shown in Table X-2, has been worked out on the basis of the cost estimates in Chapter VIII and the construction schedules in Chapter VII. The loan includes interest during an assumed three-year grace period, estimated on the basis of 5-1/2 percent annual rate. These estimated yearly disbursements have been included also under Sources of Funds in the forecast.

.5 - Other Sources - COPEL may receive funds from other sources but they will be of minor importance as compared to those mentioned and have not been included in the forecast. Funds to the equivalent of US $ 15 000 000 from Federal resources are anticipated to be provided by ELETROBRAS and other government agencies for the construction of Capivari - Cachoeira but these funds will be invested as shares in ELETROCAP and have therefor not been considered herein.

10.5 - USE OF FUNDS

.1 - Construction Expenditure - The construction expenditure, as shown under C.18 in the forecast, has been determined for each year of the Program period on the basis of the detailed estimates and the construction schedules presented herein. Interest during construction was not included except as interest during the grace period in the case of the proposed AID loan. A large portion of the financing will be provided by increased share capital for which no interest is charged, and with respect to the loans from CODEPAR, interest payments have been assumed to start the next year and are thus included in the debt service, essentially.

.2 - Debt Service - The debt service for the proposed AID loan has been estimated on the basis of 5-1/2 percent annual interest rate and 20 years amortization period, to be paid in equal installements each year. The total loan has been estimated to be

US$ 12 186 000 including US$ 1 000 000 to cover interest during the grace period. The estimated yearly payments are shown under C. 22 in the forecast.

The current loans from CODEPAR, GERCA, and BNDE are contracted at annual interest rates of about ten percent, and amortization periods of five to seven years. These apparently severe terms are a result of the high rate of inflation which has occurred in recent years and which is likely to continue for some time. For this reason, the loans are in fact very cheap, since COPEL will repay with currency which has only a fraction of the value of what was received. Since the present forecast is based on no inflation during the program period, it is more or less impossible to make a true forecast for the repayments of these loans. It was therefore decided, as a reasonable approximation, to treat these loans as government loans, provided at low interest rate and a long amortization period. All of these loans, and the anticipated new loans from CODEPAR, were accordingly assumed to be provided on the following terms: Interest rate - three percent per year; grace period - one year, and amortization period - 20 years. The estimated debt service for these loans are shown under C. 22 in the forecast.

3 - Other Expenditures - COPEL has certain obligations in respect to the financing of the Xavantes and the Capivari-Cachoeira Projects, and intends to contribute considerable amounts to the share capital of USELPA and ELETROCAP during the program period. In the forecast has been included a total equivalent of US$ 3 600 000 as shares in USELPA and the equivalent of US$ 10 400 000 as shares in ELETROCAP. Although these amounts are considered to be reasonable and adequate, it is not possible to make an accurate forecast of the requirements at this time, and some adjustments are likely to occur during the program period. It is expected, however, that these adjustments will not be of major proportions.

4 - Balance of Funds - The overall balance between sources and use of funds is shown under C. 23 in the forecast for each year in the Program period. The general conclusion is that COPEL will have sufficient funds to carry out the Program with the help provided by the proposed AID loan. One year, 1965, shows a deficit equivalent to about US$ 3 260 000 but this can be compensated by transfer of funds from 1964 which has an estimated surplus of US$ 3 200 000. The reason for the surplus this year is that new projects have been delayed because of shortage of material and equipment which must be imported.

TABLE X.-1

CIA. PARANAENSE DE ENERGIA ELETRICA - COPEL

FORECAST OF EARNINGS, RECEIPTS AND EXPENDITURES - EXPRESSED IN US$

		CALENDAR YEAR										
		1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	
A	EARNINGS FROM OPERATIONS											
	Revenue											
	1. Annual Sales of Energy - Million kwh											
	Main System	137.5	180.0	353.0	467.0	541.0	639.0	673.0	991.0	1 038.0	1 185.0	
	Isolated Systems	43.8	83.8	87.9	92.0	104.0	129.0	189.0	189.0	189.0	189.0	
	2. Average Price per kwh - US$											
	Main System	0.026	0.026	0.026	0.026	0.026	0.023	0.023	0.020	0.020	0.019	
	Isolated Systems	0.034	0.034	0.034	0.034	0.033	0.033	0.033	0.032	0.032	0.032	
	3. Gross Revenue from Energy Sales-US$											
	Main System	3 740 000	4 740 000	9 080 000	11 840 000	13 650 000	15 240 000	19 220 000	20 220 000	21 940 000	23 070 000	
	Isolated Systems	1 480 000	1 820 000	2 300 000	2 790 000	3 450 000	4 250 000	5 250 000	5 100 000	5 100 000	5 100 000	
	Total Revenue from Energy Sales	5 220 000	6 560 000	11 380 000	14 630 000	17 100 000	19 490 000	24 470 000	25 320 000	27 040 000	28 170 000	
	4. Other Income											
	Profit from shares in USELPA							250 000	250 000	250 000	250 000	
	Profit from shares in ELETROCAP							300 000	350 000	400 000	500 000	
	5. Total Income (3 + 4)	5 220 000	6 560 000	11 380 000	14 630 000	17 100 000	19 490 000	25 020 000	25 920 000	27 690 000	28 920 000	
	Cost of Operation Net Income and Profits											
	6. Operating Expenses											
	Purchases of Energy	1 360 000	1 960 000	3 090 000	4 770 000	6 850 000	9 100 000	12 400 000	12 400 000	13 050 000	14 000 000	
	Fuel Costs	780 000	1 200 000	2 060 000	2 210 000	2 310 000	1 540 000	1 540 000	1 540 000	1 540 000	1 540 000	
	All Other Operation and Maintenance & General Administration	2 330 000	2 830 000	3 920 000	5 260 000	5 600 000	5 650 000	6 100 000	6 650 000	6 900 000	7 250 000	
	Total Operating Expenses	4 470 000	5 990 000	9 070 000	12 240 000	14 760 000	16 290 000	20 040 000	20 590 000	21 490 000	22 790 000	
	7. Depreciation Allowance	140 000	210 000	580 000	950 000	1 320 000	1 620 000	1 830 000	1 890 000	1 820 000	1 750 000	
	8. Taxes	-	-	-	-	-	-	-	-	-	-	
	9. Total Cost of Operation before Interest on Long-term Debt (6 through 8)	4 610 000	6 200 000	9 650 000	13 190 000	16 080 000	17 910 000	21 870 000	22 480 000	23 310 000	24 540 000	
	10. Net Income before Interest on Long-term Debt (5 - 9)	610 000	360 000	1 730 000	1 240 000	1 020 000	1 580 000	3 150 000	3 440 000	4 380 000	4 380 000	
	11. Interest on Long-Term Debt	111 000	260 000	382 200	503 300	1 277 200	1 339 000	1 375 800	1 313 500	1 181 200	1 038 800	
	12. Net Profit or Loss (10 - 11)	+ 499 000	+ 100 000	+1 347 800	+ 736 700	- 257 200	+ 241 000	+1 774 200	+2 126 500	+3 198 800	+3 341 200	
B	SOURCES OF FUNDS											
	13. Net Income before Interest (Item 10)	610 000	360 000	1 730 000	1 240 000	1 020 000	1 580 000	3 150 000	3 440 000	4 380 000	4 380 000	
	14. Depreciation Allowance (Item 7)	140 000	210 000	580 000	950 000	1 320 000	1 620 000	1 830 000	1 890 000	1 820 000	1 750 000	
	15. Increase Paid-in Share Capital											
	Ministry of Mines and Energy (Federal Budget)	1 500 000	1 000 000	1 000 000	800 000	500 000	500 000	-	-	-	-	
	Government of Paraná (Electrification Tax)	4 000 000	4 200 000	4 400,000	4 100 000	3 600 000	2 500 000		-	-	-	
	Paraná's share of Revenuefrom Imposto Único)	650 000	800 000	880 000	910 000	800 000	585 000		-	-	-	
	16. Borrowings											
	AID loan proposed herein		5 470 000	1 280 000	3 010 000	1 772 450	-	-	-	-	-	
	CODEPAR - current contracts	730 000	-	-	-	-	-	-	-	-	-	
	CODEPAR - expected new contracts	3 270 000	4 200 000	4 400 000	4 100 000	3 600 000	2 500 000	-	-	-	-	
	GERCA - current contracts	210 000	-	-	-	-	-	-	-	-	-	
	BNDE - current contracts	230 000	290 000	-	-	-	-	-	-	-	-	
	17. Other Receipts	-	-	-	-	-	-	-	-	-	-	
	18. Total Receipts	11 340 000	16 530 000	14 250 000	15 110 000	12 612 450	9 285 000	4 980 000	5 330 000	6 200 000	6 130 000	

TABLE X - 1

CIA. PARANAENSE DE ENERGIA ELÉTRICA - COPEL

FORECAST OF EARNINGS, RECEIPTS AND EXPENDITURES - EXPRESSED IN US$

		CALENDAR YEAR										
		1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	
C	USE OF FUNDS											
19.	Construction Expenditure											
	This AID Project											
	Foreign Currency	-	5 800 000	1 355 000	3 146 000	1 878 000	-					
	Local Currency	-	4 301 000	4 108 500	2 529 000	2 589 000	274 500	-	-	-	-	
	Total AID Project	-	10 110 000	5 463 500	5 675 000	4 465 000	274 500	-	-	-	-	
	Other Construction Expenditure	6 380 000	8 973 700	4 076 500	2 381 000	2 400 000	2 265 000	-	-	-	-	
20.	Debt Service											
	Amortization of Principal											
	Existing DLF or AID Loan	-	-	-	-	-	-	-	-	-	-	
	AID Loan proposed herein											
	Existing CODEPAR Loans	134 000	138 000	142 000	147 000	351 000	372 000	382 000	410 000	434 000	452 000	
	New CODEPAR Loans		125 000	284 000	466 000	151 000	185 000	160 000	184 000	189 000	174 000	Assumed 3% interest 20 year amortiz.
	GERCA (existing)		28 600	29 500	30 400	638 000	795 000	917 000	944 000	818 000	845 000	
	RYDE (existing)		34 500	35 400	36 500	31 400	32 400	33 400	34 400	35 400	36 500	
	ATALAIA (existing)	-	-	10 000	12 000	37 600	38 800	40 000	41 300	42 600	43 900	
	Interest					32 000	-	-	-	-	-	
	Existing DPL or AID Loan	-	-	-	-							
	AID Loan proposed herein											
	Existing CODEPAR Loans	108 000	104 000	100 000	96 000	671 600	650 000	640 000	812 000	688 000	570 000	
	New CODEPAR Loans	-	100 000	227 000	355 000	91 000	87 000	82 000	77 000	72 000	67 000	
	GERCA	-	23 200	22 400	21 500	487 000	559 000	613 000	588 000	485 000	388 000	
	RYDE	-	27 800	26 800	25 800	20 550	19 500	18 500	17 500	16 500	15 400	
	ATALAIA	3 000	5 000	8 000	5 000	24 700	23 500	22 300	21 000	19 700	18 400	
						3 000	-	-	-	-	-	
21.	Other Expenditure											
	Share in USELPA	800 000	800 000	1 000 000	1 000 000	400 000	-	-	-	-	-	
	Shares in ELETROCAP	900 000	1 300 000	2 500 000	3 000 000	1 300 000	1 000 000	-	-	-	-	
	Shares in CELUSA	15 000	20 000	20 000	20 000	20 000	20 000	20 000	-	-	-	
22.	Total Expenditures	8 140 000	19 788 800	13 963 100	13 351 200	11 303 850	6 291 700	2 928 700	2 907 200	2 680 200	2 390 200	
D	CASH FLOW											
23.	Annual Cash Surplus (or Deficit)	3 200 000	-3 259 800	- 306 900	+1 858 800	+1 309 250	+2 993 300	+2 051 800	+2 422 800	+3 519 800	+3 739 800	
24.	Cash to Reserve	-	-	-	-	-	-	-	-	-	-	
25.	Cash to Dividends	-	-	-	-	-	-	-	-	-	-	
26.	Cash Balance (End of year)	3 200 000	-3 259 800	- 306 900	+1 858 800	+1 309 250	+2 993 300	+2 051 800	+2 422 800	+3 519 800	+3 739 800	
E	BALANCE SHEET ASSETS											
27.	Current Assets - Cash *	+ 883 535	-3 259 800	- 306 900	+1 858 800	+1 309 250	+2 993 300	+2 051 800	+2 422 800	+3 519 800	+3 739 800	
	- Fixed Assets **	3 500 000	5 260 000	24 456 200	27 790 000	32 290 000	40 051 700	45 789 750	47 394 200	45 404 200	43 584 200	
28.	Depreciation Reserve	-	-	-	-	-	-	-	-	-	-	
29.	Capital Assets - Constr. in Progress	6 380 000	17 083 700	9 540 000	8 036 000	6 815 000	2 510 500	-	-	-	-	
30.	Gross Assets	10 763 535	19 083 900	23 889 300	33 684 800	40 434 250	45 584 500	47 841 550	49 717 000	48 924 000	47 324 000	
31.	Accum. Depreciation	- 140 000	- 350 000	- 930 000	- 1 880 000	-3 200 000	- 4 820 000	-6 352 400	-8 242 400	-10 062 400	-11 812 400	
32.	Net Assets	10 623 535	18 733 900	22 759 300	31 804 800	37 234 250	40 764 500	41 489 150	41 474 600	38 861 600	35 511 600	
33.	Intangible Assets	-	-	-	-	-	-	-	-	-	-	
34.	Total Assets	10 623 535	18 733 900	22 759 300	31 804 800	37 234 250	40 764 500	41 489 150	41 474 600	38 861 600	35 511 600	
F	BALANCE SHEET LIABILITIES											
35.	Current Liabilities - Notes Payable	111 000	260 000	382 200	503 300	1 277 800	1 339 000	1 375 800	1 313 500	1 181 700	1 038 800	
36.	Share Capital Increase	6 150 000	6 000 000	6 200 000	5 810 000	4 900 000	4 285 000	2 000 000	4 000 000	4 000 000	4 000 000	
37.	Long-term Debt - Local	4 440 000	8 930 000	13 330 000	17 430 000	21 030 000	24 645 000	24 645 000	24 645 000	24 645 000	24 645 000	
	Long-term Debt - Proposed AID Loan	-	5 470 000	8 710 000	9 380 000	11 512 450	11 512 450	11 512 450	11 512 450	11 512 450	11 512 450	
38.	Amortization of Principal	- 134 000	- 326 100	- 500 900	- 1 192 800	-2 433 800	-3 032 000	-4 564 400	-6 158 100	-7 657 100	-9 008 500	
39.	Balance - Long-term Debt	4 306 000	14 073 900	19 539 100	25 617 200	30 108 650	33 125 450	31 593 050	29 999 350	28 500 350	27 148 950	
40.	Replacements and new investments	-	-	-	-	900 000	2 200 000	4 000 000	4 000 000	4 000 000	3 000 000	
41.	Earned Surplus (or Deficit)	56 535	-1 800 000	-3 382 000	175 700	87 800	15 050	2 520 300	2 181 750	1 180 100	323 850	
42.	Total Liabilities	10 623 535	18 733 900	22 759 300	31 804 800	37 234 250	40 764 500	41 489 150	41 474 600	38 861 600	35 511 600	

* Cash on Balance Sheet
1963 - Converted at Cr$ 620 for US$ 1.00 (rate at Dec 31, 1963)

** Fixed Assets on Balance Sheet
1963 - Converted at Cr$ 500 for US$ 1.00 (medium rate in 1963)
Real value estimated at US$ 32 000 000 (Capital increases converted to dollars at the prevailing rate at the epoch of increase)

BALANCE SHEETS

COMPANHIA PARANAENSE DE ENERGIA ELETRICA "COPEL"

Balanço Geral Realizado em 31 de Dezembro de 1961

A T I V O

2 - IMOBILIZADO			
20 - Bens e Instalações em Serviço		479 495 075 20	
28 - Outras Propriedades		5 892 475 10	485 387 550 30
4 - DISPONIBILIDADES			
4 - Caixa e Bancos			17 906 604 50
5 - PENDENTE			
50 - Suspenso		187 390 947 20	
52 - Obras em Andamento		273 739 255 00	
56 - Caução de Consumidores		11 623 836 70	453 754 038 90
6 - REALIZAVEL			
60 - Contas a receber		45 938 858 50	
61 - Obrigações a Receber		88 853 797 00	
62 - Devedores Diversos		121 146 288 50	
64 - Cauções		443 500 00	
65 - Almoxarifado		158 121 158 70	
66 - Capital a Realizar		3 883 130 00	
69 - Participações por Ações		219 800 000 00	637 966 520 70
8 - RESULTADO			
80 - Lucros e Perdas			280 493 291 70
9 - COMPENSAÇÃO			
01 - 01 - Ações Caucionadas		300 000 00	
03 - 02 - Contratos de Serviços		87 720 225 00	
03 - 01 - Banco do Estado do Paraná S.A. - Conta Caução		608 508 70	
04 - 01 - Títulos em Caução		15 900 000 00	
06 - 01 - Avais de Títulos		74 400 000 00	
06 - 02 - Títulos avalisados para Terceiros		83 900 000 00	
07 - 01 - Ordens de Compra		66 171 796 00	283 996 529 70
SOMA DO ATIVO			2 143 506 535 80

P A S S I V O

1 - INEXIGIVEL			
10 - Capital			1 400 000 000 00
3 - EXIGIVEL			
30 - Contas a Pagar		71 049 523 60	
31 - Outras Obrigações à Pagar		347 921 035 00	
37 - Outros Créditos Correntes		7 024 168 10	
39 - Obrigações		15 900 000 00	441 894 726 70
5 - PENDENTE			
51 - Créditos em Suspenso		292 626 60	
53 - Auxílios para Construções		790 805 70	
55 - Depósitos de Consumidores		11 529 847 10	13 613 279 40
9 - COMPENSAÇÃO			
01 - 02 - Caução de Diretoria		300 000 00	
03 - 02 - Cauções de Obras		608 508 70	
04 - 04 - Contratos com Caução de Títulos		15 900 000 00	
05 - 0 - Serviços Contratados		87 720 225 00	
06 - 02 - Títulos Avalizados		74 400 000 00	
06 - 04 - Responsabilidade por Aval		83 900 000 00	
07 - 02 - Responsabilidade por Ordem Compra		66 171 796 00	286 996 529 70
SOMA DO PASSIVO			2 143 506 535 80

Curitiba, 31 de Dezembro de 1961.
PEDRO VIRIATO PARIGOT DE SOUZA
Diretor Presidente
MILTON DE BARROS WITHERS
Diretor Administrativo
HIRAM ROLIM LAMAS
Diretor Técnico
T. OGINO
(Téc. Cont.) - CRC-PR-3703
Divisão de Contadoria
ATTILIO ALICE - CRC-PR-233
Superintendência

COMPANHIA PARANAENSE DE ENERGIA ELÉTRICA "COPEL"

Balanço Geral em 31 de Dezembro de 1962

A T I V O

IMOBILIZADO			
Bens e Instalações em Serviço		1 026 846 419 80	
Bens e Instalações p/uso Futuro		11 927 310 00	
Outros Bens e Instalações		45 850 636 00	
Outras Propriedades		9 316 493 90	1 093 940 809 80
DISPONIBILIDADES			
Caixa		5 620 885 80	
Bancos		735 127 483 50	740 748 369 10
REALIZÁVEL			
Curto Prazo			
CONTAS A RECEBER - CONSUMIDORES			
Exercícios Anteriores	16 520 582 80		
Exercício Corrente	40 363 900 50	56 884 483 40	
Devedores Diversos		371 852 819 30	
Longo Prazo			
Depósitos Especiais ou Caução		2 329 273 30	
Almoxarifados		1 031 222 272 50	
Capital a Realizar - Ações		1 057 725 175 40	
Empréstimos Compulsórios e Debentures		44 104 850 00	
Participação por Ações:			
USELPA	360 000 000 00		
UTELFA	238 800 000 00		
CELUSA	20 000 000 00		
CHEVI	14 000 000 00		
CODEPAR	10 000 000 00	584 700 000 00	3 148 818 451 40
PENDENTE			
Débitos em Suspenso:			
Pagamentos Antecipados	258 456 615 40		
Desp. de Lev. e Invest. Prel.	101 213 529 30		
Outros Débitos em Suspenso	110 391 809 40	470 063 834 10	
Obras em Andamento		786 018 212 30	
Caução de Consumidores		21 551 801 50	1 277 631 847 90
RESULTADO			
Lucros e Perdas			622 705 189 30
SUB-TOTAL			8 883 834 850 00
COMPENSAÇÃO			
Ações Caucionadas		400 000 00	
Contratos de Serviço		882 406 069 40	
Compromissos de Compra e Venda		541 213 332 80	
Banco do Estado do Paraná S/A - C/Caução		3 910 589 90	
Títulos em Caução		42 800 000 00	
Avais de Títulos		246 553 290 10	
Títulos Avalizados p/Terceiros		705 246 357 00	
Ordens de Compra		748 868 480 10	
Contratos de Comodato		1 121 000 00	
Contratos de Locação		9 082 000 00	
Garantia p/Desembaraços Aduaneiros		8 675 629 70	
Contratos de Financiamento		336 624 264 40	3 336 501 024 40
TOTAL DO ATIVO			12 220 135 874 40

P A S S I V O

INEXIGÍVEL			
CAPITAL			
Ações Preferenciais	1 884 000 000 00		
Ações Ordinárias	2 516 000 000 00	4 400 000 000 00	
Reserva p/Depreciação das Instalações		58 960 413 00	4 458 960 413 00
EXIGÍVEL			
Curto Prazo			
Contas a Pagar		193 248 535 40	
Obrigações à Pagar		797 496 504 80	
Outros Créditos Correntes		16 574 421 70	
Longo Prazo			
DIVERSAS DÍVIDAS A LONGO PRAZO			
Obrigações		1 444 525 780 50	2 451 845 242 40
PENDENTE			
Crédito em Suspenso		135 714 90	
Auxílio p/Construções		146 895 896 80	
Depósitos de Consumidores		22 692 982 10	169 728 593 80
SUB-TOTAL			8 883 834 850 00
COMPENSAÇÃO			
Caução da Diretoria		400 000 00	
Serviços Contratados		882 406 069 40	
Responsabilidade c/Importações		541 213 332 80	
Caução de Obras		3 910 589 90	
Contratos C/Caução de Títulos		42 800 000 00	
Títulos Avalizados		246 553 290 10	
Responsabilidade p/Aval		705 246 357 00	
Responsabilidade p/Ordens de Compra		748 868 480 10	
Contratos Comodato		1 121 000 00	
Contratos de Locação		9 082 000 00	
Desembaraços Aduaneiros		8 675 629 70	
Financiamento Contratados		336 624 264 40	3 336 501 024 40
TOTAL DO PASSIVO			12 220 135 874 40

Curitiba, 31 de Dezembro de 1962
PEDRO VIRIATO PARIGOT DE SOUZA - Diretor Presidente
GABRIEL A. H. NEIVA DE LIMA - Diretor Administrativo
HIRAN ROLIM LAMAS - Diretor Técnico
MILTON DE BARROS WITHERS - Diretor
ATTILIO ALICE - Superintendente
TAKAMASA OGINO - Divisão de Contadoria. Téc. Cont. CRC-Pr. 3703

BALANCE SHEETS

COMPANHIA PARANAENSE DE ENERGIA ELETRICA "COPEL"

Balanço Geral Realizado em 31 de Dezembro de 1959

ATIVO

	2 - IMOBILIZADO			
20	- Bens e Instalações em Serviços	297 380 696 30		
28	- Outras Propriedades	5 394 956 80	302 775 653 10	
	4 - DISPONIBILIDADES			
4	- Caixa e Bancos			3 307 697 70
	5 - PENDENTE			
50	- Suspenso	87 990 296 40		
52	- Obras em Andamento	63 689 481 30		
56	- Caução de Consumidores	2 283 033 00	133 982 810 70	
	6 - REALIZAVEL			
60	- Contas a Receber	12 577 431 00		
61	- Obrigações a Receber - Geral	84 064 275 50		
62	- Devedores Diversos	94 112 534 80		
64	- Cauções	3 500 00		
65	- Almoxarifados - Séde e Setores Administrativos	109 847 644 20		
68	- Capital a Realizar	89 188 808 10		
69	- Participação por Ações - UTELFA...	104 584 357 90	474 336 541 50	
	9 - RESULTADO			
90	- Lucros e Perdas			45 349 383 10
	0 - COMPENSAÇÃO			
01	- 01 - Ações Caucionadas	300 000 00		
01	- 05 - Subscrição de Ações	95 225 742 10		
03	- 01 - Banco do Estado do Paraná S/A. - C/Caução	606 508 70		
05	- 01 - Contratos de Serviços	6 801 803 40	102 944 054 20	
	SOMA DO ATIVO		Cr$	1 062 476 140 30

PASSIVO

	1 - INEXIGIVEL			
10	- Capital			800 000 000 00
	3 - EXIGIVEL			
30	- Contas a Pagar	34 696 377 30		
31	- Outras Obrigações a Pagar	75 737 505 00		
37	- Outros Créditos Correntes	10 321 434 20	120 755 316 50	
	5 - PENDENTES			
51	- Créditos em Suspenso	36 349 390 60		
55	- Depósitos de Consumidores	2 427 379 00	38 776 769 60	
	6 - COMPENSAÇÃO			
01	- 02 - Caução da Diretoria	300 000 00		
01	- 06 - Ações Subscritas	95 225 742 10		
03	- - Caução de Obras	606 508 70		
05	- - Serviços Contratados	6 801 803 40	102 944 054 20	
	SOMA DO PASSIVO			1 062 476 140 30

Curitiba, 31 de Dezembro de 1.959
DR. BENJAMIM DE ANDRADE MOURÃO - Diretor Presidente.
GEN. ALCIDES MUNHOZ JUNIOR - Diretor Administrativo.
Cel. LUIZ CARLOS PEREIRA TOURINHO - Diretor Técnico.
MANSUETO SERAFINI - Diretor de Operações.
OSVALDO CRUZ - Técnico em Contabilidade.
Registro no C.R.C. Pr. nº 2030

COMPANHIA PARANAENSE DE ENERGIA ELETRICA "COPEL"

Balanço Geral Realizado em 31 de Dezembro de 1960

ATIVO

	2 - IMOBILIZADO		
20	- Bens e Instalações em Serviços	315 302 300 50	
28	- Outras Propriedades	5 555 056 30	320 857 356 80
	4 - DISPONIBILIDADES		
40	- Caixa e Bancos		4 849 188 70
	5 - PENDENTE		
50	- Suspenso	89 833 886 50	
52	- Obras em Andamento	82 795 917 30	
56	- Caução de Consumidores	3 424 319 80	156 054 123 60
	6 - REALIZAVEL		
60	- Contas a Receber	32 399 667 50	
61	- Obrigações a Receber	59 156 947 10	
62	- Devedores Diversos	182 377 646 90	
64	- Cauções	3 500 00	
65	- Almoxarifados	123 218 485 70	
68	- Capital a Realizar	387 000 000 00	
69	- Participações por Ações	151 102 033 70	945 259 280 90
	9 - RESULTADO		
90	- Lucros e Perdas		73 357 787 80
	0 - COMPENSAÇÃO		
01	- 01 - Ações Caucionadas	300 000 00	
01	- 05 - Subscrições de Ações	48 697 986 30	
02	- 02 - Contratos de Serviços	2 991 521 00	
03	- 01 - Banco do Estado do Paraná S. A. - Conta Caução	606 508 70	52 595 996 00
	SOMA DO ATIVO		1 552 773 713 80

PASIVO

	1 - INEXIGIVEL		
10	- Capital		1 400 000 000 00
	3 - EXIGIVEL		
30	- Contas a Pagar	44 867 860 30	
31	- Outras Obrigações a Pagar	35 265 814 50	
37	- Outros Créditos Correntes	20 758 846 10	90 892 120 90
	5 - PENDENTE		
51	- Creditos em Suspenso	3 644 083 30	
55	- Depósitos de Consumidores	5 641 513 60	9 285 596 90
	6 - COMPENSAÇÃO		
01	- 02 - Caução da Diretoria	300 000 00	
01	- 06 - Ações Subscritas	48 697 986 30	
03	- 02 - Cauções de Obras	606 508 70	
05	- 0 - Serviços Contratados	2 991 521 00	52 595 996 00
	SOMA DO PASSIVO		1 552 773 713 80

Curitiba, 31 de Dezembro de 1960
ENG. LEÃO SCHULMAN - Diretor Presidente
ANISIO H. BARTOLOMEI - Diretor Administrativo
JOACUIM T. CARNEIRO - Diretor Técnico
ATTILIO ALICE - CRC - PR 283 - Chefe do Departamento de Contabilidade

CIA. PARANAENSE DE ENERGIA ELÉTRICA (COPEL)

GENERAL BALANCE SHEET ON DECEMBER 31, 1967

ASSETS

FIXED ASSETS			
Property and installations in use		1 741 513 862,20	
Property and installations for future use		15 727 844,00	
Other property and installations		135 188 596,20	
Other assets		19 370 399,80	1 911 800 702,00
AVAILABLE			
Cash in hand		5 401 342,00	
Cash at banks		542 490 723,80	547 792 065,80
REALIZABLE			
SHORT TERM			
Accounts Receivable - Consumers			
Previous Fiscal Years	18 346 972,90		
Present Fiscal Year	77 313 540,20	96 660 513,10	
Sundry Debtors		418 555 072,20	
LONG TERM			
Special Deposits or Guarantees		5 999 904,80	
Equipment in Stock		2 241 398 555,10	
Realizable Capital - Shares		1 656 124 983,80	
Compulsory Loans and Debentures		31 528 535,70	
Shares - Participation			
CTELPA	499 400 000,00		
CELUSA	24 000 000,00		
USELPA	624 000 000,00		
COLEPAR	10 000 000,00		
COMPARA	13 000 000,00		
ELETROCAP	117 700 193,90		
Empresa Elétrica Alexandre Scheliga	500 000,00	1 838 600 193,90	6 088 867 758,60
PENDING			
Debts in Abeyance : Payments in Advance :			
Projects 436 838 257,50			
Other Payments 13 524 412,40	460 362 869,90		
Survey and Preliminary Investigation Expenses	55 807 511,60		
Interest and Taxes on Loans	1 858 243 094,80		
Other Debts Pending	97 491 332,90	2 471 904 609,20	
Projects under Construction	3 651 449 294,00		
Payments for Installations under Constr.	54 074,20	3 651 503 168,20	
Consumers' Guarantee		37 881 460,60	6 161 289 438,00
RESULT			
Profits and Losses			650 722 272,30
		Sub-Total	15 360 472 236,70
MEMORANDUM ACCOUNTS			
Shares Held in Guarantee		500 000,00	
Service Contracts		7 887 453 583,10	
Guarantee Account - Banco do Estado do Paraná S/A		8 000 000,00	
Trade Acceptances in Guarantee		67 425 000,00	
Guarantees for Trade Acceptance		496 991 631,10	
Trade Acceptances Guaranteed by 3rd Parties		171 697 697,60	
Purchase Orders Liability		2 054 747 114,80	
Free Loan Agreement		1 121 000,00	
Rent Contracts		11 526 800,00	
Guarantee for Customs Releases		72 815 958,10	
Financing Agreements		2 352 893 000,00	
Subscribed Shares		352 048 000,00	
Electric Power Exploration		600 000 000,00	
Material Loaned by 3rd Parties		184 930,00	
Equipment Loaned by 3rd Parties		4 800 000,00	
Guarantees given by 3rd Parties on Loans		940 000 000,00	
Guarantee loaned by 3rd Parties		388 690 625,70	
Shares' Assignment		300 000,00	15 411 195 340,40
	TOTAL ASSETS		Cr$ 30 771 667 577,10

Pedro Viriato Parigot de Souza - Director President
Gabriel A. H. Neiva de Lima - Administrative Director
Mauricio Schulman - Technical Director
Jayme de Camargo Simões - Director
Francisco C. Filgueiras - Auditing Department
Takamass Ogico - Accounting Division

LIABILITIES

CAPITAL AND RESERVES			
Preferential Shares	3 204 000 000,00		
Ordinary Shares	4 796 000 000,00	8 000 000 000,00	
Reserve for Depreciation of Installations		120 994 511,60	8 120 994 511,60
EXIGIBLE			
SHORT TERM			
Accounts Payable		506 559 924,30	
Interest Outstanding		135 878 962,20	
Other Current Credits		50 041 211,60	
LONG TERM			
Current Interest		1 685 081 568,50	
SUNDRY LONG TERM DEBTS			
Financing Obligations		4 201 396 717,20	6 578 958 383,80
PENDING			
Credits in Abeyance		19 550 768,90	
AID FOR CONSTRUCTIONS			
Contributions	581 019 051,00		
Gifts	20 191 659,50	601 210 710,50	
Consumers' Deposits		19 757 841,90	660 519 121,30
		Sub-Total	15 360 472 236,70
MEMORANDUM ACCOUNTS			
Directors' Shares Deposited as Guarantee		500 000,00	
Contracted Services		7 887 453 583,10	
Projects' Guarantee		8 000 000,00	
Contracts Guaranteed by Bonds		67 425 000,00	
Bond Agreement		496 991 631,10	
Responsibility for Guarantee		171 697 697,60	
Responsibility for Purchase Orders		2 054 747 114,80	
Free Loan Agreement		1 121 000,00	
Rent Contracts		11 526 800,00	
Customs' Releases Guarantee		72 815 958,10	
Financing Agreements		2 352 893 000,00	
Subscribed Shares		352 048 000,00	
Electric Power Exploration		600 000 000,00	
Material Loaned by 3rd Parties		184 930,00	
Equipment Loaned by 3rd Parties		4 800 000,00	
Guarantee without Security		940 000 000,00	
Responsibility for Security		388 690 625,70	
Shares' Assignment		300 000,00	15 411 195 340,40
	TOTAL LIABILITIES		Cr$ 30 771 667 577,10

PROFIT AND LOSS ACCOUNT STATEMENT AT DECEMBER 31, 1967

D E B I T

Previous Balance		522 795 159,30
EXPLORATION EXPENSES		
General Administration, Power Plants, Salaries, Upkeep, Maintenance, Production Expenses, Electrical Power Transmission	803 475 435,20	
DEPRECIATION QUOTA		
Depreciation of Property and Current Instal.	56 729 195,80	860 154 631,10
NON-EXPLOITATION EXPENSES		
Interest, Banking Expenses, Amortiz., etc.	3 054 173,20	
SUNDRY DUTIES ON NET INCOME		
Duties	634 464,10	1 688 637,50
	TOTAL DEBIT	Cr$ 1 386 638 437,90

C R E D I T

EXPLORATION INCOME		
Electric Power Supply	661 414 764,10	
Other Income	10 229 931,10	671 664 698,40
NON-EXPLORATION INCOME		
Dividends Received	650 000,00	
Interest Debited to Construction	12 737 416,80	
Discount Obtained	11 146 070,60	
Other Income	17 537 085,90	64 251 487,30
PROFIT AND LOSS ACCOUNT		
Previous Fiscal Years	522 795 159,30	
Present Fiscal Year	127 917 103,00	650 722 272,30
	TOTAL CREDIT	Cr$ 1 386 638 437,90

COPEL SHAREHOLDERS AS OF SEPTEMBER 1964

N A M E	NUMBER OF SHARES		AMOUNT 1 000 Cr$
	ORDINARY	PREFERENCE	
Govêrno do Estado do Paraná	4 795 894	2 996 500	7 792 394
Flausino Mendes da Silva	2	-	2
Pedro Viriato Parigot de Souza	6	-	6
Celso Augusto Frazão Guimarães	48	-	48
Rubens Requião	6	-	6
Luiz Rodolpho Cavalcanti de Albuquerque Fº	1	-	1
Leão Schulman	2	-	2
Alcides Munhoz Jr.	2	-	2
Marciel Maciel	5	-	5
Frederico Julio Reginatto	6	-	6
Luiz Roberto de Abreu Munhoz	4	-	4
Mauricio Schulman	8	-	8
Hercan Wanderley	2	-	2
Prefeitura Municipal de Mandaguari	-	4 000	4 000
Superintendência do Plano de Valorização Econômica da Região Fronteira Sudoeste do País	-	165 500	165 500
Banco Comercial do Paraná S.A.	-	38 000	38 000
Antonio Ernesto Camargo Wanderley	13	-	13
Gabriel Antonio Henke Neiva de Lima	1	-	1
	4 796 000	3 204 000	8 000 000

ANNEX IV

Exhibit 2

TABLE I

Paraná: Revenues from the Sales, Consignment and Transactions Tax, 1953-1964, in current and 1964 prices.

(in millions of cruzeiros)

Years	Revenues			General Index of Prices 1964:100
		1964 Prices		
	Current Prices	Amounts	% change	
1953	740.0	20.431.3	-	3.6
1954	982.6	21.361.8	4.6	4.6
1955	1,360.0	25.371.3	18.8	5.4
1956	1,669.2	26,037.6	2.6	6.4
1957	2,124.4	29.036.9	11.5	7.3
1958	2,767.2	33,363.4	14.9	8.3
1959	4,748.0	41.484.8	24.3	11.4
1960	7,193.1	48.796.3	17.6	14.7
1961	11,937.9	58.963.3	20.8	20.2
1962	21,290.0	69.317.9	17.6	30.7
1963	30.638.5	57.428.9	-17.2	53.3
1964	n.a.	68.857.3	19.9	100.0
1965		82.559.9	19.9	
1966		98.989.3	19.9	
1967		118,688.2	19.9	
1968		142.307.2	19.9	

Sources: Sales Tax: IBGE's Anuários Estatísticos; 1962 and 1963, State Governor's Messages of 1963 and 1964. Projection for 1964 through 1968 on the basis of 19.9% increase per year over the preceeding year, where the 19.9% represents the average percentual increase of Sales tax in constant prices over the period 1953-1962. General Index of Prices: Conj.Econômica, November 1964.

PRINCIPAL POWER SYSTEMS IN PARANÁ

Company or Concessionaire	Abbreviation	Start of Operation (Approx.)	Principal Area of Operation	Type of Oper.	Present Capacity kW
Companhia Fôrça e Luz do Paraná	CFLP	1928	Curitiba	P.U.	48,500
Companhia Paranaense de Energia Elétrica	COPEL	1955	COPEL	P.U.	21,500
Companhia Prada de Eletricidade	PRÀDA	1930	Ponta Grossa	P.U.	3,600
Departamento de Águas e Energia Elétrica	DAEF	1948	COPEL	P.U.	6,200
Usina Termo-Elétrica de Figueira	UTELPA	1964	Ponta Grossa	P.U.	20,000
Emprêsa Elétrica Alexandre Schlemm	SCHLEMM	1930	União da Vitória	P.U.	2,100
Centrais Elétricas de Santa Catarina	CELESC /1	1955	Rio Negro	P.U.	7,500
Companhia Fôrça e Luz de Iratí	FLI	1938	Iratí	P.U.	1,500
Companhia Fôrça e Luz do Oeste	CFL-OESTE	1954	Guarapuava	P.U.	2,600
Companhia de Cimento Portland Rio Branco	CIMENTO RB	1948	Rio Branco	Ind.	6,400
Rêde Ferroviária Federal	RFF	1961		Railrd.	11,700
Indústrias Reunidas Francisco Matarazzo	IRFM	1930	Antonina e Jaguariaiva	Ind.	3,500
Indústrias Klabin do Paraná de Celulose S.A.	KLABIN	1948	Monte Alegre	Ind.	37,000
Indústrias Brasileiras de Papel	IBP	1942	Arapotí	Ind.	2,900
				SUB-TOTAL	175,000

/1 Santa Catarina Company

P.U. - Public Utility
Ind. - Industrial

Company or Concessionaire	Abbreviation	Start of Operation (Approx.)	Principal Area of Operation	Type of Oper.	Present Capacity kW
		SUB-TOTAL FROM PAGE 1.			175,000
Emprêsa Elétrica de Londrina	LONDRINA	1941	Londrina	P.U.	9,700
Companhia Hidro-Elétrica de Paranapanema	PARANA-PANEMA /2	1930	Northeast	P.U.	4,200
Other					20,000
		TOTAL			208,900

/2 São Paulo Company

LOAN AUTHORIZATION
Provided from: Alliance for Progress Funds
Brazil - COPEL (Electric Power System)

Pursuant to the authority vested in the Administrator of the Agency for International Development ("A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan pursuant to Part I, Chapter 2, Title VI, Alliance for Progress, of said Act to the Companhia Paranaense de Energia Eletrica, COPEL, (Borrower) of not to exceed twelve million two hundred thousand United States dollars ($12,200,000) to assist in financing the U. S. dollar cost of electrical equipment and material, engineering services and technical assistance and training for the following purposes: (1) to expand and improve electrical generating and transmission systems in the State of Parana, and (2) to assist in establishing a training program in utility operations and maintenance, and in improving cost control and accounting procedures.

1. Interest and Terms of Repayment:

(a) Borrower shall repay the loan to A.I.D. in United States dollars within twenty-five (25) years from the first disbursement under the loan, including a grace period of not to exceed five (5) years. Borrower shall pay to A.I.D. in United States dollars on the disbursed balance of the loan interest of five and one-half (5-1/2) percent per annum, except that interest accruing during the grace period may be capitalized as it accrues.

(b) If prior to the end of the grace period the Government of Brazil ("Government") so elects, the Borrower shall fulfill its dollar obligation under the loan by paying the Government in the currency of Brazil the equivalent, determined as of a time and in a manner satisfactory to A.I.D., of the United States dollar amounts payable to A.I.D. under (a) above and in such event the Government shall pay to A.I.D.:

(i) the equivalent in United States dollars, determined as of a time and in a manner calculated to obtain repayment of all dollars disbursed plus interest, of all amounts paid to Government as follows:

(a) all interest immediately upon receipt subject to Government's right to retain all payments in excess of one (1) percent per annum during a grace period of not to exceed ten (10) years from the first disbursement under the loan ("Government grace period") and all payments in excess of two and one-half (2-1/2) percent per annum thereafter.

(b) principal within forty (40) years, including the Government grace period.

(ii) interest in United States dollars of one (1) percent per annum during the Government grace period, and two and one-half (2-1/2) percent per annum thereafter on all amounts of outstanding principal paid by Borrower to Government from the respective dates of such payments of principal.

2. Other Terms and Conditions:

1. Equipment, materials, and services (except Marine Insurance) financed under the loan shall be procured from the United States of America.

2. The loan shall be guaranteed by Government.

3. The loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

_____
Administrator

_____
Date