

PUBLIC

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

COLOMBIA

**LOAN TO INTERCONEXIÓN ELÉCTRICA, S.A. (ISA)
SECOND STAGE OF THE CHIVOR HYDROELECTRIC POWER PLANT**

(CO0003; 263/OC-CO)

LOAN PROPOSAL

1973

COLOMBIA

LOAN TO INTERCONEXION ELECTRICA, S.A. (ISA)

(Construction of the Chivor Hydroelectric Plant, Second Stage, and
Installation of an Operational Communications and Control System)

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CURRENCY EQUIVALENTS

US\$1.00	=	Colombian Pesos (Col.\$) 23.70 <u>1/</u>
Col.\$ 1 million	=	US\$42,190

UNITS AND EQUIVALENTS

1 kilovolt (kv)	=	1,000 volts (v)
1 megavolt ampere (MVA)	=	1,000 kilovolt amperes (Kva)
1 megawatt (MW)	=	1,000 kilowatts (kw)
1 gigawatt hour (Gwh)	=	1 million kilowatt hours (Kwh)

ABBREVIATIONS

CHEC	Central Hidroeléctrica de Caldas, S.A.
CHIDRAL	Central Hidroeléctrica del Río Anchicayá Ltda.
CORELCA	Corporación Eléctrica de la Costa Atlántica
CVC	Corporación Autónoma del Cauca
EEEB	Empresa de Energía Eléctrica de Bogotá
EMCALI	Empresas Municipales de Cali
EPM	Empresas Públicas de Medellín
ICEL	Instituto Colombiano de Energía Eléctrica
IBRD	International Bank for Reconstruction and Development
ISA	Interconexión Eléctrica S.A.
JNTSP	Junta Nacional de Tarifas de Servicio Público
PIDUZOB	Programa Integrado de Desarrollo Urbano de la Zona Oriental de Bogotá

1/ Unless otherwise specified, this is the exchange rate used in this document for cost determination. This was the rate prevailing in mid-1973.

BASIC COUNTRY DATA FOR COLOMBIA
(Preliminary data for 1971 and partial estimates for 1972)

AREA: 1,138,400 Km²
439,513 ms²

POPULATION: 22.5 million (mid-1972)
Rate of Growth: 3.2% (1960-72)

Mortality (1971): 8.1 per 1,000 inhabitants
Infant Mortality (1970): 67.9 per 1,000 live births
Years of Live Expectancy at Birth (1970): 53.3
Percentage of Illiteracy (1971): 7.5

Gross Domestic Product (GDP) (1971)

Total: 7,886.3 (millions of 1970 dollars)
Per capita: 362 (1970 dollars)
Average rate of growth (1969-71): 6.1%

Gross Domestic Product (GDP) (1972)

Average rate of growth: 7.1% (estimated)

Gross Investment (1971)

Total: 1,774 (millions of 1970 dollars)

Public Finances

Central Government Operations (1971)

	<u>Col.\$ Million</u>	<u>% of GDP</u>
Current receipts	14,416	9.5
Current expenditures	10,175	6.7
Current surplus	4,241	2.8
Capital expenditures	5,903	3.9
Total credit (net)	1,662	1.1

Money, Prices and Rate of Exchange

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
Money Supply (millions of Col.\$)	18,448	21,627	23,995	29,842
Consumer Prices (Index 1954/55 = 100)	437.1	464.5	532.9	607.3
Rate of Exchange (Col.\$ per US\$ 1)	17.9	19.1	21.0	22.8

(annual variations in %)

Money supply	19.5	17.2	11.0	24.3
Consumer Prices	8.6	6.3	14.7	14.0
Rate of Exchange	5.8	6.9	9.5	9.0

Foreign Trade and Net International Reserves of the Central Bank

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
	(millions of US\$)			
Exports	667	782	754	820 (X)
Imports	645	802	784	911 (X)
Net International Reserves	96.6	152.0	170.4	353.4
	(annual variations)			
Exports (%)	10.6	17.2	-5.6	29.2 (X)
Imports (%)	4.9	24.3	-2.3	14.8 (X)

External Debt (in millions of US\$)

Total (1971): 2,226.6

Ratio of 1972 Foreign Debt Service to 1971 Exports of Goods and Services: 15.7%

(X) Registered imports and exports.

COLOMBIA

Loan to Interconexión Eléctrica, S. A. (ISA)

(Construction of the Chivor Hydroelectric Plant, Second Stage, and Installation of an Operational Communications and Control System)

SUMMARY AND CONCLUSIONS

1. Borrower and Executing Agency: The borrower and executing agency would be Interconexión Eléctrica, S. A. (ISA), which was organized on September 4, 1967 by the Empresa de Energía Eléctrica de Bogotá (EEEB), Empresas Públicas de Medellín (EPM), Corporación Autónoma Regional del Cauca (CVC), Central Hidroeléctrica del Río Anchicayá Limitada (CHIDRAL), the Instituto Colombiano de Energía Eléctrica (ICEL) and the Central Hidroeléctrica de Caldas (CHEC). All these organizations are decentralized public sector institutions: EEEB and EPM at the municipal level, ICEL at the national level and the others at the regional level.
2. Guarantee: That of the Republic of Colombia.
3. Loan Amount: US\$48,500,000 in United States dollars or the equivalent in other currencies (except that of Colombia).
4. Source of Funds: The ordinary capital resources of the Bank.
5. Terms and Conditions: Amortization over 20 years with the first payment of principal due 5-1/2 years after the date of the contract. Interest would be at 8% per annum (including the 1% special commission of the Bank) and the commitment fee would be 1-1/4% per annum. The loan would be disbursed over a period of five years.
6. Background, Objectives and Description of the Project: The project calls for execution of the second stage in the construction of the Chivor hydroelectric plant, which will ultimately have a total generating capacity of 1,000 MW, and installation of an operational communications and control system. The plant is located in the Department of Boyacá at a place about 160 kilometers northwest of Bogotá. The first stage of the plant, which will result in a capacity of 500 MW, was started in 1969 and consists in the construction of:
(a) La Esmeralda dam on the Batá River, which will have a height of 240 meters; (b) an intake at the reservoir created by that dam, and a valve-equipped headrace, a surge tank and a penstock consisting of a vertical shaft and an inclined tunnel leading to the powerhouse; (c) the central portion and the northern end of the main powerhouse building, the transformer station and the spillways, as well as the control building and installation of the traveling cranes for both

stages; (d) a connection yard; (e) a dual circuit 230 kv transmission line 105 kilometers long connecting Chivor, Torca and La Mesa, and substations at Torca and La Mesa; and (f) ancillary works such as access roads, camps, etc. The total cost of this first stage is at present estimated at the equivalent of US\$163,584,000, part of which is being financed with IDB Loan 214/OC-CO and IBRD Loan 681-CO.

The second stage of the Chivor hydroelectric plant --the stage discussed in this loan document-- would consist basically in an expansion and supplement to the first stage to increase the total capacity of the plant to 1,000 MW; the work at this stage would consist in: (a) construction of a transmission system parallel to that built in the first stage, including another headrace surge tank, vertical shaft and inclined tunnel leading to the powerhouse; (b) the south wing of the powerhouse, such wing to be used to house four 145 MW generator sets; (c) an expansion of the switchyard; and (d) a transmission line parallel to that of the first stage, with an expansion of the Torca substation. In addition, the proposed project would include purchase and installation of equipment for an operational communications and control system for the entire electrical interconnection network, with the aim of achieving economies in the operation of that network and providing ISA with the necessary means for fully carrying out its functions as an agency in charge of coordinating the dispatch of loads.

7. Total Cost and Financing of Project: The total cost of the project is estimated at the equivalent of US\$111,483,000 which will be financed as indicated in the following table:

(In thousands of US\$ or equivalent)

Categories and Main Subcategories	I D B	Suppliers	I S A		Total
	Foreign Exchange	Foreign Exchange	Foreign Exchange	Local Currency	
1. <u>Engineering and Administration</u>	2,573	-	-	4,494	7,067
2. <u>Direct Cost</u>	26,609	17,933	3,165	13,132	60,839
2.1 Generating system	17,432	17,020	3,004	12,095	49,551
2.2 Transmission system	3,786	913	161	818	5,678
2.3 Telecommunications system	5,391	-	-	219	5,610
3. <u>Financial Costs</u>	9,366	-	6,758	4,296	20,420
3.1 IDB interest	8,881	-	-	-	8,881
3.2 Interest on suppliers' credit	-	-	4,483	-	4,483
3.3 Commitment fee	-	-	2,275	-	2,275
3.4 Inspection and supervision	485	-	-	-	485
3.5 Interest on bonds	-	-	-	4,296	4,296
4. <u>Unassigned</u>	9,952	5,680	481	7,044	23,157
4.1 General contingencies	3,772	2,330	401	3,733	10,236
4.2 Provision for escalation	6,180	3,350	80	3,311	12,921
Total	48,500	23,613	10,404	28,966	111,483
Percentages	(43.5)	(21.2)	(9.3)	(26.0)	(100.0)

8. Procurement: In the acquisition of equipment with funds from the Bank loan, international bidding procedures would be applied and a schedule satisfactory to the Bank would be followed in contracting for goods and services. Colombian manufacturers would be given the benefit of a preference margin of 15%. ISA is exempt from the payment of import duties.

9. Consultants: Prior to the first disbursement, ISA would engage the services of consulting firms for the final design and for supervision of project execution.

10. Conclusions: It is generally considered that the project is soundly conceived from the technical point of view, not only because it was prepared by consulting firms with a good reputation, but also because its design reflects the experience gained in the first stage of the Chivor hydroelectric plant, which is being carried out in a satisfactory manner. Moreover, based on detailed studies of the Colombian power sector, on projections of power demand and on feasible alternatives for meeting that demand, the proposed project is regarded as the

most advantageous in economic terms. In addition, installation of the operational communications and control system for the electrical interconnection network would make for greater economy and efficiency in the operation of that network and would provide ISA with the necessary means for fully discharging its functions as an organization responsible for coordinating the dispatch of loads.

Preparation of the project is well advanced and affords a sufficient basis for arriving at accurate estimates of the total cost, and for the expectation that the project can be started on time and carried out according to the execution schedule, that is, within the planned period of five years.

ISA has the necessary legal authority to contract for the proposed loan and execute the project. Its technical staff is regarded as capable and will only need to be strengthened in the future as the organization's responsibilities increase. Its financial management is efficient and well organized, having benefited from services of various consulting firms in such matters, among others, as accounting, internal and external audit, rates, and organization and methods.

This sound management is reflected in ISA's favorable financial position. The liquidity ratio was 1.33 in 1972 and by 1982 will rise to 1.92, which is considered very satisfactory. The debt-capital ratio was somewhat high in 1972 (3.05), but will improve substantially in the future, dropping in 1982 to 1.90, which is considered acceptable. The projections show that once the first stage of the Chivor hydro-electric plant enters into full operation in 1976, ISA will operate with an annual rate of return of 7.33% on investment in utility assets in service, and that this rate will increase in 1978 to 9.37%, exceeding the minimum level stipulated in loan contract 214/OC-CO with the Bank.

Finally, an analysis of the bases of the financing plan shows that it is feasible, since it indicates that the contributions from ISA and other sources will be made punctually and in amounts sufficient for completion of the project. ISA's cash flow projection shows that the organization will be able to make its allotted contributions to the project, based on provision of capital by its stockholders through the purchase of shares and on funds to be received from the sale of bonds pursuant to the company's by-laws. The financial projections of the shareholders firms indicate that they will have to obtain credit and/or additional capital in order to be able to complete their contributions. This is considered feasible since all those contributions except CVC's would be small in amount and would be needed only during two of the 10 years in the period considered. In regard to the suppliers' credit, it is felt that on the basis of the negotiations carried out by ISA and the letters of intention to be received from the pertinent authorities of the exporting countries, ISA will be able to obtain such credit.

I. INTRODUCTION

A. The Application

- 1.01 On July 6, 1973, Interconexión Eléctrica S. A. (ISA) filed an application with the Management of the Bank for a loan for the equivalent of US\$72.1 million to finance approximately 70% of the total cost of the project for construction of the second stage of the Chivor hydroelectric plant and installation of an operational communications and control system for the interconnected network. The total cost was estimated at that time at the equivalent of US\$102.1 million, and the initial application covered the entire external component of that cost. Previously, on July 5, 1971, the Bank had signed the contract with ISA for Loan 214/OC-CO for US\$34.1 million to finance part of the external costs of the first stage of construction of that plant, for which another loan in the amount of US\$52.3 million was received from the International Bank for Reconstruction and Development, the contract for the latter loan having been signed on June 4, 1970.
- 1.02 In its reply to that application, the Bank informed ISA that in view of the high percentage and amount of financing requested and the probable availability of external resources from other sources of credit on reasonable terms and conditions, it would be extremely advisable for ISA to pursue negotiations to obtain parallel financing that would reduce to some extent the amount of the possible IDB loan.

B. Priority

- 1.03 On August 22, 1973, the National Planning Department of Colombia stated that it had assigned high priority to the project and accordingly endorsed such negotiations as ISA might have to conduct in order to obtain external financing for the project. The proposed project was included by the Colombian authorities in the list of projects for external financing in 1973-74 that was submitted to the Seventh Meeting of the Consultative Group for Colombia, held in Paris in June 1973, on which occasion the Management of this Bank, with prior knowledge of the Board of Executive Directors, expressed interest in a possible consideration of the project by this Bank.

C. Bank Mission

- 1.04 An analysis mission was in Colombia from August 15 to 31, 1973, evaluating the technical, financial, economic and institutional aspects of the project. On the basis of that study it was considered that the total cost of the project would be the equivalent of US\$111.5 million and that the external component would be about US\$82.5 million, including the financial charges, general contingencies and provision for cost escalation. It was further concluded that some machinery and equipment items included in the external component might be financed through suppliers' credit and that elimination of those items from the possible IDB financing might therefore be considered.

D. ISA Mission

- 1.05 On the basis of this preliminary conclusion as to possible parallel financing of certain equipment and machinery items, it was agreed with ISA that the latter would pursue the necessary negotiations to confirm that possibility, particularly in view of the desirability of having adequate assurance that ISA would receive sufficient external credit for executing and completing the project. The shareholders' meeting of ISA therefore authorized the Manager of that organization to go to Washington and Europe to contact the national authorities responsible for export financing in the main industrial countries regarded as the likeliest sources of machinery and equipment for the proposed project, in order to determine the possible amounts, terms, conditions and other features of possible parallel credits. Those countries were Canada, France, Germany, Italy, Japan, Switzerland, the United Kingdom and the United States. ISA requested the Bank's assistance in this effort, and its Manager was therefore accompanied during his interviews in Washington, and also during his trip to Europe, by members of the staff of this Bank, who therefore had an opportunity to learn at first hand the reaction of the above-mentioned authorities and also to provide information on any pertinent aspects of Bank policies and procedure in connection with the processing of this loan application.
- 1.06 As a result of those negotiations it was concluded that there was sufficient assurance that ISA would be able to obtain financing from the supplier countries for the external component of the four largest equipment and machinery contracts under the proposed project, namely, the contracts for the generators, transformers, turbines, and sheathing for the pressure line. The total foreign currency cost of those four contracts would be approximately US\$27.8 million, of which amount it is estimated that the supplier countries would be prepared to finance at least 85%, or US\$23.6 million, at a term running at least 10 years from the date of installation and start-up of the equipment and machinery concerned. In order to obtain more definite confirmation that ISA would be able to obtain such financing, ISA has requested the national authorities of the countries visited to supply letters of intention, copies of which must be submitted to the Bank prior to signature of the loan contract (see paragraph 8 (c) (iii) of proposed resolution). As a result of these negotiations and other adjustments to the plan of financing for the proposed project, the amount of possible financing from the Bank has been established.
- 1.07 The Manager of ISA was in Washington from November 12 to 16, 1973, accompanied by senior executives of the ISA shareholder firms and by a representative of the National Planning Department of Colombia, to discuss with the Bank the conditions on which it would be prepared to consider participating in the financing of the proposed project.

II. THE ELECTRIC POWER SECTOR IN COLOMBIA

A. General Background: Institutional Development

- 2.01 Up to 1946 both domestic and foreign private firms provided electric power chiefly to the large cities. That year, by Law 80, the government created the Instituto de Aprovechamiento de Aguas y Fomento Eléctrico, ELECTRAGUAS, to study the regions to be provided with electric power, to execute water harnessing projects and to finance and construct waterworks, operating directly or as a stockholder in other firms.
- 2.02 In 1948, the creation and organization of the first departmental affiliates, now called Electrificadoras, was initiated. These affiliates were made responsible for channeling resources from the departments and municipalities toward projects in the power sector and operating electric power services in the areas under their jurisdiction. At the same time, the great demand for power in cities like Bogotá, Cali and Medellín led their municipal councils to set up municipal enterprises to operate services in those cities. Moreover, in order to meet regional demand, in 1954 the Corporación Regional del Cauca (CVC) was created (Decree Law 3110) to develop the resources of the Cauca Valley respecting electric power generation, distribution, river harnessing, irrigation, reforestation, etc.
- 2.03 In 1967, the two newest electric power companies were created. These are Interconexión Eléctrica, S.A., which is described in more detail in Chapter V, and the Corporación Eléctrica de la Costa Atlántica (CORELCA), which was created by Law 59 in 1967 to generate and transmit electric energy to seven departments in the north through block sales to various electric companies (electrificadoras) in the region. In 1968, Electraguas was given the name Instituto Colombiano de Energía Eléctrica (ICEL) by Law 3175. Later, by Decree 1485 of August 1970, its new statutes were set. Basically, the statutes strengthened ICEL's responsibilities by allowing the Institute greater participation in formulating the National Electrification Program and in coordinating the plans of existing firms.

B. Organization of the Sector

- 2.04 In Colombia, the supply of electric power is the responsibility of public firms owned by the Central Government, the departments or the municipalities. Four public agencies supply 95% of the electricity delivered by the public sector in Colombia. These are: the Instituto Colombiano de Energía Eléctrica (ICEL), the Empresa de Energía Eléctrica de Bogotá (EEEB), the Empresas Públicas de Medellín (EPM) and the Corporación Autónoma Regional del Valle del Cauca (CVC). ICEL is a government-owned firm with nationwide jurisdiction to supply electric power. It controls 15 electric companies (electrificadoras) that serve 20 of the 29 departments of the country not served by EEEB, the EPM and the CVC. EEEB and EPM are municipally-owned public corporations which generate and distribute electric power in Bogotá, Medellín and their surrounding areas. CVC

is an autonomous, regional, multi-purpose entity engaged in the development primarily of agriculture and electric power facilities in the Cauca Valley. With regard to supplying electric power, CVC manages the Central Hidroeléctrica del Río Anchicayá, Ltda. (CHIDRAL), which makes block sales of electricity for distribution by the Empresas Municipales de Cali (EMCALI) and other smaller distributors.

- 2.05 In Colombia, two additional major utility companies were created in 1967 in the electric power sector: Corporación Eléctrica de la Costa Atlántica (CORELCA) and Interconexión Eléctrica S.A. (ISA). CORELCA is a corporation that engages in interconnecting the chief markets of the northern region. ISA was constituted as a corporation by the four large public service firms mentioned above (ICEL, EEEB, EPM and CVC), to interconnect the transmission systems of its members and to plan, construct and operate the new generator plants. The IBRD financed part of ISA's first project, a 230 Kv transmission network extending over 540 kilometers, to interconnect the systems of its members. The IDB and the IBRD are now contributing to the financing of the first generator project of the first stage of the 500 MW Chivor hydroelectric plant, which will start operations about the middle of 1975 (Loan 214/OC-CO). Since ISA's creation in 1967, there has been significant progress toward the national integration of electric power supply. The primary service areas are in the central region, which was interconnected in 1972; the northeast region, that will become part of the interconnected system in 1974; and the Atlantic coast region, whose interconnection with the rest of the country will take place toward the end of the 1970s.

C. Generating Capacity and Investments in the Power Sector

- 2.06 Development of the electric power sector of Colombia has progressed rapidly in the past eight years. The installed generating capacity, including the generators owned by industrial enterprises, went from 1,245 MW in 1965 to 2,545 MW in 1972, which represents an average annual growth rate of approximately 9.4%. At the present time, 71% of the installed generating capacity is hydroelectric energy and the remaining 29% is supplied from thermal plants. However, per capita installed capacity of the entire country is only 101 watts, lower than in most of the other countries of Latin America. (The average for Latin America in 1968 was 130 watts.) The level of electric power consumption varies widely from region to region, with particularly sharp variations between urban and rural areas. In the chief marketing areas, the annual consumption per capita was 500 MWH, in the urban centers of 30,000 inhabitants, the average consumption per capita was 600 MWH. Approximately 30% of the population lacked electric service. New annual investments in the electric power sector went from US\$14.7 million in 1965 to US\$134.0 million in 1971. Plans at the present time envisage expansion of installed generating capacity to 5,000 MW by the end of this decade, for which an additional investment of an estimated US\$1,600 million would be required. To achieve this, the average annual growth rate of generating capacity would have to be approximately 10% during this period.

D. Financing of the Sector

- 2.07 In 1971 the investments in the sector were financed as follows: 50% with external credit, 20% with internal resources from public services and 30% through the national budget and internal credit. The IBRD has been the main source of external financing Colombia's electric power sector. It has authorized 19 loans to eight public service entities for a total of US\$350.1 million, of which US\$234.5 million was disbursed up to March 31, 1973. The World Bank has granted ISA two loans for a total amount of US\$71.2 million as a contribution to the financing of the Red Central de Interconexión and the Chivor generator plant. The IBRD considers that, in general, its projects in this sector have been executed satisfactorily, especially from the technical standpoint.
- 2.08 For its part, in the past five years, the IDB also has assumed an important role in financing the electric power sector in Colombia. The IDB has lent US\$190.8 million (of which US\$97.3 million had been disbursed as of September 30, 1973) for the following projects in this sector: Central Hidroeléctrica del Río Prado (Loan 106/OC-CO for US\$8.0 million); Planta Termoeléctrica de Zulia (Loan 107/OC-CO, for US\$3.4 million); Central de San Francisco and the expansion of the waterworks and the subtransmission and distribution systems of CHEC (Loans 125/OC-CO, 258/OC-CO and 374/SF-CO for a total of US\$15.0 million); a transmission and distribution project executed by EMCALI (Loan 65/SF-CO for US\$3.3 million); Central Hidroeléctrica del Río Anchicaya (Loans 175/OC-CO and 13/CD-CO for US\$70.0 million); the first stage of the Central Hidroeléctrica de Chivor (Loan 214/OC-CO for US\$34.1 million, which after monetary adjustments came to the equivalent of US\$40.8 million); and a transmission and distribution project executed through ICEL (Loans 211/OC-CO and 290/SF-CO for US\$25.0 million). Moreover, the Bank, through Loans 238/OC-CO (for the Integrated Program of Urban Development in the Eastern Zone of Bogotá) and 249/OC-CO, has channeled US\$7 million and US\$21.1 million respectively to finance a program for expansion of the subtransmission and distribution systems of the Empresa de Energía Eléctrica de Bogotá. In general, the IDB's experience has also been good with regard to the execution of its projects in this sector (see paragraphs 3.21-3.35 for an evaluation of Chivor I).

E. Planning of the Sector

- 2.09 The principal objectives of the Government of Colombia in the electric power sector are expansion and improved efficiency of the power generation and transmission works and integration of the electric power plants of the country into a single national system. In that regard, the support from the IDB and the IBRD to the energy sector and to ISA has contributed considerably toward the efficiency of the planning process in a large part of the sector. Even so, along with the urgent need to install additional generating capacity and to interconnect the northeastern region and the Atlantic coast, other problems still remain

to be solved in this sector, namely: a) consolidation of ICEL's subsidiaries within a regional structure; b) improved distribution to low-income urban areas (EEEB and EPM place high priority on solving this problem); c) improved quality of service in most of the smaller towns served by ICEL's subsidiaries (through Bank loans 290/SF-CO and 211/OC-CO to ICEL a program has been initiated for 117 small towns); and d) rural electrification to satisfy the demands of approximately six million people residing in areas lacking electricity (basic studies are now being done under ICEL sponsorship to identify priorities). The Government of Colombia has begun to prepare a development plan for electric power which will deal with these problems and which will include the institutional changes needed to improve the planning and operating efficiency of the sector on a national level. This plan will be coordinated with the National Development Plan, and is expected to be completed in early 1974; Colombian authorities have expressed interest in studying this program with international lending institutions.

III. PROJECT JUSTIFICATION

A. Project Market. The Interconnected System

- 3.01 The ISA interconnected market comprises the systems of Empresas de Energía Eléctrica de Bogotá (EEEB), Empresas Públicas de Medellín (EPM), Corporación del Valle del Cauca (CVC), Central Hidroeléctrica de Caldas (CHEC) and NORDESTE and those of the Departments of Cauca, Nariño, Tolima and Huila, which are served by four ICEL electric companies. The power demand projections to 1982 have been calculated on the basis of historical observed demand on the individual markets. In this way, starting from the average growth figure, upper and lower limits were arrived at which delimit the probability density curve with a band width which covers 95% of the growth rate figures. Account has also been taken of the appreciable additional demands deriving from the installation of industrial loads, which are concentrated exclusively in the EPM and NORDESTE systems.
- 3.02 The projections of this demand are shown in Appendix C, analysis of which yields the following considerations with respect to the projected energy demand:
- a) EEEB. The observed annual growth rate for the last ten years (12.1%) is maintained over the period 1973-75, after which (consequent upon partial saturation of the market), the rate declines progressively to stabilize at 10% by 1980.
 - b) EPM. The historical rate of 8.9% is adopted for normal growth. This rate increases year by year with the appearance of substantial new industrial consumptions, such as Cementos NARE and the Matoso Ferronickel mining. This increased consumption, occurring during the present decade, raises average annual growth to 11.2%.
 - c) CVC and CHEC. These markets will tend to maintain their historical growth rates of 8.3%.
 - d) NORDESTE. Because of unsatisfied demand, consumption will increase at an annual rate of 13.1% over 1973-76, after which the growth rate will slow down, to stabilize at the end of the decade at 10%. In the case of this system account is taken of an appreciable increase in industrial consumption over the period 1973-78 as a consequence of the expansion of such industrial enterprises as Cementos Boyacá, Cement Paz del Rio Steelworks and the ECOFETROL Refinery.
 - e) CEDENAR, CEDELCA, ELECTROLIMA and ELECTROHUILA. Following a period of rapid expansion (the reasons being the same as for the NORDESTE system), the annual growth rate will decline, to level off at about 10% from 1978.

- 3.03 On the basis of the above individual projections, the integrated demand of the system, for both energy and power, has been determined, using a diversification factor of 2.5%. The average growth rates for energy and power over the period concerned are close to 10% a year. The power requirements of the systems having been determined, their deficits were aggregated. Account was also taken of the fact that the ISA plants will generate secondary power which will be sold on the markets of its shareholders and will enable them to reduce their thermal generation by some 50%.
- 3.04 The aggregate power to be met by ISA having thus been determined, the next step was to prepare Appendix D, showing the annual output required of the ISA plants. This table shows that during the initial years the Chivor I plant, with an average generating capacity of 3,200 GWH, will work during the initial years at a low plant factor which will rise until 1979, when the Chivor II units will enter into service, and will equal the output of the latter with a maximum annual generation of 3,477 GWH. As early as the 1980s ISA will have to add a power plant with a capacity of approximately 500 MW to the system every year. Appendix E shows the output deficits of the system and the way in which they are covered by the firm capacities of the ISA plants.
- 3.05 It is pointed out that the principle adopted by ISA in determining its plant generation needs was that when a system showed a deficit this had to be made up by the ISA plants and not from surpluses of other systems. It is noteworthy that the only system with significant surpluses during the initial years of operation of Chivor is the CVC system and that from 1979, when the plant will be producing to full capacity, the entire demand of the interconnected market will have to be met by ISA, all the systems being in deficit.

B. Technical and Economic Comparison of Programs

- 3.06 One of the primary responsibilities of ISA is construction of the generating facilities of the interconnected system. Accordingly, it has devoted attention from the very start to programming the expansion of the system so as to keep pace with power and energy demands. In the first stage ISA had three hydroelectric projects under study: Alto Anchicayá, Chivor I and Guatapé II. The sequence of construction was decided on after careful studies which the IBRD and the IDB had occasion to consider when appraising the Chivor I project. The outcome was the following program, which is currently under way:

<u>Project</u>	<u>Capacity</u>	<u>Entry into service</u>
Alto Anchicayá	340 MW	1974
Chivor I	500 MW	1975
Guatapé II	280 MW	1977

3.07 Subsequently, in a second stage, it was necessary to determine the appropriate sequence for construction of Guatapé II, Chivor II, Samaná I and Mesitas I, the studies for which were the only ones available at the end of 1971. The methodology used on that occasion was based on probability techniques using a group of computer programs. The result is to ensure the supply of power and energy of the system with adequate reliability and economy.

3.08 The following procedure was used in considering the various alternative sequences of the four plants. An initial examination showed that first priority had to go to Guatapé II in order to ensure that the power-deficit risk-threshold of 5% would not be exceeded. It was then seen that, with Guatapé II built first, it would be inadvisable to give Samaná second place since there would then be a power-deficits probability of 44%. With matters thus simplified the following alternatives remained for further analysis:

Sequence 1: Guatapé II/Mesitas I/Chivor II/Samaná I

Sequence 2: Guatapé II/Chivor II/Mesitas I/Samaná I

Sequence 3: Guatapé II/Mesitas I/Samaná I/Chivor II

Sequence 4: Guatapé II/Chivor II/Samaná I/Mesitas I

3.09 The most suitable sequence was determined by the following method: The projections of aggregate peak and energy demand having been obtained, analyses were made of the period of construction of the four projects and of the available capacity of the system. These data were used to fix the dates of entry into service of the plants in such a way that the deficit probability would not exceed 5%. The hydrology of all the rivers of the system having previously been determined for a period of 11 years, an exercise of simulation of operation of the plants was carried out to ascertain whether the alternatives selected satisfied the energy demand. Wherever a deficit appeared the date of entry into service of the plant was advanced until the deficit was eliminated. Next, supply by the plants within the load curve was simulated, with an analysis of the costs of fuel, operation and maintenance and power stored in the reservoirs at the end of the planning period.

These data, plus the annual investments required for the construction of the four plants, were used to calculate the present values of the four sequences, with sensitivity analyses for three different discount rates, cost of fuel and rate of exchange. The above analysis revealed the most advantageous sequence from the economic point of view, all of the four alternative sequences meeting the system demand with a high degree of reliability.

- 3.10 This economic study did not reveal any appreciable percentage differences in present value among the alternative sequences since all took account of the same plants, with equal capacities. It appeared, however, that the most advantageous sequence was No. 4 (Guatapé II/Chivor II/Samaná I/Mesitas I). Consequent upon this analysis the Board of Directors of ISA decided to give second priority, after Guatapé II, to construction of Chivor II.
- 3.11 In order to strengthen the data yielded by the above analysis, with a view to selection of the third-place power station (the present values of sequence 4 and sequence 2 being about the same), the technical departments of ISA recently carried out an independent study of the expansion of the system in 1980, devoted to the Samaná and Mesitas plants. This analysis yielded the following conclusions for selection of the third plant:
1. The cost per installed KWH of the initial investment is very similar for each of the two power stations.
 2. The units cost of generation differ substantially: for Samaná, with a generation of 3,590 GWH, it is 5.32 mills/KWH, while for Mesitas, with a generation of 802 GWH, it is 20.17 mills/KWH.
 3. Comparative analyses of each power station with a thermal alternative reveals, on the one hand, that the annual charges for capital plus operating, maintenance and administrative expenses would be 76% higher for the thermal alternative than for the Samaná hydroelectric plant. For Mesitas, on the other hand, those charges would be substantially equal to those of the thermal alternative.
 4. With Samaná, the date of entry into service of the second plant can be deferred for nine months following start-up of Samaná I if Samaná is replaced by Mesitas.

From the above conclusions follows the recommendation that Samaná should be built third in turn to supply the additional generating capacity required for the system by 1980.

- 3.12 In the light of all the above considerations it is clear that the sequence recommended by the ISA technicians (and adopted in part by the Board of Directors, with the selection of Chivor II as the second plant) is the optimum solution from the technical and economic standpoints. With this sequence the increases in demand of the interconnected system can be met with the lowest present investment and with a very high probability of zero deficits.

C. Comparison with a Thermal Plant

- 3.13 Although construction of the first stage of Chivor had been justified ^{1/} and there were already plans to construct the second stage, which would double its capacity, it was felt that a comparison of the generating cost

^{1/} See paragraphs 4.12 to 4.34 of Document PR-471 of April 20, 1971, on the Chivor I project.

of the entire Chivor plant with the cost of fuel under a technical alternative with equivalent characteristics would be illustrative. For this purpose, a steam plant burning fuel oil was taken as the basis for the comparison (in Colombia coal is not mined on a sufficient industrial scale for it to be used for power generation).

Table III-1: Generation cost for Chivor I and II

Installed capacity: 1,000 MW

Average annual output (delivered to receiving substations): 3,425 GWH

Total present investment (incl. financial costs): US\$261 million

Useful life: 50 years

Capital charges (based on total investment)	<u>US\$ millions</u>
- 8% discount rate	21.3
- 10% discount rate	26.3
- 12% discount rate	31.4

Capital charges plus costs of operation,
maintenance and administration (US\$1.8 million)

- 8% discount rate	23.1
- 10% discount rate	28.1
- 12% discount rate	33.2

Average cost per KWH	<u>US\$mills/KWH</u>
- 8% discount rate	6.8
- 10% discount rate	8.2
- 12% discount rate	9.7

- 3.14 To replace the generating capacity of Chivor it would be necessary to build two 500-MW plants, located in the consumption centers, which are basically (and in equal shares) the Torea substation, from which Bogotá is supplied, and the Esmeralda Substation, through which the rest of the interconnected system is supplied. For each such plant a calorific yield would be obtained of 9,400 BTU/KWH. Assuming the fuel to be Bunker "C" fuel oil with a calorific value of 6.3 million BTU/barrel, a unit output would be obtained of 670 KWH/barrel with a cost of fuel (delivered to plant) of US\$6 a barrel. ^{1/} For the planned generation of each plant (1,713 GWH) the estimated consumption is 2,557,000 barrels. This gives a total annual cost of fuel of US\$15.4 million; dividing this by the generation required we obtain an average cost of approximately 9.0 mills/KWH.
- 3.15 It will be seen that this cost falls between the average costs of the hydroelectric plant for profitabilities of 10% and 12%. It must also be borne in mind that in view of present market conditions the cost per barrel of Bunker "C" may be expected to rise at a rate which, for the sake of uniformity with the analysis made for this project, has been estimated at 5% a year. This means that in the year of entry into service of a thermal plant its fuel cost would be higher than the generation cost of the Chivor plant for the highest discount rate considered.

Account has not been taken in this analysis of the capital charges and operating costs of the thermal station; these would have to be considered in any analysis in greater depth but in the light of the figures quoted such an analysis does not seem to be necessary.

- 3.16 In conclusion, it is considered that no economically viable thermal alternative exists to the Chivor hydroelectric project.

D. Program of Works for the Interconnected System

- 3.17 With the object of meeting the first of the responsibilities entrusted to it by its statutes, ISA undertook the construction of the central interconnection system, to link the main consumption centers of Colombia (EEEEB, EPM, CVC and CHEC systems). Construction of this system, which was partly financed by an IBRD loan, was completed early in 1972 and it is now in operation with the function of exchanging energy among ISA's shareholders. The area served by CVC is today basically a buying market and is supplied by the sales of EEEB, EPM and CHEC.

^{1/} This price is based on recent quotations. At the average price for Bunker "C" fuel oil in the Caribbean ports in 1972 of US\$3 a barrel, the price of the product delivered would be US\$4 a barrel. Prices have recently risen sharply, to as high as US\$6 a barrel, but there is no positive indication of what the average price level would be during the useful life of a possible thermal plant; it could well be even higher.

3.18 The interconnected system comprises:

- 540 km of 230 KV double-circuit line linking the cities of Medellín, Manizales, Cali and Bogotá.
- 4 receiving substations on the outskirts of the above cities (La Mesa, Esmeralda, Yumbo and Guatapé substations), with an installed transformer capacity of 540 MVA.

In addition ISA at present has under construction the Guatapé-Barranca and Chivor-Paipa 220-KV lines for interconnection of the central system with the northeast.

3.19 As stated in paragraph 3.06, ISA had to undertake construction of the Chivor I power station, since the Alto Anchicayá and Guatapé II stations remained, in accordance with its statutes, to be built by CVC and EPM. Chivor I is currently under construction, together with its 220-KV transmission lines, at a cost of approximately US\$163 million and is expected to enter into service in mid-1975. The second stage of Chivor, with an installed capacity of 500 MW and entry into service planned for 1979, has already been defined and its construction forms the subject of the present loan request. Work will be started on the Samaná power station (598 MW) in 1980 and on Mesitas (558 MW) in 1982. The works program of the ISA system also provides for the necessary reinforcements to the central system for supply of the northeast and interconnection with CORELCA (planned for the end of the 1970s).

3.20 To enable the demands of the interconnected system to be met from 1982 onwards it is planned, after the above-mentioned plants have entered into service, to put into service one power station of at least 500 MW every year; construction would have to be undertaken during the period now under consideration, as soon as the feasibility studies now being conducted by ISA have been completed and the comparative analyses of alternatives can be carried out.

E. Evaluation of the Chivor I Project

1. Background: Description, Total Cost and Financing

3.21 The fundamental purpose of the Chivor Hydroelectric Project (Stage 1) is the construction of an electricity generating plant with a total capacity of 500 MW, consisting basically of a dam on the Batá River in the Department of Boyacá about 160 kms northeast of Bogotá, the system of conveyance of the water from the reservoir created by the dam and the powerhouse, the central part and the northern wing of the main building of the powerhouse, the switchyard and discharge canals, and also the control building and the installation of two traveling cranes, a connection yard, a transmission line linking Chivor, Torca and La Mesa,

substations at Torca and La Mesa, and ancillary works such as access roads, camps, etc. The total cost of Stage 1 is at present estimated at the equivalent of US\$163,584,000. This is being financed by IDB Loan 214/OC-CO for US\$40,754,000 1/, approved on May 5, 1971, an IBRD loan of US\$52,300,000, commercial bank and suppliers' credit for a total amount of US\$ 5,290,000 and an ISA contribution equivalent to US\$65,240,000.

- 3.22 The Project was started in 1970 with financing as above by the IBRD, which on June 4, 1970 signed a loan agreement (681-CO) to finance part of the cost of the principal construction works of the Chivor Power Station as well as the engineering and supervision costs of the Project. It was provided that the electrical and mechanical equipment for the plant and other minor investment headings were to be financed by credits from other external sources. To this end both the IBRD and ISA held meetings and conducted negotiations with supplying countries 2/. The results were negative since there was no agreement on the system of financing to be used and the conditions of the possible parallel loans were not considered appropriate as they were not in line with the minimum financial requirements of the project.
- 3.23 With respect to the system of financing, the IBRD originally attempted to organize joint or parallel financing with the supplying countries and to this end held meetings with representatives of those countries with a view to reaching agreement on the terms and conditions of possible financing. The advantage of such a system of financing, both to ISA and to Colombia, would have been that the IBRD loan and the suppliers' credits would together have been sufficient to cover the entirety of the foreign exchange needs for the machinery and equipment financed under the system. However, it was not possible to arrange this "joint financing" because the supplying countries were unable to reach agreement on the said terms and conditions. The IBRD accordingly decided to adopt a scheme of "non-organized parallel financing" and included a provision in its loan agreement stating that ISA "shall use its best efforts" to obtain loans or financing from other external sources, on reasonable terms, to cover the foreign currency component of the electrical and mechanical equipment, with the condition that the IBRD resources were not to be used to finance that equipment, even in part. Results were again negative, mainly because the parallel financing from other external sources called for a down payment by ISA of 10-15% of the contract prices. ISA was unable to meet this requirement in consequence mainly of its lack of available

1/ After taking account of monetary adjustments; the original amount was for the equivalent of US\$34.1 million.

2/ Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, Switzerland, United Kingdom and United States

resources at that time. 1/ This amount of financing was later included in the list of 1971-74 projects for external financing submitted to the Consultative Group for Colombia in February 1971, at which time the Bank expressed interest in considering a possible application.

- 3.24 In view of this situation, on October 22, 1970 ISA applied to the IDB for a loan of the equivalent of US\$33.9 million 2/ to help finance the foreign currency cost of the electrical and mechanical equipment for Stage 1 of the Chivor Hydroelectric Station and its substations, the 230-KV transmission line (supply and erection) and the civil engineering works for the penstock. IDB Loan Contract 214/OC-CO, for the equivalent of US\$34.1 million 3/, was approved by the Bank's Board of Executive Directors on May 5, 1971 and signed on July 5 of that year.

2. Present position and forecast

- 3.25 The project in general has advanced satisfactorily. At July 31, 1973 disbursement had been made of the equivalent of US\$7.2 million (18%) from IDB loan 214/OC-CO and of US\$22.7 million (43%) from IBRD loan 681-CO. At June 30, 1973 the project had advanced, as an overall average, approximately 30%, with the following category breakdown:

a.	Dam:	Excavation	95%
		Fill	20%
b.	Spillway and surge tank:	Excavation	78%
c.	Pressure tunnel:	Structures	0%
		Excavation	95%
		Lining	5%
d.	Penstock:	Excavation	55%
		Lining	0%
e.	Powerhouse:	Excavation	100%
		Structures	0%

1/ The financing plan for the Chivor II project makes provision for an adequate local contribution to finance possible down payments. In addition, Colombia's present sound international reserves position means that the country is now able to meet the foreign currency needs of these advance payments to suppliers, a situation which did not exist to the same extent in 1971.

2/ On the occasion of the operations mission of January/February 1971 it was decided, on the basis of further studies and final adjustments of project costs, that the required financing from the IDB would amount to the equivalent of US\$34.1 million.

3/ Monetary adjustments later brought the amount up to the equivalent of US\$40.8 million.

- 3.26 The resources of both loans have been almost totally committed, since most of the contracts for the civil engineering works and the supply of the machinery and equipment for the project have been let. It is expected that the project can be completed to the original schedule and that the power station will begin operation during 1975-76. It is accordingly considered that total disbursement of the IDB loan will be possible by the contract date, i.e. July 5, 1976.

3. Major Aspects

a. Increased costs and their financing

- 3.27 The main problem encountered during the execution of the Chivor I project has been the rise in costs and the consequent need to obtain additional financing. Since the Bank's study in April 1971 the cost of the project has risen by approximately 12%, as detailed in the following table: 1/

1/ For an analysis of the cost increases between May 1970, when the original estimates were made, and April 1971, when the project was analyzed by the IDB, see document PR-471 of April 20, 1971, paragraphs 3.23 - 3.29.

TABLE III-2: Increase in Costs of Chivor I

(In US\$ thousands or equivalent)

Category or Subcategory	Budget		Percentage increase or decrease
	April '71	October '73	
1. Engineering and Administration			
1.1 Engineering and direction of works	7,970	7,970	-
1.2 Administration and general costs	1,000	1,220	+ 22.0
Total for category 1	<u>8,970</u>	<u>9,190</u>	<u>+ 2.5</u>
2. Direct Costs			
2.1 Generating plant			
2.11 Dam, tunnel, spillway and surge tank			
2.111 Civil works -Contract CH-001	59,910	62,950	+ 5.1
2.112 Electromechanical equipment	3,760	3,330	- 11.4
2.12 Penstock			
2.121 Civil works -Contract CH-002	4,440	7,010	+ 57.9
2.122 Equipment: conduit	4,220	6,800	+ 61.1
2.13 Powerhouse			
2.131 Civil works -Contract CH-003	4,580	2,940	- 35.8
2.132 Mechanical equipment	4,300	8,710	+102.6
2.133 Electrical equipment	8,300	10,440	+ 25.8
2.14 Ancillary works			
2.141 Highway (Contract CH-004), land, camps and miscella- neous installations	8,430	10,490	+ 23.4
2.2 Transmission system			
2.21 230-KV line -Contract CH-005	4,240	4,810	+ 13.4
2.22 Torca and La Mesa substations	2,120	2,780	+ 31.1
2.23 Land and rights of way	200	200	-
Total for category 2	<u>104,500</u>	<u>120,460</u>	<u>+ 15.3</u>
3. Financing Costs			
3.1 IBRD loan: interest and commitment charge	9,400	15,353	+ 63.3
3.2 IDB loan			
3.21 Interest	5,840	6,750	+ 15.6
3.22 Commitment fee	1,500	1,650	+ 10.0
3.23 Inspection and supervision	341	341	-
Total for category 3	<u>17,081</u>	<u>24,094</u>	<u>+ 41.1</u>
4. Unspecified			
4.1 General contingencies	15,699	9,840	- 37.3
Total investment	<u>146,250</u>	<u>163,584</u>	<u>+ 11.9</u>

3.28 The following are the main causes of this increase in cost:

- i. Rises in world market costs prices, particularly for electromechanical equipment. The impact on the total project cost was all the more severe in that it was calculated in U. S. dollars, the purchasing power of which has fallen sharply during the last two and a half years. Indeed, although it is difficult to quantify that loss precisely, it may well have been the most important single factor in the increase in the total cost of Chivor I.
- ii. A change in the design of the penstock. This followed a recommendation by INGETEC, consultants to ISA, which was accepted by ISA and the Bank, that the penstock be built entirely underground because of previously undetected geological conditions. This design change called for greater civil engineering works and the installation of a larger conduit.
- iii. Higher financial costs for the external credits, resulting mainly from initial underestimation by the IBRD of the interest on its loan.

3.29 The following summary table shows how the project (updated total cost) is being financed:

Table III-3: Plan of financing of Chivor I^{1/}

(In US\$ thousands or equivalent)						
	<u>IDB</u>	<u>IBRD</u>	<u>Commercial banks</u>	<u>Suppliers</u>	<u>ISA</u>	<u>Total</u>
1. Engineering and administration	-	300	-	-	8,390	9,190
2. Direct costs	29,940	41,000	720	4,570	44,230	120,460
3. Financing costs	8,741	9,400	-	-	5,953	24,094
4. Unspecified	<u>2,073</u>	<u>1,100</u>	<u>-</u>	<u>-</u>	<u>6,667</u>	<u>9,840</u>
Total	<u>40,754</u> ^{2/}	<u>52,300</u>	<u>720</u>	<u>4,570</u>	<u>65,240</u>	<u>163,584</u>
Percentage shares	(24.9)	(32.0)	(0.4)	(2.8)	(39.9)	(100.0)

^{1/} The funds provided by IDB, IBRD, commercial banks and suppliers in this financing plan are wholly in foreign currency and are financing external costs. ISA's contribution is mostly in Colombian pesos, to finance local costs, except for US\$12,750,000 in foreign exchange, for financing costs and for civil works.

^{2/} After taking account of monetary adjustments; the original amount of the loan was US\$34.1 million.

3.30 During the second half of 1972, when call for bids CH-002 for execution of the penstock civil works (see paragraph 3.33) was under consideration by the Bank, it was realized that the project was running into cost increases in excess of the April 1971 estimate. The increase had been estimated at that time at the equivalent of US\$15.0 million, giving a total project budget of the equivalent of US\$160.1 million (slight changes have been made to this calculation during the last year in consequence mainly of monetary adjustments). As a result of the determination of these over-costs, in August 1972 the Bank made its approval of Contract CH-002 conditional upon ISA submitting to the Bank a new financing plan demonstrating that it will have available sufficient funds, either of its own or from other sources, to supplement the financing of the penstock works and equipment, together with any further increases in the local contribution, consequent on the increase in the total project cost, necessary to ensure completion of the project. In response to this requirement, ISA successfully negotiated additional suppliers' credits for the equivalent of approximately US\$4.6 million. It also obtained from the National Planning Department (Departamento Nacional de Planeamiento --DNP) a favorable opinion allowing ISA to enter into the necessary negotiations to obtain further financing for up to the equivalent of US\$20.0 million. A copy of the letter from the DNP containing that opinion is attached as Appendix F. In the light of this evidence that ISA could obtain credits from other sources and had the permission of the pertinent national authorities to pursue action to obtain the required additional financing the Bank approved Contract CH-002 in December 1972. It should further be noted that during the analysis of the application for the loan proposed herein it was concluded that ISA's financial projections offered assurance that ISA would have sufficient funds of its own, along with the funds already obtained from the above-mentioned credits, for completing the Chivor I project (see paragraphs 5.29 to 5.38).

b. Bidding and contract award procedures

3.31 The placing of contract CH-002 for the penstock civil works, mentioned above, gave rise to other circumstances which also called for special attention on the part of the Bank's Administration. The call for bids, issued at the end of 1971, produced only two bids. One was from the same construction firm that was already carrying out Contract CH-001 (works for the dam, spillway, surge tank, headrace and diversion tunnels); this bid met all the requirements of the schedule of specifications but quoted a price substantially higher than the original budget. The other bid quoted a price more in line with the budget but was submitted by a firm which did not meet, inter alia, the condition of adequate experience and capacity for the execution of the works. With the approval of its consultants, ISA proposed to award the contract to the first firm and the Bank eventually agreed to this. However, during the analysis by the Bank it was found that the bid included costs that could be adjusted or eliminated, resulting in a substantial reduction in the contract price. The Bank accordingly made its approval of this contract subject to the condition (in addition to the above-mentioned requirement to submit a new plan of financing) that,

after having awarded the contract, ISA would negotiate these adjustments with the bidder. This was done, with the result that the original bid price was reduced by 15%. In addition, the fact that a bid was submitted by a firm that did not meet the requirements for execution of the work pointed up the need for ISA to adopt a system of prequalification in order to avoid such a situation in the future (see paragraph 4.20).

c. Technical problems

- 3.32 During excavation of the spillway structure, landslides occurred on the left "bank" of the project which were caused by the existence of slicks or slip areas. To ensure the stability of the excavation, therefore, the consultants, INGETEC, suggested a number of alternative solutions which involved changes in the design of the spillway and consequently in the period of execution and cost of the work. The borrower accepted what appeared to be the best alternative, from both the technical and the economic standpoints. This consisted in reducing the gradient of the excavation wall by increasing the width of the berms, which made it necessary to eliminate one of the four spillway gates. In order to maintain the designed flood diversion capacity, the hydraulic gradient above the spillway would be increased by raising the dam crest by two meters. A study prepared by INGETEC indicates that the cost of the additional works necessitated by this situation would be more than offset by reductions through elimination of one of the gates and the reduction of other civil works, so that the result would be a net saving on the total cost of the project.
- 3.33 These changes in the original design were submitted to the Bank which, while it agreed in principle that the changes were appropriate, considered that other additional safety measures should also be studied. For this purpose an individual consultant was engaged who, after visiting the project site, recommended that exploratory tunnels be driven to determine the extent of the "slick" in the area upstream of the spillway. INGETEC accordingly dug an exploratory tunnel and the preliminary information received indicates that the works for strengthening the slip area would be relatively simple and that their cost would be relatively low and could be met out of the above-mentioned savings or, if necessary, out of the contingencies item in the project budget. Moreover, this situation is not expected to delay the project.

4. Conclusion

- 3.34 To sum up, the problem that have arisen during the execution of Chivor I have been suitably solved and in general the project is being carried out in a satisfactory manner. In addition, ISA is complying fully with the conditions of Loan Contract 214/OC-CO.

IV. THE PROJECT

A. Objectives and Description of the Project

1. Background and frame of reference

- 4.01 The project would consist of accomplishing the second phase of construction of the Chivor Hydroelectric Power Plant which would eventually have a total generating capacity of 1,000 MW, and installing an operational and monitoring communications system. The plant is located in the Boyacá Department at about 160 Kms. to the northeast of Bogotá. The first stage of the power plant, which would have a capacity of 500 MW, was started in 1969 and consists of constructing: (a) the La Esmeralda dam across the Batá River, to a height of 240 meters; (b) an intake in the reservoirs created for the dam, a valve-equipped headrace, and a penstock consisting of a vertical shaft as well as an inclined tunnel leading to the powerhouse; (c) the central part and the northern side of the main building of the powerhouse, a transformer station and spillways, as well as a control building, and installing traveling cranes for both stages; (d) a switchyard; (e) a 230 Kv, double conductor transmission line measuring 105 kms. between the Chivor, Torca and La Mesa, and substations at the two last-named places; (f) supplementary construction-measures such as access roads, workers' campsites and other construction. The total cost of the first stage is now estimated at US\$163,584,000 equivalent, which is being financed through Loan 214/OC-CO in the amount of US\$40,754,000 ^{1/} and was approved on May 5, 1971; a loan in the amount of US\$52,300,000 from the World Bank, credits from commercial banks and suppliers for a total amount of US\$5,290,000, an allotment from ISA in the amount of US\$65,240,000 equivalent. (See paragraphs 3.21 to 3.34 for an analysis of the execution and financing of the first stage of the Chivor Project.)
- 4.02 The second stage of the Chivor Hydroelectric Power Plant, which is the object of this loan document, would be primarily an expansion and complement to the first stage, increasing total capacity of the power plant to 1,000 MW. Construction measures at this stage would consist of: (a) the construction of a parallel conductor system to the one constructed in the first stage, including another headrace, surge tank, vertical penstock, and inclined tunnel leading the powerhouse; (b) the southern wing to the powerhouse which would house four generating sets of 125 MW; (c) an expansion to the switchyard; and (d) a parallel transmission line to that of the first stage, with an extension to the Torca substation. Furthermore, the project would include the purchase and installation of equipment for an operational control communications system for the whole electric interconnection system to achieve greater economy in the operation of thereof and provide the ISA with the necessary means to accomplish its duties as coordinating authority in the dispatching of energy loads.

^{1/} Taking into account exchange rate adjustments; the original amount of the loan was US\$34.1 million.

2. Description of the project

4.03 There follows a description of construction measures mentioned above:

- a) Headrace:^{1/} A tunnel measuring 5,325 meters from the valve chamber to the penstock, 5.4 meters in diameter, part in circular section and part horseshoe-shaped, entirely lined in concrete. The part between the intake works and the valve chamber, as well as the installation of the valve chamber is to be done in the first phase. Construction of the tunnel will require the excavation of about 160,000 cubic meters of rock and the emplacement of about 33,000 cubic meters of concrete. For construction of this tunnel two access gates measuring 200 and 300 meters each will be required.
- b) Surge tank:^{1/} The surge tank would be located at about 280 meters from the penstock and will consist of a vertical shaft 145 meters high with two lateral chambers, one upper and one lower, the latter connected to the tunnel by means of a vertical shaft. This would require excavation of about 13,600 cubic meters of rock.
- c) Penstock:^{1/} This will be entirely underground, consisting of a vertical shaft about 240 meters deep feeding into an inclined tunnel with a grade of 10% which will end in a manifold conveying water for four turbines. The shaft, 5 meters in diameter, will be lined with reinforced concrete, and the tube measuring a total of 115 meters will be lined with reinforced concrete along the first part (540 meters) and thereafter in steel (1,575 meters), the concrete-lined section measuring 5 meters across and the steel-lined section measuring 3.9 meters. The amount of excavation required is estimated at 55,000 cubic meters of rock and emplacement of 24,600 cubic meters of concrete.
- d) Powerhouse and step-up substation: The part of the powerhouse for the second stage includes the following main equipment:
 - four Pelton turbines rated at 173,000 HP each, 6 jets, operating at 450 r.p.m.
 - four generators rated at 125,000 KW each, 13.8 Kv - 2,000 tm2 - 60 cycles.
 - four single-phase transformer banks, 3 x 54 MVA - 13.8/230 Kv (the two traveling cranes were acquired in the first stage).

The switchyard will comprise seven modules, four for the generating units, two for the feeder lines to Torca and one for a future feeder.

^{1/} Parallel to the construction measures in the first stage.

- e) 230 Kv transmission line:^{1/} The double-circuit transmission line which will link Chivor with Torca substation in Bogota will measure 105 kms. and installed on metal towers with ACSR 1,350 MCM conductors.
- f) Torca substation: Expansion of this substation in the second stage calls for two modules for the incoming lines, two modules for the power transformers, and two transformer banks rated at 230/115 Kv - 3x56 MVA for feeding into the EEEB system.
- g) Dispatching center and telecommunications system: These facilities would comprise: (i) construction and outfitting of a new national dispatching center; (ii) construction and equipment of two regional centers for systems operation, the first of which will be located in Bogotá in the same building as the National Center, and the second at Manizales which would consist primarily of the extension and modernization of the present dispatching system of ISA which operates in that city; and (iii) improvements and extensions to the existing telecommunications system, including the telephone, telex, radio, telemetry and service channels.

B. Cost of the Project

- 4.04 The total cost of the project is estimated at US\$111,483,000 equivalent and is described in Appendix G-1 and Appendix G-2. There follows a summary of the cost of the project, with investment items grouped into investment categories and principal subcategories.

^{1/} Parallel to the facilities constructed in the first stage.

TABLE IV-1: Total Cost of the Project

(In thousands of US\$ or equivalent)

Principal categories and subcategories	Costs foreign exchange	Costs in local currency	Total	%
1. <u>Engineering and Administration</u>	<u>2,573</u>	<u>4,494</u>	<u>7,067</u>	<u>6.3</u>
2. <u>Direct Costs</u>				
2.1 Generating system	37,456	12,095	49,551	
2.2 Transmission system	4,860	818	5,678	
2.3 Telecommunications system	<u>5,391</u>	<u>219</u>	<u>5,610</u>	
Total Category 2	<u>47,707</u>	<u>13,132</u>	<u>60,839</u>	<u>54.6</u>
3. <u>Finance Charges</u>				
3.1 IDB interest	8,881	-	8,881	
3.2 Suppliers' interest	4,483	-	4,483	
3.3 Commitment fee	2,275	-	2,275	
3.4 Inspection and supervision	485	-	485	
3.5 Interest on bonds ^{1/}	<u>-</u>	<u>4,296</u>	<u>4,296</u>	
Total Category 3	<u>16,124</u>	<u>4,296</u>	<u>20,420</u>	<u>18.3</u>
4. <u>No Specific Allocation</u>				
4.1 General contingencies	6,491	3,745	10,236	
4.2 Allowance for escalation	<u>9,622</u>	<u>3,299</u>	<u>12,921</u>	
Total Category 4	<u>16,113</u>	<u>7,044</u>	<u>23,157</u>	<u>20.8</u>
Total Investment	<u>82,517</u>	<u>28,966</u>	<u>111,483</u>	<u>100.0</u>
Percentages	(74,0)	(26,0)	(100,0)	

4.05 Determination of the external and local costs of the Chivor II Project, proposed herein, was done on the basis of the first stage of the Chivor project and on other recent projects in Colombia's electric energy sector. This experience has shown that contracts for general construction (civil

^{1/} Interest on bonds sold to members of ISA to partly finance (60%) of the local cost of the proposed project, in conformity with the by-laws of that organization.

works) as well as for machinery and equipment would be awarded to foreign firms. The amount of US\$60,839,000 equivalent represents the direct cost of construction (not including cost escalation or contingencies) and is allocable at US\$24,462,000 for general construction (civil works) and US\$36,377,000 for machinery and equipment. The external component of general construction measures consists of materials imported by the contracting firms and utilized in construction - with no further transformation or working, total amortization of imported machinery and equipment, and the overhead as well as the profits of said firms. The total amount of this external component is estimated at about US\$14,789,000. The local costs of this general construction, which are estimated at US\$9,673,000 equivalent, will consist chiefly of labor and local materials (such as cement). The external costs of the equipment and machinery, which are estimated at a total of US\$32,918,000, represent the FOB price thereof, plus insurance, ocean transportation, and installation supervision. The remainder of US\$3,459,000 equivalent, is made up of inland freight charges and expenses of installing the equipment and machinery. It is appropriate to note that no calculation of indirect costs in foreign exchange was included, in keeping with the applicable IDB policy set forth in document GN-605 of February 9, 1970, as the amount of such costs was regarded as relatively insignificant. On the one hand, there are no plans for importing raw materials which would be used later on for manufacturing equipment and machinery in Colombia. On the other hand, the machinery to be utilized in general construction would be amortized entirely in the five years of the project, and so there would be no indirect expenses in foreign exchange for partial depreciation of said machinery. The only indirect costs in foreign exchange would be the imported component of fuel for the operation of such machinery and of spare parts.

- 4.06 The local costs of engineering and administration, which are estimated at US\$4,494,000 equivalent, represent chiefly amounts payable to the Colombian firm INGETEC, which prepared the studies and designs of the Chivor II project and which will hold the basic responsibility for the supervision thereof, and to a lesser degree, the administrative expenses which ISA is to incur in connection with the project. The external costs, in the amount of US\$2,573,000, for the most part would refer to the contracting of Motor Columbus, a Swiss consulting firm, which will undertake to do the final design for the control and communication systems; to expenses of a "Board of Special Consultants", (see paragraph 4.28) and to other minor expenses.
- 4.07 The composition of finance charges depends on the source of financing, as indicated in the table in paragraph 4.04. It is appropriate to note that ISA would have to pay interest in the amount of US\$4,296,000 equivalent in national currency on the bonds acquired by its members for the partial financing of the local costs of the project, in conformity with the ISA by-laws.
- 4.08 The local and external costs which are not specifically allocated are proportionate to the direct costs of construction and of engineering and administration.

4.09 In connection with the Chivor II project it is noteworthy that the external component (74%), is higher in percentage than that of the Chivor I project, that is, 66.7%. This is explainable by the fact that in the first stage of Chivor most of the general construction (civil works) of the power station was completed, such as the dam, the spillway, the access roads and other facilities which involved a greater proportion of local costs.

4.10 The cost calculation is regarded as reasonable and within the normal parameters for this type of project, as explained below:

- a) The proportion of expenses for engineering and administration, that is, 11.6% of the direct cost of construction, is regarded as justifiable, particularly if account is taken of the fact that it includes engineering on the telecommunications system and control centers which, owing to their characteristics, account for high percentage of such costs.
- b) The budget prepared by the INGETEC firm, at the end of 1972 for the direct costs of construction, was updated to July 1973 on the basis of the results of recent invitations for bids on the Guatapé II project, on the budget for the Samaná plant done by the firm of Jacobs Associates, and on the currency realignments which took place during 1973. It is noteworthy that the INGETEC budget was based chiefly on invitations to bid on Chivor I in respect of equipment and general construction, taking into account for the last-named items, the prices obtained in the invitations to bid on the Chinzaga tunnel of the new potable water system of Bogotá, which is now being constructed with financing from the IBRD.
- c) Finance charges during construction were calculated on the basis of interest at 8% a year on the proposed IDB loan as well as on supplier credit; and 9% a year to pay interest on the bonds to be placed by ISA among its members so as to cover 60% of its local contribution to the project.
- d) Such expenses as are not specifically allocable were determined in accordance with the following criteria: for underground items of general construction (civil works) contingencies were stated at 20%, taking into account not only the special technical features of this type of work, but also the possibility of having to increase the length of the steel-armored section of the pressure tunnel. For the rest of the general construction measures and equipment a normal allowance of 10% for contingencies was set. As regards the allowance for cost escalation, a 5% annual increase in prices for both currencies was adopted, taking into account the secular growth trend of prices on the world market and the domestic market as well.

C. Financial Plan

4.11 The financial plan for the project would be as follows:

TABLE IV-2: Financing of the Project
(In thousands of US\$ or equivalent thereof)

Principal categories and sub-categories	I D B	Parallel Financing <u>1/</u>	I S A		Total
	Foreign exchange	Foreign exchange	Foreign exchange	Local currency	
1. <u>Engineering and administration</u>	<u>2.573</u>	<u>-</u>	<u>-</u>	<u>4.494</u>	<u>7.067</u>
2. <u>Direct cost</u>	<u>26.609</u>	<u>17.933</u>	<u>3.165</u>	<u>13.132</u>	<u>60.839</u>
2.1 Generating system	17.432	17.020	3.004	12.095	49.551
2.2 Transmission system	3.786	913	161	818	5.678
2.3 Telecommunications system	5.391	-	-	219	5.610
3. <u>Financial charges</u>	<u>9.366</u>	<u>-</u>	<u>6.758</u>	<u>4.296</u>	<u>20.420</u>
3.1 IDB interest	8.881	-	-	-	8.881
3.2 Supplier interest	-	-	4.483	-	4.483
3.3 Commitment Fee	-	-	2.275	-	2.275
3.4 Inspection and supervision	485	-	-	-	485
3.5 Interest on bonds	-	-	-	4.296	4.296
4. <u>No specific allocation</u>	<u>9.952</u>	<u>5.680</u>	<u>481</u>	<u>7.044</u>	<u>23.157</u>
4.1 General contingencies	3.772	2.330	401	3.733	10.236
4.2 Allowance for cost escalation	<u>6.180</u>	<u>3.350</u>	<u>80</u>	<u>3.311</u>	<u>12.921</u>
Total	<u>48.500</u>	<u>23.613</u>	<u>10.404</u>	<u>28.966</u>	<u>111.483</u>
Percentages	(43,5)	(21,2)	(9,3)	(26,0)	(100,0)

1/ Suppliers and/or export-financing institutions.

- 4.12 The proposed IDB loan (US\$48,500,000) entirely in foreign exchange, would cover 43.5% of the cost of the project. ^{1/} The loan in foreign exchange would finance the total amount of the foreign component of general construction and such items of machinery and equipment as would not be financed through supplier credit, engineering services, finance charges on the proposed loan from the IDB, and a proportional amount of expenses which are not specifically allocable. It is expected that supplier credit, in the amount of US\$23,613,000, will cover 85% of the CIF price of the contracts for the generators, turbines, transformers and armor plating of the pressure tunnel, including the appropriate general contingencies and allowances for cost escalation.
- 4.13 The amount provided in this financial plan for supplier credits is based on recent experience with this type of financing and on arrangements which ISA has made to obtain external credit for this project. A minimum condition set in these arrangements was that supplier financing would cover at least 85% of the CIF price of the contracts and that the amortization period would be at least 10 years starting from the date when the corresponding equipment or machinery is installed. During the visit by the Manager of ISA (See paragraph 1.05) it was determined that these conditions were applicable solely to relatively large contracts and thus only to generators, turbines, transformers and armor plating, for which the contracts in foreign exchange amount to US\$7,177,000, US\$9,504,000, US\$3,282,000 and US\$7,820,000, respectively. Each one of the other contracts for machinery and equipment has an average price of approximately US\$1,000,000 each. Supplier credit is granted on such amounts on much less favorable terms than those indicated above.
- 4.14 Based on the results of these negotiations, it is therefore believed that ISA would be able to obtain the necessary supplier financing on acceptable terms. As indicated in paragraph 1.06, the authorities interviewed expressed the opinion that they would be prepared to finance the contracts on acceptable terms if, through international competitive bidding, a company of the corresponding country were to be awarded one or more of the four largest equipment contracts of the project. ISA has requested written confirmation of this position. This confirmation must be presented to the Bank prior to the signing of the proposed loan contract (see paragraph 8 (c) (iii) of the Proposed Resolution). It is considered that these terms could provide at least 85% financing of the contracts and an amortization period of ten years, starting from the date of installation and start-up of the respective equipment or machinery. These conditions could be supported by ISA. There is also the possibility that these terms could be even more favorable to the extent of 90% financing and an amortization period of 12 years, including capitalization of interest during the manufacturing and assembly period. Nevertheless, it should be pointed out that according to the practices

^{1/} See Appendix H, List of Investment Categories on the IDB loan.

followed by most of the national agencies of export financing, it is not customary for these agencies to commit themselves to specific terms and conditions before the bidding process begins and the contracts are awarded.

4.15 It is also not a customary practice of these export-financing agencies to commit themselves in advance to provide export financing prior to the selection of the firm which will be awarded the contract for the necessary equipment or machinery. Consequently and in view of the fact that the provision of the turbines, generators, transformers and steel plating for the pressure tunnel, will not be necessary until 1975 or 1976, it is recommended that a condition be included whereby within the time schedule for project execution, ISA shall present evidence to the Bank that it has received proposals for supplying such equipment and machinery, as well as the financing is to be arranged (see paragraph 8 (f) of the Proposed Resolution).

4.16 The origin and use of currencies for the financing of the project are given in the following table:

Table IV-3: Origin and Use of Currencies

(in thousands of US\$ or equivalent)

	<u>Currencies by Origin</u>		<u>Currencies by Use</u>			
	<u>Foreign</u>	<u>Local</u>	<u>Foreign</u>	<u>Local</u>	<u>Total</u>	<u>%</u>
IDB	48.500	-	48.500	-	48.500	43,5
Suppliers	23.613	-	23.613	-	23.613	21,2
ISA	-	39.370	10.404 ^{1/}	28.966	39.370	35,3
Totals	<u>72.113</u>	<u>39.370</u>	<u>82.517</u>	<u>28.966</u>	<u>111.483</u>	<u>100,00</u>
Percentages	(64,7)	(35,3)	(74,0)	(26,0)	(100,0)	

4.17 The IDB participation in the financing of the proposed project, which represents the equivalent of 43.5% of its total cost, is considered reasonable, since it is below the percentages of loans previously made

^{1/} The foreign currency component to be financed by ISA is composed of the following items:

Interest on supplier credits	US\$4.483.000
Commitment Fee	2.275.000
Down payment (15%) on equipment with supplier financing	3.646.000
	<u>10.404.000</u>

by IDB to Colombia in the electric power field. In the case of loans 175/OC-CO and 13/CD-CO for the hydroelectric project of Alto Anchicayá, the resources of those loans are financing 66% of the total cost of that project. Loan 214/OC-CO and loan 681-CO from the World Bank are financing approximately 58% of the first stage of Chivor. In the case of still more recent loans, the percentage financed by IDB was 50.3% and 52.4%, respectively, for the projects for electric power transmission and distribution for the system of the Empresa de Energía Eléctrica de Bogotá (Electric Power Company of Bogotá) and for expansion of the Insula-Esmeralda San Francisco system of the Hydroelectric Power Station of Caldas. It should also be pointed out that with the proposed IDB loan the percentage of financing obtained from international lending agencies for the Chivor power station, including the first and second stages and the communications system, would be 51.5%.

D. Project Execution

1. Construction, Investment and Procurement Schedule and Procedures

- 4.18 The execution and disbursement period for the project would be approximately 5 years, starting with the date of the contract and ending with the start-up of the generating units, approximately in the first half of 1979. The annual investment and disbursement schedule has been estimated based on the schedules for bidding, general construction works, manufacturing and assembly of equipment, all of which is described in Appendices I and J, and can be summarized as follows: 1/

Table IV-4: Investment Schedule

(in thousands of US\$ or equivalent)

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>Total</u>
IDB	220	3.740	6.017	6.457	18.882	7.933	5.251	48.500
Parallel Financing <u>2/</u>	-	-	-	6.448	8.900	6.757	1.508	23.613
ISA	<u>235</u>	<u>2.474</u>	<u>5.974</u>	<u>7.703</u>	<u>9.495</u>	<u>9.456</u>	<u>4.033</u>	<u>39.370</u>
Total	<u>455</u>	<u>6.214</u>	<u>11.991</u>	<u>20.608</u>	<u>37.277</u>	<u>24.146</u>	<u>10.792</u>	<u>111.483</u>
Percentage	(0,4)	(5,6)	(10,8)	(18,5)	(33,3)	(21,7)	(9,7)	(100,0)

1/ A detailed schedule is shown in Appendix K.

2/ Supplier credit and/or export-financing institutions.

- 4.19 The general construction (civil works) of the project was grouped into three invitations to bid, one of which is the basic component of the project and covers all of the construction work on the conductor system and two smaller construction jobs comprising the building of the southern wing of the powerhouse and the substations and the installation of the 230 KV transmission line. Eight international invitations to bid are expected for the Chivor II equipment, most of which will be opened during 1975, with the exception of the turbines and generators for which bids will be invited in September, 1974. Plans also call for the telecommunication equipment and the equipment for the Bogota load dispatching sector to be acquired through two international invitations to bid which will be opened by mid-1974.
- 4.20 The bidding and awarding of all of the contracts for general construction and procurement of machinery and equipment will be carried out through competitive international bidding, basically in accordance with the same standards and procedures applied in the execution of Chivor I, which were examined and found acceptable by the Bank. ^{1/} The only significant difference in the procedures of the new project relative to those of the preceding project would be the adoption of a system of pre-qualifying contractors for the general construction work, which was examined and found acceptable by the Bank. It should be noted that ISA recently called for pre-qualification bidders for general construction work on the conductor system so as to make it possible to decide by the end of 1973 as to which bidders would be eligible to participate at the beginning of 1974.
- 4.21 The schedule of investments for the project, shown in Appendix L, was based on the bidding and construction programs, taking into account the following system for making payments to the various contractors who will participate in the project: (i) for general construction an advance payment of 15% of the contract price, monthly payments against presentation of vouchers for a total of 75% and withholding of 10% up to 60 days after acceptance of the work; (ii) for the equipment for the power plant and the transmission system, an advance payment of 10% to 15% of the

^{1/} The only exception to this rule for international competitive bidding would apply in the procurement of the equipment for modifying and/or acquiring turbine regulators, wherein provision is made for direct awards, the reason being that these items of equipment must be acquired from or adapted to the specifications of the same manufacturers which supplied the existing equipment. The total amount of these awards is estimated at US\$900,000 including contingencies and price escalation. It is therefore recommended that these items be acquired by comparing supplier prices or through direct negotiations with suppliers who can prove that they are capable of supplying such equipment to comply with the designs and specifications of existing equipment. In these cases, however, ISA would have to provide detailed justification to the Bank as to why it would not resort to international public bidding and it would have to propose procurement procedures which were satisfactory to the Bank. (see Clause 8 of the Proposed Resolution in Appendix B)

corresponding contract price; payment 1/ of 75% to 80% on date of shipment of the equipment or machinery; and payment 1/ of the remaining 10% on the date of its acceptance, when it is put into service; 5% of this amount would be covered by a guarantee up to 12 months after recorded acceptance; and (iii) for the telecommunication equipment, payment of 25% at the time the order is awarded, 40% in the last third of the manufacturing period, and the remaining 35% when the equipment is put into service.

- 4.22 The investment schedule (see paragraph 4.18 and Appendix K) reveals that there are certain costs in the second half of 1973 and in the first few months of 1974 which will be covered by ISA. Some of these are for investments allocable to the proposed IDB loan. Almost all of these expenses are in the category of Engineering and Administration and represent payments for design work to the local consulting firm of INGETEC, to the Swiss firm of Motor Columbus and for advisory services from the Board of Special Consultants. For this reason it is recommended that the Bank allow as part of the local contribution to the financing of the project up to the equivalent of US\$355,000; and that it reimburse from the proceeds of the loan the equivalent of US\$255,000, invested by ISA to pay local and foreign costs, respectively, for engineering and administration services prior to the date of the proposed contract, which is estimated to be the first quarter of 1974, but in any event after the date of the loan application (July 6, 1973).

2. Status of Designs and Specifications

- 4.23 The preparation of the project is considered to be very advanced, providing sufficient basic information to make accurate calculations of the total project cost, and assuring that the project will be started on schedule and be carried out accordingly. This advance is estimated at approximately 60%, taking into account that even though work on the designs for the power station is well advanced that for the communications system is still at the initial stages. Since the equipment for the power station has the same characteristics as that being manufactured for the first stage of Chivor, and general construction is similar in design as regards the headrace, powerhouse and transmission line, no difficulties are anticipated in preparing the specifications for the procurement of such equipment and in the final preparation of the designs for general construction. The latter should be finished by the end of 1973, depending only on a decision that ISA will take, in consultation with its consultants, and with the approval of the Bank, as to whether or not it is necessary to line the entire pressure tunnel with a steel plating. The designs for the communication system are expected to be completed on time for the invitation to bid planned for mid-1974.

1/ In the case of the generators, turbines, transformers and steel plating, payments will be financed by supplier credit.

3. Engineering, Project Management and Equipment Inspection Services During Project Execution

- 4.24 For technical supervision of the project, ISA intends to continue using the services of the Colombian consulting firm INGETEC. This is considered fully justifiable in view of the fact that this firm has satisfactorily completed its tasks in designing and participating in the Chivor I project and since it has also prepared the designs for Chivor II. ISA also intends to continue using the advisory services of the Swiss firm Motor Columbus for preparing the final designs for the system of operational and control communications, since this firm assisted the ISA engineers in satisfactory fashion on the initial design of this system. The Bank has examined this particular aspect and, considering the reasons mentioned above, the Bank feels that ISA should continue using these firms, pursuant to the Bank's policy on such matters. The hiring of these firms would be completed prior to the first disbursement of the proposed loan.
- 4.25 It is also believed that ISA should be provided with the services of a Board of Special Consultants comprised by international experts of recognized experience and ability and with a world-wide reputation in the fields of geology, soil mechanics and hydraulic engineering. These consultants would provide advisory assistance on technical matters pertinent to the design during the course of work on the Chivor Project as a whole. Appendix L gives the general terms of reference and budget for these experts. It should be pointed out that ISA has used the services of such experts in the execution of project Chivor I, but on an ad-hoc basis and primarily in the event of a special situation. Therefore, it is advisable that the provision of these services be organized in a more systematic yet pragmatic fashion. Each one of these experts would work over short periods of time for a total of 4 weeks per year during execution of the project, and they would immediately present their recommendations to ISA without having to submit detailed reports or prepare action programs in each and every case. In view of the characteristics of this type of advisory services for such short periods of time, the consultants would be paid exclusively in foreign currency.
- 4.26 IDB supervision would be performed by one of the sector specialists currently working in the Bank's field office in Bogota. No particular difficulties are anticipated in the execution of the various general construction jobs, which consist basically in the headrace conductors, since the experience obtained with Chivor I is now available, as well as geological information on the area where these facilities will be installed, as the bearing would be nearly parallel to that of the Chivor I tunnels and at a short distance therefrom.

V. THE BORROWER AND FINANCIAL PROJECTIONS

A. Institutional organization and legal framework

1. Nature, purpose and legal capacity

- 5.01 The borrower and executing agency would be Interconexión Eléctrica, S.A. (ISA), organized on September 14, 1967 as a corporation ^{1/} whose shareholders and their ownership of the capital stock of the enterprise are: Instituto Colombiano de Energía Eléctrica (ICEL) and its affiliate, Central Hidroeléctrica de Caldas (CHEC) at 25% (24.5% and 0.5%); Empresa de Energía Eléctrica de Bogotá (EEEEB) at 25%; Corporación Autónoma Regional del Valle del Cauca (CVC), and its affiliate Central Hidroeléctrica del Río Anchicayá (CHIDRAL), at 25% (24.5% and 0.5%); and Empresas Públicas de Medellín (EPM) at 25%. The ISA has its legal domicile in the city of Bogotá and it was organized for a duration of 50 years from the date of its incorporation, that is, up to the year 2017; but the General Meeting of Shareholders may, pursuant to the ISA bylaws, extend the duration.
- 5.02 The purposes of the organization are: to interconnect the electric systems of its members so as to provide for an energy exchange to meet deficiencies where generating capacity is inadequate to demand; to utilize the reserve system capacity of the new system and to place surplus electric energy in all interconnected areas; to establish an order of priority for the construction of new generating stations, in terms of the technical and economical advantages for the interconnected system; and to plan program and construct new sources of electric energy generation so as to provide for meeting the demand of the shareholders' systems as well as of other areas to be interconnected in the future.
- 5.03 According to the bylaws of the enterprise, the investments needed to achieve its objectives are financed as follows:

Generating Plants

- Investment in national currency: a) 40% by means of shares of capital stock which shareholders will convey in the following proportions: EEEB, 10%; EPM, 10%; CVC and CHIDRAL, 10% between both of them; ICEL and CHEC, 10% between both of them; b) the

^{1/} According to Colombian legislation, the ISA is considered to be an "Industrial and Business Entity of the State", created indirectly and without government sponsorship.
See page 1 of the Legal Report, Annex III to loan document PR-471 prepared for loan 214/OC-CO.

remaining 60% by means of bond issues which the shareholders would acquire in the necessary proportions so that the total shares and bonds acquired by each would correspond to the capacity assigned to the new generating plant.

- Investments in foreign exchange. These are financed for the most part by means of credit acquired abroad.

Interconnection Systems and Studies

- Investments in national currency. These are financed entirely with capital allotments of the stockholders in cases where no financing from domestic sources is obtained.
- Investments in foreign exchange: the same scheme as for generating plants.

- 5.04 ISA has full legal authority to contract the proposed loan and other financing necessary, and to execute the project.

2. Organization and Management 1/

- 5.05 The administration, management and control of the business of the Corporation is conducted by the following organs: (a) General Meeting of Shareholders; (b) Board of Directors; (c) Office of the Manager. The organization chart of ISA is shown in Appendix M.
- 5.06 The highest level of ISA's executive authority is rested in the General Meeting of Shareholders comprised at present by representatives of EEEB, EPM, CVC, CHIDRAL, ICEL and CHEC. The powers of the General Meeting of Shareholders are set forth in the bylaws of the corporation, the shareholders being responsible for appointing members to the Board of Directors as well as alternates and electing the Financial Examiner as well as his alternate.
- 5.07 The Board of Directors of the corporation is comprised by four members who are elected for a term of one year and may be re-elected for an indefinite period, or removed by the General Meeting of Shareholders. 2/ Each principal member of the Board has an alternate who is appointed in the same manner and for the same period as the titular director. The Board of Directors elects a chairman who

1/ For a more detailed description of the ISA's organization, see document PR-471. paragraphs 2.03-2.11.

2/ At present the Board of Directors of ISA is comprised by the Manager of the EEEB, the Manager of the EPM, the Manager of the ICEL and the Executive Director of the CVC.

presides over its meetings as well as those of the General Meeting of Shareholders. The principal functions of the Board of Directors are also set forth in the bylaws of the Corporation, and the Board may appoint and freely remove the manager and his respective deputies.

- 5.08 The Legal Representative and Chief Executive of the ISA is the Manager, who is elected for a two-year term by the Board of Directors and may be re-elected indefinitely. The span of executive control of the Manager comprises staff units, namely the General Secretariat (including Public Relations) and the Office of the General Counsel; and executive (line) units, namely the Office of the Deputy Manager for Administration and the Office of the Deputy Manager for Technical Affairs.

The Office of the Deputy Manager for Administration is comprised by the departments of Economics and Financial Affairs, Energy Economics, Industrial Relations, Accounting, Goods and Commercial Affairs, and by the Systems and Methods Unit. The Office of the Deputy Manager for Technical Affairs is comprised by the Generating Plants, Electric, Operation, Construction, and Chivor departments. The two offices are advised by external consultants in their various fields of competence.

- 5.09 The general organization structure of ISA is based on its bylaws and organization manuals which were designed and formulated in rational fashion; at first, advisory assistance was provided by the consulting firm of Buenahora, Restrepo y Cía. The bylaws and organization manuals set forth and define the functions and powers of the principal units of the corporation and may generally be regarded as acceptable from the technical and administrative stand points.
- 5.10 The ISA staff on July 31, 1973 comprised 255 functionaries and employees; of these, 64 were high and intermediate level professionals, 88 were in the category of technicians and administrative employees, and 103 were laborers. The labor affairs of the corporation are governed by the labor laws of Colombia and by the Internal Work Regulations; salary and personal policies are implemented by means of scientific personal management systems based on seniority grading, manuals of administrative standards, evaluation of positions and of merit. These are constantly updated. In designing and implementing these systems advisory assistance was available from a firm of independent consultants (Buenahora, Restrepo y Cía.).

B. Financial and Technical Administration

1. Financial Management

- 5.11 Assisted by officials of the enterprise, the systems and procedures for financial management were designed by the consulting firm Arthur Andersen & Co.; the recommendations put forward were all instituted and the results achieved may be regarded as generally satisfactory. The work done comprises the following general aspects: (i) general accounting system; (ii) accounting and recording of fixed assets; (iii) purchasing and inventory control procedures; (iv) budget system; and (v) other internal control procedures. The following principal manuals resulted from the work carried out: a classification of accounts; daily cash entries; work orders; general policies and procedures; property units (fixed assets); standard form for financial reports and operations reports; purchases; inventories; budgets, etc.
- 5.12 The classification of accounts was designed in conformity with the system of accounts employed by public utility enterprises in the United States and in most of the countries of Latin America which have technically-conceived accounting systems. Nevertheless, it was adapted to the specific needs of ISA, to Colombian laws concerning accounting, and to the regulations of the Contraloría General de la República. ISA has at its disposal an Olivetti P-203 installation of the mini-computer type which, by means of data processing capabilities, processes most of the principal operations with quite satisfactory results.
- 5.13 The supervision and auditing scheme of ISA is carried out as follows:
- (i) A Financial Examiner appointed by the General Meeting of Shareholders; the scope of his duties are, in general, set forth in the bylaws of the Corporation. The local firm "Cuellar Fedeg y Cía." was appointed as Financial Examiner of ISA and charged also with the internal auditing. The contract for said auditing services was entered into on May 25, 1973. The contract calls for the firm to draw up such audit programs as may be necessary and to perform the internal auditing, in addition to the functions it must carry out as financial examiner. 1/
 - (ii) A firm of independent auditors acceptable to the Bank - the firm Arthur Andersen & Co. - is now carrying out that function.

1/ See Chapter VI, Recommendations, paragraph 6.03 (d).

- 5.14 The capacity of the ISA senior management staff in the area of financial management is thought to be suited to the accomplishment of that end.

2. Technical Capability

- 5.15 The organization of the office of the Deputy Manager for Technical Affairs is shown in the Appendix M and basically comprises three sectors: programming construction and operation of the ISA systems which comprise the interconnection system and the new generating stations. There are 40 persons who make up the professional staff of the Office, a number which is regarded as adequate for present needs, considering that ISA has only one plant under construction and the central system in operation.
- 5.16 In the future, the program for expansion of the generating system and consequent additions to the network calls for starting construction in a period of ten years, of 7 new stations. If to this is added the volume and complexity of studies required for the harnessing of hydroelectric power, there is an obvious need for considerable reinforcement of the technical staff, especially as regards the departments of Plan Facilities and Electrical Facilities. Professional staff members would be responsible not only for programming functions but also for reviewing studies and designs for new plants and systems, which, in keeping with the practice of enterprises in the electric sector, are done by Colombian engineering consultants who are generally associated with foreign firms.
- 5.17 It is deemed appropriate that within the special conditions section of the loan contract there would be established a term of 12 months from the date the contract is signed for ISA to submit to the IDB for consideration a plan for reinforcing the Office of the Deputy Manager of Technical Affairs, calling for implementation of this recommendation within an adequate period of time to meet the growing needs of technical character. 1/.

C. Tariff Scheme

- 5.18 ISA employs two modes of operations in connection with its rate schedules: one during the first stage when the system is operating and interchanging energy only among members, and the other at the second stage, on a permanent basis, when it will generate and transmit to the substations of its members the energy necessary to meet deficits and reduce thermal generation at its plants.

1/ See Chapter VI, Recommendations, paragraph 6.03 (c).

The structure of selling prices during the interchange period was developed according to a study submitted in November 1971 by the firm of Motor Columbus. The study was done in cooperation with ISA's Office of the Deputy Manager for Administration. The estimate of selling prices was developed for the wet and dry seasons and for three periods of a day (daytime, peak load and nighttime). This was done on a basis of the provisions of the Corporation's bylaws. Article 8 thereof establishes that the export price of energy from a system must cover the costs of generation and transmission, yielding moreover, a reasonable rate of return for the member selling on its assets in service. The price paid by the member purchaser is derived from the weighted average of purchasing prices paid by the ISA. Taking this into account, prices were established for basic energy which will meet the deficits and provide for optimum energy loads so as to reduce the production of energy at higher cost in the buying system.

- 5.19 For the ISA energy generation, a study is to be submitted which is now being prepared by the firm of Motor Columbus, with financing from the World Bank, for purposes of establishing a rate schedule scheme to be applied whenever ISA begins to sell block energy to its members. The rate schedules to be adopted, which must be approved in due course by the Board of Directors of ISA, will yield the necessary revenue to cover the charges set forth in Article 17 of the bylaws and summarized in Appendix T. These bases are consistent with the condition concerning rate schedules 1/ which the Bank has employed in connection with loan 214/OC-CO. Furthermore, it would be estipulated in the proposed loan contract (see paragraph of the Draft Resolution) whereby it is required that the rate schedules applicable to electric energy sales from the generating system of the borrower: (i) produce at least enough revenue to cover all operating expenses of the system, including those relating to operation, maintenance, administration and depreciation; (ii) provide a reasonable rate of return on the fixed investment in the system, which is estipulated at 9% a year; and (iii) if the cash flow from the above measures is not enough to cover timely amortization of all obligations undertaken by the borrower, to generate such additional revenue as may be necessary for the purpose.

1/ It is appropriate to note that these rate schedules must be authorized previous to their implementation by the National Tariff Board, since it is so required by the current provisions of laws governing this type of public service.

In examining this application, it was noted that operation of the interconnected energy distribution system, which is a considerable part of the ISA system, is not supposed to return a profit, in keeping with its bylaws. If that system is incorporated to the rate base (net fixed investment) ISA will probably have to raise its rates so as to yield an acceptable return on the whole system. Therefore, it was deemed advisable to recommend that ISA, with the participation of the National Tariff Board, make a study of these aspects so as to determine the effect on the generation of revenue for the borrower and its shareholders if ISA were to apply rates yielding an acceptable return on total fixed investment in the system, including the interconnected system, as well as any amendments to the ISA bylaws and those of its shareholders that might become necessary to allow inclusion of that system in the rate base. (See Paragraph 8 (f) Draft Resolution).

D. Financial condition: 1969 to 1972

- 5.20 The financial condition of ISA was generally suitable during the period from 1969 through 1972, taking into account its characteristics and mode of operation. 1/ Said characteristics and mode of operations, which did not allow for making a conventional financial analysis, may be summarized in the following points: (i) as of March 1972 the enterprise began to operate the electric system intertie, but it is still engaged in constructing the generating project of the Chivor I Hydroelectric Power Station and the Guatapé-Barranca interconnection; (ii) according to the Corporation's bylaws, expenses of administration, operation, maintenance, depreciation and financial expenses, in relation to the system intertie, are to be allocated among the shareholders based on energy sales by each one of them and on the total amount sold by all; according to this criteria the Corporation did not obtain, nor is it now obtaining, a profit from operation of the system intertie. Therefore, it is unnecessary to determine the rate of return on fixed investment until such time as the generating system of ISA enters into operation, that is, the first stage Chivor; (iii) the analysis of accounts collectible from users, which are the shareholders themselves, (six all told) was limited, during the examination period, to reimbursable expenses uncollected which are normally paid over the short term; in the event that ISA should require additional funds, the shareholders may make provisional advances which would be payable annually in definitive fashion.
- 5.21 The impact of devaluation was reflected as an increase in the value in Colombian pesos, that is, in foreign exchange debt incurred by the Corporation and utilized to finance its construction projects; resulting differences in exchange rates were accounted for as an increase in the value of the respective fixed assets. As regards values in terms of United States dollars, the Corporation has not suffered to any great extent from domestic inflation owing to its mode of operation, described above, which consists in its entirety of the costs of operation and finance charges which are covered by the ISA shareholders. During February 1973 there was a change in U.S. dollar exchange parity, and therefore, the Corporation's obligations in foreign exchange, other than dollars, will increase by about \$Col.33 million (US\$1.4 million), which amount will be charged to fixed assets in keeping with Corporation policy.
- 5.22 As may be noted in the Consolidated Balance Sheets in Appendix N, the current liquidity ratio was somewhat tight during 1970 and 1971, at 0.78 and 0.69 respectively, as was the working capital net, though there was substantial improvement at the end of 1972 with a current ratio of 1.33 and a working capital net of US\$3 million. The chief factor affecting this condition during 1970 and 1971 was the effect of accounts payable to contractors, which amounted to US\$2.3 million and US\$3.4 million, respectively; however, it is noteworthy that such accounts are paid with

1/ Appendices N, O and P show the comparative financial statements for the period from 1969 through 1972 (Consolidated Balance Sheet, Income Statement, Source and Application of Funds Statement, respectively) which served as a basis for the examination. The statements were audited by a firm of independent public accountants acceptable to the Bank and were converted to United States dollars applying the generally accepted methodology for that purpose.

the proceeds of existing credit lines, owing to the fact that the accounts originate from construction measures which are financed by international organizations (IBRD and IDB) and by other financial and banking institutions. Therefore, this negative situation is not very important to the overall financial condition of the Corporation.

- 5.23 The debt ratio was also somewhat high at the close of 1970, 1971 and 1972, the debt/equity ratio having been 3.42:1, 3.55:1 and 3.05:1, respectively. The main reason for this high debt/ratio is that the investments in construction work were financed to a greater extent by resources from external loans (the World Bank, IDB, etc.) and by issuing bonds than through contributions from the shareholders for increasing the capital. From 1970 to 1972 (3 years) external borrowing increased US\$35.6 million; the issue of bonds increased US\$9.2 million, totaling US\$44.8 million, whereas the increase in net worth during the same period of time was only US\$15.9 million. ^{1/} Due to the increase in authorized capital to Col.\$1 billion, formalized in June 1973, an improvement has been projected for the debt ratio in the next few years (see paragraph 5.27).
- 5.24 Net fixed assets as of December 31, 1972 rose to US\$64.6 million, representing 82% of the total assets of the corporation; from 1970 to 1972 (3 years) fixed assets increased US\$58.5 million. An increase of US\$11 million in current assets, also occurred in that same period and other assets increased by US\$1.9 million. These increases totaling US\$71.4 million were financed by external loans of US\$35.8 million (50%); increase in net worth by US\$15.8 million (22.3%); issue of bonds by US\$9.2 million (12.9%) and other items by US\$10.6 million (14.8%). ISA's capitalization as of December 31, 1972 was US\$69.6 million, maintaining a reasonable relationship to total fixed assets. Long-term and short-term foreign debt amounting to US\$38.8 million was composed completely of foreign currency, as follows: World Bank, Loan 681-CO, US\$17.2 million; World Bank, Loan 575-CO, US\$10.8 million; IDB, Loan 214/OC-OC, US\$5.2 million; Istituto Mobiliare Italiano in Lira, equivalent to US\$2.2 million; Credit Industriel et Commercial and Banque Française du Commerce Extérieur (France) in French francs, equivalent to US\$1.8 million; the Export-Import Bank of Japan in yen, equivalent to US\$0.6 million; and Swiss Banks in Swiss francs, equivalent to US\$1.0 million.
- 5.25 The original authorized capital was \$Col.200 million and subsequently it was increased, on October 11, 1971, to \$Col.500 million; on April 18, 1972 to \$Col.800 million, and on June 20, 1973 to \$Col.1 billion. The subscribed capital as of December 31, 1972, rose to \$Col.400 million (equivalent to US\$19.4 million) and paid-in capital rose to \$Col.372 million (equivalent to US\$18.1 million and as of July 31, 1973, it was \$Col.600 million, equivalent to US\$25.0 million and \$Col.472.9 million equivalent to US\$19.7 million respectively.

^{1/} This includes a small portion of shares subscribed and payable, since payment is made over a short period of time.

E. Financial Projections: 1973 to 1982

5.26 The financial projections composed of the forecasts of the General Balance Sheet, Statement of Operations and Income Statement, and the Statement of Source and Application of Funds, shown in Appendices Q and R, respectively, were drawn up in terms of dollars for the period from 1973 to 1982 at the institutional level, and include Chivor I, the present project, the interconnected network and the studies. At the Chivor I and II level, only the forecasts for the Operations and Income Statement was made and is shown in Appendix T. The following main assumptions were used in these forecasts:

- i) the operating revenue corresponding to the generating plants was calculated on a rate base which would cover administrative, operating and maintenance expenses; depreciation, interest on domestic and foreign borrowing, any balance necessary in excess of charges, for depreciation, for amortization of loans, and an amount that would allow a return equivalent to 9% on capital stock. As regards the system intertie, the operating expenses and finance charges would be allocated among the company's shareholders;
- ii) the bases for calculating operating costs are shown in Appendix U;
- iii) the funds for financing investments in local currency for the project under study and for Chivor I would be derived mainly from the local counterpart to the proposed IDB loan, by means of contributions from shareholders to the extent of 40% for capital and 60% for issuance of bonds to be acquired by the shareholders themselves in proportion to the capacity assigned to them in the new generating plant;
- iv) the funds to finance the investments in foreign currency would be derived mainly from the following external sources: (a) for Chivor II, whose total cost is estimated at US\$111.5 million, the proposed Bank loan for US\$48.5 million and supplier financing of US\$23.6 million; (b) for Chivor I, balance of the IDB loan for the equivalent of US\$36.0 million; balance of the World Bank loan 681/CO for US\$34.9 million, and other financing in an amount equivalent to US\$8.8 million; and (c) for the System Intertie and Studies: the balance of World Bank loan 575/OC for US\$5.8 million; FONADE for the equivalent of US\$5.8 million; ICEL for the equivalent of US\$2.5 million, and the balance of loans from Swiss Banks for the equivalent of US\$0.15 million;
- v) the calculation of debt service on the Chivor II Project was based on the following terms:

Sources	Total Period	Grace Period	Interest Rate
IDB Loan	20 years	5 years	8%
Supplier Financing	13-1/2 years <u>1/</u>	3-1/2 years <u>1/</u>	8% <u>1/</u>
Chivor II Bonds	28 years	5 years	9%

5.27 The conclusions shown in the financial projections indicate that the Chivor Project (I and II) would be feasible from the financial point of view and the company's financial condition would be acceptable during the period projected. This conclusion is based on the following results:

- i) The rate of return on fixed investment in the corporation's power stations (Chivor I and II) would range from 6.77% to 1975, and to 9.90% in 1982. This is considered to be a reasonable return and in compliance with the rate clause of the contract with the Bank (during 1975 to 1977 the return will be somewhat less because the Chivor power station would be operating below maximum capacity during that time).
- ii) the operating ratio 2/ of the corporation, when Chivor enters service would range from 3.5% in 1975 to 5.7% in 1982, and considered to be quite satisfactory;
- iii) the debt coverage ratio of ISA's power stations, that would range from 1.5 in 1975 and 1.2 in 1982, is also considered to be satisfactory;
- iv) the company's current ratio would be 1.25 in 1973 and would reach 1.9 in 1982, which is also considered to be reasonable;
- v) the company's debt ratio, which would be 3.25 in 1973, would move to a higher level from 1974 to 1975 as a result of the disbursements of the proposed loans, reaching 3.5 in 1975, and gradually improving from that year on until it reached an acceptable ratio of 1.9 in 1982;
- vi) the company's working capital net is also considered to be satisfactory;
- vii) the net operating revenue of the proposed project would be acceptable both in absolute and in relative terms; and
- viii) the net worth structure would be adequate (for a summary of financial data and ratios see Appendix V).

1/ Average

2/ Operating expenses, before charges for depreciation, as a percentage of operating revenue from sales.

- 5.28 The company's net fixed assets would increase by 433% over the period 1973 to 1982, reaching US\$64.6 million at the beginning of 1973 and US\$279.5 million at the end of 1982. Over that same period of time, capitalization would also increase by 433%, starting from US\$69.5 million at the beginning of 1973 and reaching US\$301.3 million at the end of 1982. The existing relationship between net fixed assets and capitalization is considered to be adequate.
- 5.29 The funds needed to finance investments in local currency for the proposed project would come from the shareholders who would contribute these funds as capital and bond purchases, which were lumped together under the category "other domestic sources", in the forecast of the Statement of Source and Application of ISA Resources (see Appendix S). The following table lists the participation that would be necessary for each one of the ISA shareholders to comply with these requirements for funds and also to complete their contributions to Chivor I: 1/

(equivalent to millions of US\$)

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>TOTAL</u>
EEEEB	9,58	11,42	8,40	5,45	6,23	6,20	2,07	49,35
EPM	3,82	4,22	2,66	1,58	1,59	1,57	0,83	16,27
CVC	2,67	3,05	2,06	1,52	1,59	1,57	0,83	13,29
ICEL	5,95	6,40	3,85	1,81	1,77	1,73	0,88	22,39

1/ See Appendix W for more information.

- 5.30 Based on the financial projections prepared by EEEB and EPM (see Appendix X) deficits are posted in some years of the project. The reason for this is that the amounts originally estimated for Chivor I and Chivor II are less than the amounts which were presently estimated on the basis of increases in costs during the first stage of this project and a better definition of the total cost of the proposed project as a result of the Bank's analysis. Nevertheless, these companies posted surpluses at the end of 1972 in the amount of US\$2.78 million equivalent in the case of EEEB and US\$3.42 million in the case of EPM, with which the annual and accrued surpluses or deficits (in brackets) of those shareholders during the project period would be as follows:

(in the equivalent of millions of US\$)

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
<u>EEEB</u>							
Annual	(4.10)	(2.10)	2.61	6.41	4.37	13.59	24.59
Cumulative	(1.32)	(3.42)	(0.81)	5.60	9.97	23.56	48.15
<u>EPM</u>							
Annual	(1.42)	(2.09)	(1.00)	(0.76)	6.49	0.42	5.82
Accrued	2.00	(0.09)	(1.09)	(1.85)	4.64	5.06	10.88

- 5.31 The deficits indicated above can be covered through intermediate-term bank loans, by rate increases, or by an increase in the capital stock of the companies. Bearing in mind that the amount of deficit is not significant, no problems are anticipated in terms of resources for these companies. It is worth repeating that the by-laws provide that members of ISA are obliged to provide the contributions necessary to meet requirements in domestic currency for expansion of the energy generating system. Furthermore, the shareholders did specifically approve the Chivor II Project. The shareholders have thus obligated themselves to provide the local resources for that project. It is recommended that before the proposed loan contract is signed ISA should submit a copy of the shareholders' resolution to the Bank.
- 5.32 It is believed that the EEEB and EPM deficits do not reflect any problem in the financial condition or financial management of said companies, but rather these deficits are the result of the size of their investment programs. To the contrary, both institutions are generally speaking generating sufficient internal resources to cover their own needs as well as the necessary contributions to ISA. This can be seen from the fact that the revenue produced by their rates is covering not only all of their operating costs and amortization of their debts, but is also yielding an acceptable rate of return which is greater than 9% per annum.

- 5.33 The situation of CVC and ICEL differs from that of EEEB and EPM. This difference is due to the fact that CVC depends to a large extent on contributions from the government to cover both its own needs for funds and those of ISA, and the ICEL depends completely on government contributions to meet these needs. In contrast to ICEL, CVC generates internal resources which cover at least part of these requirements. However, in view of the deficits indicated in the projections in Appendix X, it may be concluded that for practical purposes these two companies would have to resort to the government to obtain the resources they must contribute to ISA. These contributions can be summarized as follows:

(in the equivalent of millions of US\$)

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
Government allotments to CVC and ICEL for their contributions to ISA	8,62	9,45	5,91	3,33	3,36	3,30	1,71

It is therefore recommended that, as a condition precedent to the signing the proposed loan contract, the Government should agree to include in the investment programs of the National Budget such items as may be necessary for these two companies to make the contributions.

- 5.34 It is believed that these allotments would offer no problem for the Government, since they would represent relatively small amounts within the overall national investment budget. Compared to the Budget for 1972 (the equivalent of US\$380 million), for example, these contributions would represent only 2.3% in 1973, 2.5% in 1974, 1.6% in 1975, 0.9% in 1976, 1977 and 1978, and 0.5% in 1979. Furthermore, as regards ICEL in particular which, as has been indicated, depends completely on the Government for its financing, 1/ the contributions which the Government would have to provide so that this shareholder could in turn contribute to ISA, would be in keeping with the trend of the last three years during which time the Government increased its contribution to ICEL for these purposes by more than 100%: from the equivalent of US\$1.2 million in 1970 to the equivalent of US\$2.9 million in 1972. As estimated, this contribution would have to be doubled in 1973 to the equivalent of US\$5.95 million, would remain at a similar level in 1974 with a contribution equivalent to US\$6.40 million, and then would drop substantially in the following years.

1/ According to its By-Laws ICEL does not generate internal resources to invest in or contribute to ISA.

- 5.35 It should also be pointed out that, by means of Resolution 51 of the Monetary Board, the Government agreed to grant credit to several electric utilities in the total amount equivalent to US\$40 million for debt refinancing. These loans would be granted for a period of 10 years, including a grace period of 3 years, at an interest rate of 7% per annum. Out of that total amount it has been provided that CVC would receive the equivalent of US\$10 million and ICEL could receive up to US\$20 million. The effect of these credits would be to release resources from these companies so that they could, among other things, make their appropriate contributions to ISA.
- 5.36 The reason why ICEL has to resort to the national budget is that this company supplies electric energy to rural sectors and relatively less developed areas of the country, where lower rates are charged than those in the main cities such as Bogotá and Medellín. The Government has made known its intention to approve increases in rates for ICEL and its affiliated companies to produce a rate of return of 6.0% per annum starting in 1975, but at the present time these rates are still at a low level.
- 5.37 The reason for the deficit situation of CVC is, first of all, that the Alto Anchicayá power station has not yet started to operate (it would eventually generate substantial revenue); secondly, because it has been difficult to increase the rates for this company owing to the fact that its Board of Directors, which has authority over this matter, includes two members with effective veto power, who represent the largest consumer of electric energy. Consequently, they have not been willing to approve the necessary rate increases, and so, the rates do not generate sufficient funds to enable this company to expand its generating facilities, make its contributions to ISA and thus comply with complementary requirements. 1/
- 5.38 In conclusion, and bearing in mind the considerations and steps indicated above, it is believed that ISA will soon have sufficient resources to be able to make the contributions necessary within the financial plan of the proposed project.

1/ According to the provision in loan contracts 175/OC-00 and 13/CD-00 for the partial financing of Alto Anchicayá Project, the rates charged by CVC should generate sufficient funds to cover its operating expenses and the amortization of its debt, and produce a rate of return of 9% per annum on fixed investment starting in 1975 when the hydroelectric power station will start to operate. The borrower and the guarantor are aware of the need to increase their rates to comply with this condition whenever necessary.

VI. RECOMMENDATIONS

- 6.01 As a result of the Bank's evaluation of the ISA project summarized herein for construction of the second stage of the Chivor Hydroelectric plant and installation of an operational communications and control system, and in view of the conclusions set forth in this document, it is recommended that a loan for the equivalent of US\$48,500,000 be granted to Interconexión Eléctrica S.A. (ISA), with the guarantee of the Republic of Colombia, from the ordinary capital resources of the Bank, for partial financing of the external and local costs of that project. The loan would have a term of 20 years, with the first installment of principal payable 5-1/2 years from the date of the loan contract, interest at 8% per annum (including the 1% special commission of the Bank) and a commitment fee of 1-1/4% per annum. The loan would be disbursed over a period of five years.
- 6.02 It is also recommended that, in addition to the standard contractual clauses, there be included in the loan and guarantee contracts, as appropriate, and in the resolution the following special conditions, to be fulfilled to the satisfaction of the Bank:
- (a) Prior to the signing of the loan contract, the borrower shall present to the Bank: (i) evidence that the shareholders of ISA have committed themselves to providing the amounts they are to contribute for the project; (ii) evidence that the Government has committed itself to make such contributions to CVC and to ICEL as necessary to enable them to make the necessary contribution for the project; and (iii) evidence that there is a favorable disposition on the part of institutions of industrialized countries to financing the generators, turbines, transformers and sheathing for the penstock under appropriate conditions (see Resolution, paragraph 8 (c)).
 - (b) Prior to the first disbursement from the loan, the borrower shall present proof to the Bank that it has contracted the consulting firms for the engineering work and technical supervision of the project. (See Resolution, paragraph 8 (d)).
 - (c) The borrower shall demonstrate to the Bank that it has reached a decision with respect to the firms that will supply the machinery and equipment mentioned below in accordance with the following schedule. In addition, the borrower shall present to the Bank detailed information on the financing it proposes to contract under satisfactory conditions for such procurement.
 - (i) Within 18 months of the date of signature of the loan contract: turbines and generators;
 - (ii) Within 24 months of the date of signature of the loan contract: sheathing for the pressure tunnel; and

(iii) Within 28 months of the date of signature of the loan contract: transformers. (See Resolution, paragraph 8 (e)).

- (d) Within 12 months of the date of the contract, the borrower shall present to the Bank a study of the impact that ISA's application of rates yielding a reasonable return on the entirety of its system would have on the rate system and generation of resources of ISA and its shareholders. (See Resolution, paragraph 8 (f)).
- (e) The Bank may utilize up to the equivalent of US\$255,000 of the resources of the loan invested in the project for engineering services prior to the date of signature of the loan contract, but subsequent to the date of the loan application, that is, to July 6, 1973. (See Resolution, paragraph 8 (g)).
- (f) In order to declare or pay dividends, in a form other than its own shares, the borrower shall have fulfilled the requirements normally applied by the Bank in these cases. (See Resolution, paragraph 8 (h)).
- (g) Except with prior approval at the Bank, the borrower shall not acquire or redeem any of its outstanding stock, or distribute any part of its capital. (See Resolution, paragraph 8 (i)).
- (h) The borrower and the guarantor shall take appropriate measures in order that the rates for the sale of electric energy of the generating system of the borrower produce revenues at least sufficient to cover all operating expenses of the system and timely amortization of all the obligations of the borrower and yield a reasonable return estimated, at 9% per annum. (See paragraph 8 (j) of Resolution and paragraph VII of Appendix A, Description of Project).
- (i) Although the normal policies of the Bank will apply to the acquisition of machinery, equipment and other materials for the project, the Bank may waive the requirement for use of the public bidding system with respect to the acquisition of the equipment for the modification of turbine regulators provided that the borrower so requests, gives the reasons and states the procedures it plans to utilize. (See paragraph 8 (1) of Resolution and paragraph V of Appendix A, Description of Project).

6.03 It is further recommended that, in addition to the conditions mentioned in paragraph 6.02, there be included in the loan and guarantee contracts, as appropriate, the following conditions, to be performed to the satisfaction of the Bank:

- (a) Prior to the first disbursement from the loan, the borrower shall present to the Bank: (i) a communication in which the competent authorities of Colombia express their intention to grant such import permit as may be necessary for the acquisition abroad of the goods and services, payable in foreign exchange, required for execution

of the project; (ii) proof that the loan contract has been registered in the appropriate exchange registry office of the Government of Colombia; and (iii) evidence of having contracted individual consultants, acceptable to the Bank, to advise the borrower in the fields of geology, soil mechanics and hydroelectric works engineering, in accordance with the terms of reference approved by the Bank.

- (b) Within 12 months of the date of signature of the contract, the borrower shall submit to the Bank: (i) a plan for strengthening of its Subgerencia Técnica, including the pertinent program of implementation to enable it to meet the technical requirements of the borrower; and (ii) the internal audit program which the borrower may be using.
 - (c) Within 24 months of the date of signature of the contract, the borrower shall obtain the concessions and/or permits and/or easements as they are needed for laying the transmission lines.
 - (d) The Bank may recognize as part of the local contribution to the financing of the project, expenditures, other than those called for in clause 8 (g) of the Resolution, up to the equivalent of US\$355,000, incurred by the borrower for the payment of local costs of engineering services and interest on bonds prior to the date of the contract, but subsequent to July 6, 1973, provided that requirements substantially similar to those set forth in the resolution and in the loan contract have been fulfilled.
- 6.04 The loan contract shall contain provisions as to the manner in which the financial statements of the borrower and of the project are to be audited, taking into account the provisions of paragraph 5.13 of this document.
- 6.05 An annex substantially similar in content to Appendix A (Description of Project) of this document shall be included in the loan contract.
- 6.06 An amount of US\$485,000 of the resources of the loan shall be used to cover the commission of the Bank for general inspection and supervision.

DESCRIPTION OF PROJECT

(Annex B to Loan Contract)

I. Objective

The main objective of the project is to expand and supplement the first stage of the construction of the Chivor Hydroelectric Plant to increase the total capacity to 1,000 MW, and to install a new operational communications and control system for the electrical interconnection networks of ISA so as to achieve a more economical and efficient operation of that network.

II. Description of Project

The project will be constituted approximately as follows:

- (a) Headrace: ^{1/} A tunnel 5,325 meters long from the valve chamber to the penstock, with a diameter of 5.4 meters, partly U-shaped and partly round, and concrete-lined throughout. The installation of the section between the intake and the valve chamber, and of the latter itself, will be done as part of the first stage. It is estimated that about 160,000 cubic meters of rock will have to be excavated and about 33,000 cubic meters of concrete put in place for construction of the tunnel. Two access openings, one 200 meters and the other 300 meters long, will be required for construction of the tunnel.
- (b) Surge tank: ^{1/} Will be located 280 meters from the shaft of the penstock and will consist of a vertical shaft 135 meters high with two horizontal chambers, upper and lower, the latter connected to the transmission tunnel by a vertical shaft. The necessary excavation is estimated at some 13,600 cubic meters.
- (c) Pressure pipe: ^{1/} Will be underground throughout, consisting of a vertical shaft some 240 meters deep followed by an inclined tunnel with a 10% grade ending at the distributor for the four turbines. The shaft, with a diameter of 5 meters, will be lined with reinforced concrete, and the tunnel, with a total length of 2,115 meters, will be lined with reinforced concrete in its first section and sheathed thereafter, with a 5.0 meter cross section in the concrete-lined section and a 3.9 meter cross section in the sheathed section. It is estimated that 55,000 cubic meters will have to be excavated and 24,600 cubic meters of concrete put in place.

^{1/} Parallel to the works being constructed in the first stage.

- (d) Powerhouse and step-up substation: The portion of the powerhouse corresponding to the second stage includes the following principal equipment:

- four 173,000 HP, 6-jet, 450 RPM Pelton turbines
- four 125,000 KW generators, 13.8 KV - 2,000 tm² - 60 Hz
- 4 banks of single-phase transformers, 3 x 54 MVA - 13.8/230 KV

The switchyard will consist of seven modules, four for the generating units, two for the line outlets to Torca and one for a future outlet.

- (e) 230 KV transmission line: This dual circuit line will connect Chivor with the Torca substation at Bogotá, will have a length of 105 kilometers and will be mounted on metal towers with 1,350 MCM ACSR conductors.
- (f) Torca substation: Expansion of this substation for the second stage includes two modules for the reception lines, two modules for the power transformers and two banks of transformers (230/115 KV 3 x 56 MVA) to feed the EEEB system.
- (g) Dispatch center and telecommunications system: These works would include: (i) construction and equipping of a new National Dispatch Center; (ii) construction and equipping of two Regional Centers for Operation of System, the first of which will be located in Bogotá in the same building as the National Center, and the second at Manizales, the latter to consist basically of an expansion and modernization of the present ISA Dispatching Facility in that city; and (iii) improvements and expansions to the present telecommunications network, including the telephony, telex, radio, telemetry and remote control system.

III. Total Cost and Financing of Project

The total cost of the project, has been estimated at the equivalent of US\$111,483,000, which will be financed approximately as indicated in the following table:

(in thousands of US\$ or equivalent)

	IDB Foreign Exchange	Parallel Financ- ing 1/		ISA Local Currency	Total
		Foreign Exchange	Foreign Exchange		
1. Engineering and Administration					
1.1 Engineering and Administration	2.573	-	-	3.744	6.317
1.2 Administration and General Expenses	-	-	-	750	750
Total Category 1	2.573	-	-	4.494	7.067
2. Direct Construction Cost					
2.1 General Plant and step-up substation					
2.11 Tunnel and surge tank					
2.111 Civil works	8.972	-	-	5.091	14.063
2.112 Equipment	45	-	-	9	54
2.12 Piping and distribution					
2.121 Civil works	4.553	-	-	2.357	7.090
2.122 Equipment	-	5.052	893	1.765	7.710
2.13 Powerhouse					
2.131 Civil works	878	-	-	1.318	2.196
2.132 Mechanical equipment	416	6.131	1.082	539	8.168
2.133 Electric equipment	1.830	5.837	1.029	613	9.309
2.14 Switchyard					
2.141 Civil works	25	-	-	148	173
2.142 Equipment	713	-	-	75	788
Total Subcategory 2.1	17.432	17.020	3.004	12.095	49.551
2.2 Transmission System					
2.21 230 KV line					
2.211 Construction	352	-	-	528	880
2.212 Materials	2.878	-	-	125	3.003
2.22 Torca substation					
2.221 Civil works	9	-	-	51	60
2.222 Equipment	547	913	161	114	1.735
Total Subcategory 2.2	3.786	913	161	818	5.678
2.3 Communications System					
2.31 Telecommunications equipment	1.947	-	-	79	2.026
2.32 Dispatch centers	2.766	-	-	113	2.876
2.33 Adjustment of turbine regulators	678	-	-	27	705
Total Subcategory 2.3	5.391	-	-	219	5.610
Total Category 2	26.609	17.933	3.165	13.132	60.839
3. Financing Costs					
3.1 Interest on IDB loan	8.881	-	-	-	8.881
3.2 Interest on suppliers' loan	-	-	4.483	-	4.483
3.3 Commitment fee	-	-	2.275	-	2.275
3.4 Inspection and supervision	485	-	-	-	485
3.5 Interest on bonds	-	-	-	4.296	4.296
Total Category 3	9.366	-	6.758	4.296	20.420
4. Not Specifically Assigned	9.952	5.680	481	7.044	23.157
TOTAL	48.500	23.613	10.404	28.966	111.483
Percentages	(43,5)	(21,2)	(9,3)	(26,0)	(100,0)

1/ Credit from suppliers and/or export-finance institutions.

IV. Origin and Use of Currency

The origin and use of currency for the financing of the project will be approximately as follows:

(In thousands of US\$ or equivalent)

	<u>Currency of Origin</u>		<u>Use of Funds</u>		<u>Total</u>	<u>%</u>
	<u>Foreign Currency</u>	<u>Local Currency</u>	<u>Foreign ex-change costs</u>	<u>Local Currency costs</u>		
IDB	48.500	-	48.500	-	48.500	43,5
Suppliers	23.613	-	23.613	-	23.613	21,2
ISA	-	39.370	10.404 ^{1/}	28.966	39.370	35,3
Total	<u>72.113</u>	<u>39.370</u>	<u>82.517</u>	<u>28.966</u>	<u>111.483</u>	<u>100,0</u>
Percentages	(64,7)	(35,3)	(74,0)	(26,0)	(100,0)	

V. Bidding Requirements

When the goods and services to be acquired through public bidding are to be financed in whole or in part with resources from the loan, the pertinent bidding procedures and specific bidding requirements shall permit unrestricted participation of bidders which are nationals or residents of countries which are eligible under such eligibility rules as may apply to use of the resources from which the loan was made, with the exception of the equipment for the modification of the turbine regulators, for the acquisition of which the Bank may waive the requirement that the system of public bidding be applied, provided that the provisions to be set forth in the loan contract are fulfilled to its satisfaction. Consequently, such procedures and/or specific requirements shall contain no conditions which may preclude or restrict the participation of such bidders.

^{1/} Exclusively for direct costs in foreign exchange.

VI. Selection and Contracting of Consulting Firms

In the selection and contracting of consulting firms for the project, the procedures set forth in section of the loan contract shall be followed, with the understanding that the borrower shall not establish, for application either before or after the rendering of services: (i) provisions or conditions precluding or restricting the selection and contracting of such consulting firms of member countries of the Bank; or (ii) requirements or conditions based on the nationality of such firms.

VII. Tariffs and Minimum Rates of Return

By virtue of the objectives set forth in section of the loan contract, the rate schedule for the provision of electricity of the specific system covered by the loan to Interconexión Eléctrica, S. A. (ISA) shall be so structured as to yield a rate of return of at least 9% per year on net utility investment.

APPENDIX B

PROPOSED RESOLUTION

COLOMBIA. LOAN TO INTERCONEXION ELECTRICA, S. A.
(Construction of the Second Stage of the CHIVOR Hydroelectric Power Plant
and Installation of an Operational Communications and Control System)

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with Interconexión Eléctrica, S. A., as borrower, and the Republic of Colombia, as guarantor, for the purpose of granting the former a loan to cooperate in the financing of a project for construction of the second stage of the CHIVOR Hydroelectric Power Plant and installation of an operational communications and control system. This loan shall be subject substantially to the following conditions:

1. Amount and Currencies: Up to US\$48,500,000 or the equivalent in other currencies (except that of Colombia) which are part of the ordinary capital resources of the Bank, to be disbursed to pay for goods and services acquired through international competition and for such other purposes as shall be specified in the loan contract. Payments of amortization and interest shall be effected proportionately in the currencies disbursed.
2. Source of Funds: The ordinary capital resources of the Bank.
3. Guarantee: Full guarantee of the Republic of Colombia.
4. Commitment Fee: 1-1/4% per annum on the undisbursed portion of the loan, commencing to accrue 60 days after the date of the contract and payable in United States dollars on the same dates as interest.
5. Amortization: The borrower shall amortize the loan in a period of 20 years from the date of the contract, by means of 30 consecutive, semiannual, and as so far as possible, equal installments. The first installment shall be paid 5-1/2 years after such date.
6. Interest: 8% per annum (including the 1% special commission of the Bank), payable semiannually on principal amounts outstanding. The first payment shall be made 6 months after the date of the contract. At the request of the borrower, the loan **resources** may be used to pay interest on the loan during the period of disbursement thereof.

7. Disbursement: Total disbursement of the loan shall be made within a period of 5 years after the date of the contract.
8. Special Conditions:
- (a) The resources of the loan shall be utilized in their entirety by the borrower. If modifications in the legal provisions or in basic regulations concerning the borrower are approved which, in the opinion of the Bank, may substantially affect the project, the Bank may take such measures as it deems appropriate in accordance with provisions to be set forth in the loan contract.
 - (b) The loan shall be used to participate in the financing of a project estimated at the equivalent of US\$111,485,000 and in no case shall the participation of the resources of the loan exceed 43.5% of the total amount of such project. Consequently, the loan contract shall contain such provisions as the Bank deems appropriate to ensure that such resources as may be necessary, in addition to the loan, for the complete execution of the project shall be duly provided in an amount estimated at the equivalent of US\$62,983,000, in accordance with a schedule of investments satisfactory to the Bank.
 - (c) Prior to the signing of the loan contract, the borrower shall present to the Bank's satisfaction:
 - (i) the minutes of the Asamblea de Accionistas of the borrower in which the shareholders commit themselves to provide to the borrower, in accordance with the Statutes of that entity and with a financing plan and investment schedule which are acceptable to the Bank, the equivalent of at least US\$28,996,000 for the financing of the local costs;
 - (ii) evidence that the guarantor has committed itself to include in the investment programs of the National Budget such amounts as may be necessary so that the Corporación Autónoma Regional Eléctrica (ICEL) will be able to make the contributions required for the project;
 - (iii) evidence that there is a favorable disposition on the part of industrialized countries toward financing the generators, turbines, transformers and sheathing for the penstock under satisfactory conditions.

- (d) Prior to the first disbursement from the loan, the borrower shall present proof to the Bank's satisfaction that it has contracted two or more firms of consulting engineers acceptable to the Bank, to cooperate in the engineering work and in the administration and technical supervision of construction of the second stage of the Chivor hydroelectric plant and of the installation of the operational communications and control system, respectively.
- (e) The borrower shall demonstrate to the Bank that it has reached a decision with respect to the firms that will supply the machinery and equipment mentioned below in accordance with the following schedule. In addition, the borrower shall present to the Bank detailed information on the financing of purposes to contract under satisfactory conditions for such procurement:
 - (i) within 18 months of the date of signature of the loan contract: turbines and generators;
 - (ii) within 24 months of the date of signature of the loan contract: sheathing for the pressure tunnel; and
 - (iii) within 28 months of the date of signature of the loan contract: transformers.
- (f) Within 12 months of the date of the loan contract, the borrower shall present to the Bank a study, in accordance with terms of reference previously approved by the Bank, demonstrating the impact that the borrower's applying rates yielding a reasonable return on the entire net utility investment in its system, including the interconnected network, would have on the rate system and the generation of resources by the borrower and its shareholders as well as the possible amendments to the Statutes of the borrower and its shareholders to permit such rates.
- (g) The Bank may reimburse from the resources of the loan up to the equivalent of US\$255,000 invested in the project for engineering services prior to the date of signature of the loan contract, but subsequent to July 6, 1973, provided that requirements substantially similar to those laid down in the loan contract have been fulfilled.
- (h) In order to declare or pay dividends, in a form other than its own shares, the borrower shall have fulfilled the following requirements, except with the previous authorization of the Bank:
 - (i) that it shall be up to date in compliance with all its obligations to the Bank;
 - (ii) that it shall be able to establish that it will have available adequate funds to fulfill its obligations falling due within the following 12 months;

- (iii) that after deducting the amounts representing the declaration or payment of dividends, its current assets at the close of each fiscal year shall be not less than 120% of its current liabilities; and
 - (iv) that it shall not use for payment of cash dividends more than 50% of its net earnings accumulated after December 31, 1979; but the payment of dividends representing a percentage greater than 50% shall be permitted, provided the borrower shall have applied to the prepayment of the remaining installments of principal of the loan an amount equivalent to the amount of dividends to be distributed in excess of such percentage.
- (i) Except with prior approval of the Bank the borrower shall not acquire or redeem any of its outstanding stock, or distribute any part of its capital.
- (j) The borrower and the guarantor shall take appropriate measures acceptable to the Bank in order that the rates for the sale of electric energy of the generating system of the borrower: (i) produce revenues at least sufficient to cover all operating expenses of the system, including those related to operation, maintenance, administration and depreciation; (ii) yield a reasonable return on the net utility investment in the system; and (iii) if the flow of funds available from the foregoing is not sufficient to cover the timely amortization of all the obligations of the borrower, generate such additional sums as shall be needed for this purpose.
- (k) In the acquisition of machinery, equipment and other materials for the project and in the awarding of construction contracts, the system of public bids shall be followed in each case in which the value of such acquisition or contracts exceeds the equivalent of US\$50,000. The bidding procedures shall be based on the applicable laws of the Republic of Colombia, provided that the specific bidding requirements shall be subject to conditions acceptable to the Bank, consistent with its policies and the purposes of the loan.
- (l) The provisions of subparagraph 8 (k) above notwithstanding, the Bank may waive the requirement for use of the public bidding system with respect to the acquisition of the equipment for the modification of turbine regulators indicated in the loan contract, for a total of approximately US\$900,000, provided that the borrower so requests, gives the reasons and states the procedures, which shall be consistent with the purposes of the loan.

- (m) The Bank shall establish such inspection procedures as it deems necessary to assure the satisfactory execution of the project, and the debtor and the gurantor shall extend all cooperation which is required for the most effective accomplishment of this purpose. The contract shall establish the amount of the resources of the loan that shall be used to cover the costs of inspection and supervision by the Bank.

BALANCE ANUAL DE ENERGIA Y POTENCIA - SISTEMA INTERCONECTADO

		1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
EEEB											
Producción requerida	(GWH)	2 856	3 198	3 581	4 017	4 478	4 975	5 491	6 040	6 644	7 299
Energía generable	(GWH)	3 308	3 435	3 689	3 689	4 633	4 633	4 633	4 633	4 633	4 633
Excedente(déficit)	(GWH)	452	237	108	(328)	155	(342)	(858)	(1 407)	(2 011)	(2 666)
Demanda máxima	(MW)	603	678	762	857	961	1 071	1 185	1 307	1 440	1 591
Capacidad disponible ^{1/}	(MW)	609	672	672	672	672	672	672	672	672	672
Excedente (déficit)	(MW)	6	(6)	(90)	(185)	(289)	(399)	(513)	(635)	(768)	(919)
EEPM											
Producción requerida	(GWH)	2 555	2 865	3 124	3 665	4 645	5 009	5 355	5 714	6 127	6 625
Energía generable	(GWH)	3 907	3 884	3 884	3 884	3 884	4 386	4 748	4 748	4 748	4 748
Excedente (déficit)	(GWH)	1 352	1 019	760	219	(761)	(623)	(607)	(966)	(1 379)	(1 877)
Demanda máxima	(MW)	489	548	596	773	829	901	962	1 035	1 114	1 207
Capacidad disponible	(MW)	681	681	681	681	681	947	947	947	947	947
Excedente (déficit)	(MW)	192	133	85	(92)	(148)	46	(15)	(88)	(167)	(260)
CVC/CHIDRAL											
Producción requerida	(GWH)	1 531	1 660	1 798	1 942	2 107	2 275	2 464	2 672	2 896	3 140
Energía generable	(GWH)	869	1 017	2 224	2 398	2 398	2 398	2 398	2 398	2 398	2 398
Excedente (déficit)	(GWH)	(662)	(643)	426	456	291	123	(66)	(274)	(498)	(742)
Demanda máxima	(MW)	304	329	355	385	417	453	488	528	571	618
Capacidad disponible	(MW)	234	336	540	540	540	540	540	540	540	540
Excedente (déficit)	(MW)	(70)	7	185	155	123	87	52	12	(31)	(78)
CHEC											
Producción requerida	(GWH)	557	602	653	707	768	831	900	973	1 055	1 142
Energía generable	(GWH)	720	720	720	720	720	720	720	720	720	720
Excedente (déficit)	(GWH)	163	118	67	13	(48)	(111)	(180)	(253)	(335)	(422)
Demanda máxima	(MW)	126	135	146	158	171	185	200	216	234	252
Capacidad disponible	(MW)	198	198	198	198	198	198	198	198	198	198
Excedente (déficit)	(MW)	72	63	52	40	27	13	(2)	(18)	(36)	(54)
NORDESTE											
Producción requerida	(GWH)	1 128	1 272	1 438	1 712	1 860	1 986	2 105	2 232	2 374	2 530
Energía generable	(GWH)	1 348	1 348	2 008	2 212	2 212	2 212	2 212	2 212	2 212	2 212
Excedente (déficit)	(GWH)	220	76	570	500	352	226	107	(20)	(162)	(318)
Demanda máxima	(MW)	214	250	270	324	349	375	401	428	457	492
Capacidad disponible	(MW)	208	208	334	334	334	334	334	334	334	334
Excedente (déficit)	(MW)	(6)	(42)	64	10	(15)	(41)	(67)	(94)	(123)	(158)
CEDELCA-CEDENAR											
Producción requerida	(GWH)	206	231	259	289	323	355	391	426	473	523
Energía generable	(GWH)	181	244	291	291	291	291	291	291	291	291
Excedente (déficit)	(GWH)	(25)	13	32	2	(32)	(64)	(100)	(137)	(182)	(232)
Demanda máxima	(MW)	47	51	56	62	68	74	81	89	97	107
Capacidad disponible	(MW)	38	62	62	62	62	62	62	62	62	62
Excedente (déficit)	(MW)	(9)	11	6	-	(6)	(12)	(19)	(27)	(35)	(45)
ELECTROLIMA-ELECTROHUILA											
Producción requerida	(GWH)	251	283	318	353	393	434	478	524	577	638
Energía generable	(GWH)	215	295	295	295	295	295	295	295	295	295
Excedente (déficit)	(GWH)	(36)	12	(23)	(58)	(98)	(139)	(183)	(229)	(282)	(343)
Demanda máxima	(MW)	55	60	66	72	80	87	95	104	114	126
Capacidad disponible	(MW)	72	72	72	72	72	72	72	72	72	72
Excedente (déficit)	(MW)	17	12	6	-	(8)	(15)	(23)	(32)	(42)	(54)
SISTEMA TOTAL											
Producción requerida sistema	(GWH)	9 084	10 111	11 171	12 685	14 574	15 865	17 184	18 583	20 146	21 897
Demanda máxima requerida sistema (con diversificación 2.5%)	(MW)	1 792	2 000	2 195	2 565	2 803	3 067	3 327	3 614	3 926	4 283

^{1/} La capacidad disponible de cada sistema se estima en un 90% de la capacidad instalada a efectos de contar con una reserva giratoria del 10%.

PROYECCIONES DE LA ENERGIA A SUMINISTRADA POR ISA (GWH)

	1975	1976	1977	1978	1979	1980	1981	1982
<u>EEEB</u>								
<u>Deficit</u>	43	328	366	586	871	1 407	2 011	2 666
Reducción 50% energía térmica	148	356	201	356	356	356	356	356
	191	684	567	942	1 227	1 763	2 367	3 022
<u>EEPM</u>								
<u>Deficit</u>	-	52	761	623	607	966	1 379	1 877
Reducción 50% energía térmica	-	-	-	-	-	-	-	-
	-	52	761	623	607	966	1 379	1 877
<u>CVC/CHIDRAL</u>								
<u>Deficit</u>	-	-	-	-	66	274	498	742
Reducción 50% energía térmica	-	-	-	63	147	147	147	147
	-	-	-	63	213	421	645	889
<u>CHEC</u>								
<u>Deficit</u>	-	-	48	111	180	253	335	422
Reducción 50% energía térmica	-	-	-	-	-	-	-	-
	-	-	48	111	180	253	335	422
<u>NORDESTE</u>								
<u>Deficit</u>	-	-	9	26	57	146	245	365
Reducción 50% energía térmica	185	576	724	850	921	972	1 030	1 076
	185	576	733	876	978	1 118	1 275	1 441
<u>CEDELCA/CEDENAR</u>								
<u>Deficit</u>	-	-	-	-	100	137	182	232
Reducción 50% energía térmica	-	-	-	50	9	9	9	9
	-	-	-	50	109	146	191	241
<u>ELECTROLIMA/ELECTROHUTLA</u>								
<u>Deficit</u>	12	58	98	139	183	229	282	343
Reducción 50% energía térmica	12	22	22	22	22	22	22	22
	24	80	120	161	205	251	304	365
Producción requerida en S.E. receptoras	406	1 413	2 262	2 868	3 572	4 992	6 593	8 381
Energía generable ISA	800	3 205	3 205	3 205	3 405	5 377	7 067	7 404
Excedente (Deficit)	394	1 792	943	337	(167)2/	385	474	(977)2/

1/ El calculo del deficit agregado de energia hizose semestralmente teniendo en cuenta los siguientes conceptos:
 - En caso de no existir deficit de energia, pero si de potencia, este se traduce en un deficit de energia utilizando la curva de carga integrada del sistema.
 - En caso de existir deficits de potencia y energia, se traduce el primero en deficit de energia y se toma el mayor.
 2/ De producirse estos deficits, los mismos serian cubiertos por aumento de la generacion termica.

PROYECCIONES DE LA POTENCIA PICO A SER SUMINISTRADA POR ISA (MW)

	1975	1976	1977	1978	1979	1980	1981	1982
<u>HEEB</u> Deficit	90	185	289	399	513	635	768	919
<u>FERM</u> Deficit	-	92	148	-	15	98	167	260
<u>CVC/CHIDRAL</u> Deficit	-	-	-	-	-	-	31	78
<u>CHEC</u> Deficit	-	-	-	-	2	18	36	54
<u>NORDESTE</u> Deficit	-	-	15	41	67	94	23	158
<u>CEDELCA-CEPENAR</u> Deficit	-	-	6	12	19	27	35	45
<u>TOJIMA-HUJIA</u> Deficit	-	-	2	15	23	32	42	54
Total con diversificación de 2.5% Capacidad firme ISA	90 460	270 460	458 460	455 460	623 920	882 1 518	1 074 1 518	1 529 2 076
Excedente (Déficit)	370	190	2	5	297	636	444	547

UPEC/14/2933/72

Unidad de Proyectos Específicos
y Crédito Externo

Señor doctor
José María Piedrahita
Gerente
Interconexión Eléctrica S.A.
La Ciudad

Bogotá, D.E. 20 septiembre, 1972

Estimado doctor Piedrahita:

Me refiero a la comunicación G 2959 del 30 de Agosto de 1972, en la cual se exponen los motivos por los cuales sería necesaria la contratación de un crédito externo destinado a cubrir el aumento correspondiente a los costos de la parte en moneda extranjera de la primera etapa del proyecto Chivor I, en una cuantía aproximada de US\$20,0 millones.

El Departamento Nacional de Planeación considera de gran importancia para el desarrollo eléctrico del país la terminación del proyecto para lo que estima conveniente tomar las medidas conducentes para la obtención de un crédito externo que pueda cubrir el faltante de los recursos en moneda extranjera que se ha presentado en el transcurso de la ejecución de la obra, de tal manera que el sistema interconectado nacional pueda cubrir la demanda de energía, de acuerdo con el programa de desarrollos eléctricos de generación programados por Interconexión Eléctrica S.A.

Finalmente me permito recomendar la negociación de términos financieros amplios para el préstamo, con el objeto de que la programación de nuevas obras se pueda adelantar sin obstáculos financieros posteriores.

De usted atentamente,

(firmado)
ROBERTO ARENAS BONILLA
Jefe del Departamento

PRESUPUESTO Y PLAN DE FINANCIAMIENTO

SUBPROYECTO CHIVOR II (en miles de dólares o su equivalente)

	Inversión Estimada			Aporte BID	Proveed.	Aporte ISA	
	MN	ME	Total	ME	ME	MN	ME
1. INGENIERIA Y ADMINISTRACION							
1.1 Ingeniería y Dirección de Obra	3 400	500	3 900	500	-	3 400	-
1.2 Administración y Gastos Generales	750	-	750	-	-	750	-
Total Categoría 1	4 150	500	4 650	500	-	4 150	-
2. COSTO DIRECTO CONSTRUCCION							
2.1 Central General y S.E. Elevadora							
2.11 Tunel y Almenara	5 091	8 972	14 063	8 972	-	5 091	-
2.111 Obras Civiles	9	45	54	45	-	9	-
2.112 Equipos							
2.12 Tubería y Distribuidor							
2.121 Obras Civiles	2 537	4 553	7 090	4 553	-	2 537	-
2.122 Equipos	1 765	5 945	7 710	-	5 052	1 765	893
2.13 Casa de Máquinas							
2.131 Obras Civiles	1 318	878	2 196	878	-	1 318	-
2.132 Equipo mecánico	539	7 629	8 168	416	6 131	539	1 082
2.133 Equipo eléctrico	613	8 696	9 309	1 830	5 837	613	1 029
2.14 Patic Conexiones							
2.141 Obras civiles	148	25	173	25	-	148	-
2.142 Equipos	75	713	788	713	-	75	-
Total Subcategoría 2.1	12 095	37 456	49 551	17 432	17 020	12 095	3 004
2.2 Sistema Transmisión							
2.21 Línea 230 KV							
2.211 Construcción	528	352	880	352	-	528	-
2.212 Materiales	125	2 878	3 003	2 878	-	125	-
2.22 S. E. Torca							
2.221 Obras Civiles	51	9	60	9	-	51	-
2.222 Equipos	114	1 621	1 735	547	913	114	161
Total Subcategoría 2.2	818	4 860	5 678	3 786	913	818	161
Total Categoría 2	12 913	42 316	55 229	21 218	17 933	12 913	3 165
4. SIN ASIGNACION ESPECIFICA							
4.1 Imprevistos generales	3 680	5 623	9 303	2 904	2 330	3 668	401
4.2 Provisión escalación	3 210	8 414	11 624	4 972	3 350	3 222	-
Total Categoría 4	6 890	14 037	20 927	7 876	5 680	6 890	1 481
TOTAL COSTO CONSTRUCCION	23 953	56 853	80 806	29 594	23 613	23 953	3 646
3. GASTOS FINANCIEROS							
3.1 Intereses préstamo BID	-	7 229	7 229	7 229	-	-	-
3.2 Intereses préstamo proveedores	-	4 483	4 483	-	-	-	4 483
3.3 Comisión compromiso	-	2 016	2 016	-	-	-	2 016
3.4 Inspección y vigilancia	-	373	373	373	-	-	-
3.5 Intereses bonos	4 296	-	4 296	-	-	4 296	-
Total Categoría 3	4 296	14 101	18 397	7 602	-	4 296	6 499
INVERSION TOTAL	28 249	70 954	99 203	37 196	23 613	28 249	10 145

PRESUPUESTO Y PLAN DE FINANCIAMIENTO

APENDICE G-2

SUBPROYECTO DE TELECOMUNICACIONES (en miles de dólares o su equiv.)C O R T I A S

	INVERSION ESTIMADA			ESQUEMA DE FINANCIAMIENTO		
	MN	ME	Total	Aporte BID		Aporte I
				MN	ME	MN
<u>RIA Y ADMINISTRACION</u>						
lería y Dirección	344	2 073	2 417	-	2 073	344
Categoría 1	344	2 073	2 417	-	2 073	344
<u>DIRECTO DE CONSTRUCCION</u>						
os despacho y telecomunicaciones	79	1 947	2 026	-	1 947	79
ipo telecomunicaciones	113	2 766	2 879	-	2 766	113
tros de despacho	27	678	705	-	678	27
ste reguladores turbinas	219	5 391	5 610	-	5 391	219
Categoría 2						
<u>GNACION ESPECIFICA</u>						
vistos generales	65	868	933	-	868	65
sión escalación	89	1 208	1 297	-	1 208	89
Categoría 5	154	2 076	2 230	-	2 076	154
<u>O CONSTRUCCION</u>						
	717	9 540	10 257	-	9 540	717
<u>FINANCIEROS</u>						
eses préstamo BID	--	1 652	1 652	-	1 652	
ión de compromiso	-	259	259	-	-	
cción y Vigilancia	-	112	112	-	112	
Categoría 3	-	2 023	2 023	-	1 764	
<u>TOTAL</u>	717	11 563	12 280	-	11 304	717

APENDICE H

LISTA DE CATEGORIAS DE INVERSION PRESTAMO BID
(en miles de US\$ dólares o su equivalente)

	ME
1. <u>INGENIERIA Y ADMINISTRACION</u>	
1.1 Servicios Consultores	2 373
Inspección equipos	150
Vehículos y equipos interventoría	50
Subtotal Categoría 1	2 573
2. <u>COSTO DIRECTO CONSTRUCCION</u>	
2.1 Central Generadora y S.E. Elevadora	
2.11 Tunel y almenara	
2.111 Obras civiles (Contrato 201)	8 972
2.112 Equipos (compuertas y ventilac.)	45
2.12 Tubería y distribuidor	
2.121 Obras civiles (Contrato 201)	4 553
2.13 Casa de máquinas	
2.131 Obras civiles (Contrato 202)	878
2.132 Equipo complementario electromecánico (Contratos 306-308-Pedidos varios)	2 246
2.14 Patio de conexiones	
2.141 Obras civiles (Contrato 202)	25
2.142 Equipo protección (Contrato 305)	713
2.2 Sistema de transmisión	
2.21 Línea 230 KV	
2.211 Obras civiles (Contrato 203)	352
2.212 Materiales (Contrato 307)	2 878
2.22 Subestación Suba	
2.221 Obras civiles (Contrato 202)	9
2.222 Equipo (Contrato 305)	547
2.4 Centros despacho y telecomunicaciones	
2.41 Equipo telecomunicaciones (Contrato 309)	3 203
2.42 Equipo centros despacho (Contrato 310/Pedido)	1 510
2.43 Ajustes reguladores turbinas (Pedidos)	678
Subtotal Categoría 2	26 609
3. <u>GASTOS FINANCIEROS</u>	
3.1 Intereses préstamo	8 881
3.4 Inspección y vigilancia	485
Subtotal Categoría 3	9 366
5. <u>GASTOS SIN ASIGNACION ESPECIFICA</u>	
5.1 Imprevistos generales	3 772
5.2 Provisión escalación	6 180
Subtotal Categoría 5	9 952
TOTAL PRESTAMO BID	48 500

APPENDICE I

[illegible]

PROYECTO CHIVOR II Y TELECOMUNICACIONES
PROGRAMA GENERAL DE CONSTRUCCION

OBRA O SUMINISTRO	1974	1975	1976	1977	1978	1979
<u>OBRAS CIVILES - CONSTRUCCION</u>						
Sistema de Conducción						
Casa Máquinas y Subestaciones						
Línea de Transmisión						
<u>EQUIPOS - FABRICACION Y MONTAJE</u>						
Blindaje y Distribuidor						
Turbinas y Reguladores						
Generadores						
Transformadores						
Equipo de Subestaciones						
Barras y Tableros 13.8 KV						
Materiales Línea 230 KV						
Servicios Auxiliares						
Equipos Mecánicos Varios						
Equipo Telecomunicaciones						
Centros de Despacho						
Ajuste de Reguladores						

↓ Puesta en servicio de los grupos generadores.

ANEXO K

CRONOCRAMA INVERSIONES PROYECTO CHIVOR II Y TELECOMUNICACIONES
(en miles de dólares o su equivalente)

CATEGORIAS	Inversión		1973		1974		1975		1976		1977		1978		1979	
	ME	Total	ME	Total	ME	Total	ME	Total	ME	Total	ME	Total	ME	Total	ME	Total
INICIATIVA Y ADMINISTRACION																
COSTO DIRECTO CONSTRUCCION																
1 Central Generadora y S.E.	4 494	5 573	7 067	7 067	307	307	492	492	853	853	1 416	1 416	608	608	1 472	1 472
2 Sistema Transmision	12 095	37 556	49 551	49 551	1 243	1 243	1 973	1 973	3 216	3 216	1 900	1 900	4 542	4 542	6 530	6 530
3 Dispatching y Telecomunicacion	215	4 860	5 676	5 676	-	-	-	-	-	-	-	-	-	-	-	-
	219	5 391	5 610	5 610	-	-	587	587	581	581	581	581	581	581	581	581
Total Categoría 2	13 132	47 707	60 539	60 539	1 243	1 243	2 560	2 560	3 003	3 003	1 900	1 900	5 123	5 123	7 113	7 113
GASTOS FINANCIEROS																
1 Intereses BID	-	6 641	6 641	6 641	-	-	109	109	-	-	374	374	-	-	881	881
2 Intereses Proveedores	-	4 463	4 463	4 463	-	-	480	480	-	-	606	606	-	-	209	209
3 Intereses Compañias	-	4 465	4 465	4 465	-	-	73	73	-	-	97	97	-	-	943	943
4 Intereses Multilaterales	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 Intereses bancos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Categoría 3	-	16 169	16 169	16 169	-	-	662	662	-	-	1 077	1 077	-	-	1 297	1 297
SIN ASIGNACION ESPECIFICA																
1 Proveedores generales	3 745	6 491	10 236	10 236	33	33	269	269	563	563	663	663	1 246	1 246	732	732
2 Provision escalacion	3 599	9 682	12 921	12 921	-	-	171	171	229	229	894	894	556	556	1 584	1 584
Total Categoría 4	7 044	16 173	23 157	23 157	33	33	366	366	865	865	1 557	1 557	1 802	1 802	2 316	2 316
INVERSION TOTAL	28 566	86 517	111 483	111 483	235	235	220	220	4 002	4 002	7 909	7 909	11 991	11 991	5 465	5 465
FINANCIAMIENTO																
1 FONDOS FINANCIEROS																
1.1 Intereses BID	-	6 641	6 641	6 641	-	-	109	109	-	-	374	374	-	-	881	881
1.2 Intereses Proveedores	-	4 463	4 463	4 463	-	-	480	480	-	-	606	606	-	-	209	209
1.3 Intereses Compañias	-	4 465	4 465	4 465	-	-	73	73	-	-	97	97	-	-	943	943
1.4 Intereses Multilaterales	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.5 Intereses bancos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Categoría 3	-	16 169	16 169	16 169	-	-	662	662	-	-	1 077	1 077	-	-	1 297	1 297
SIN ASIGNACION ESPECIFICA																
1 Proveedores generales	3 745	6 491	10 236	10 236	33	33	269	269	563	563	663	663	1 246	1 246	732	732
2 Provision escalacion	3 599	9 682	12 921	12 921	-	-	171	171	229	229	894	894	556	556	1 584	1 584
Total Categoría 4	7 044	16 173	23 157	23 157	33	33	366	366	865	865	1 557	1 557	1 802	1 802	2 316	2 316
INVERSION TOTAL	28 566	86 517	111 483	111 483	235	235	220	220	4 002	4 002	7 909	7 909	11 991	11 991	5 465	5 465
FINANCIAMIENTO																
1 FONDOS FINANCIEROS																
1.1 Intereses BID	-	6 641	6 641	6 641	-	-	109	109	-	-	374	374	-	-	881	881
1.2 Intereses Proveedores	-	4 463	4 463	4 463	-	-	480	480	-	-	606	606	-	-	209	209
1.3 Intereses Compañias	-	4 465	4 465	4 465	-	-	73	73	-	-	97	97	-	-	943	943
1.4 Intereses Multilaterales	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.5 Intereses bancos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Categoría 3	-	16 169	16 169	16 169	-	-	662	662	-	-	1 077	1 077	-	-	1 297	1 297
SIN ASIGNACION ESPECIFICA																
1 Proveedores generales	3 745	6 491	10 236	10 236	33	33	269	269	563	563	663	663	1 246	1 246	732	732
2 Provision escalacion	3 599	9 682	12 921	12 921	-	-	171	171	229	229	894	894	556	556	1 584	1 584
Total Categoría 4	7 044	16 173	23 157	23 157	33	33	366	366	865	865	1 557	1 557	1 802	1 802	2 316	2 316
INVERSION TOTAL	28 566	86 517	111 483	111 483	235	235	220	220	4 002	4 002	7 909	7 909	11 991	11 991	5 465	5 465
FINANCIAMIENTO																
1 FONDOS FINANCIEROS																
1.1 Intereses BID	-	6 641	6 641	6 641	-	-	109	109	-	-	374	374	-	-	881	881
1.2 Intereses Proveedores	-	4 463	4 463	4 463	-	-	480	480	-	-	606	606	-	-	209	209
1.3 Intereses Compañias	-	4 465	4 465	4 465	-	-	73	73	-	-	97	97	-	-	943	943
1.4 Intereses Multilaterales	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.5 Intereses bancos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Categoría 3	-	16 169	16 169	16 169	-	-	662	662	-	-	1 077	1 077	-	-	1 297	1 297
SIN ASIGNACION ESPECIFICA																
1 Proveedores generales	3 745	6 491	10 236	10 236	33	33	269	269	563	563	663	663	1 246	1 246	732	732
2 Provision escalacion	3 599	9 682	12 921	12 921	-	-	171	171	229	229	894	894	556	556	1 584	1 584
Total Categoría 4	7 044	16 173	23 157	23 157	33	33	366	366	865	865	1 557	1 557	1 802	1 802	2 316	2 316
INVERSION TOTAL	28 566	86 517	111 483	111 483	235	235	220	220	4 002	4 002	7 909	7 909	11 991	11 991	5 465	5 465
FINANCIAMIENTO																
1 FONDOS FINANCIEROS																
1.1 Intereses BID	-	6 641	6 641	6 641	-	-	109	109	-	-	374	374	-	-	881	881
1.2 Intereses Proveedores	-	4 463	4 463	4 463	-	-	480	480	-	-	606	606	-	-	209	209
1.3 Intereses Compañias	-	4 465	4 465	4 465	-	-	73	73	-	-	97	97	-	-	943	943
1.4 Intereses Multilaterales	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.5 Intereses bancos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Categoría 3	-	16 169	16 169	16 169	-	-	662	662	-	-	1 077	1 077	-	-	1 297	1 297
SIN ASIGNACION ESPECIFICA																
1 Proveedores generales	3 745	6 491	10 236	10 236	33	33	269	269	563	563	663	663	1 246	1 246	732	732
2 Provision escalacion	3 599	9 682	12 921	12 921	-	-	171	171	229	229	894	894	556	556	1 584	1 584
Total Categoría 4	7 044	16 173	23 157	23 157	33	33	366	366	865	865	1 557	1 557	1 802	1 802	2 316	2 316
INVERSION TOTAL	28 566	86 517	111 483	111 483	235	235	220	220	4 002	4 002	7 909	7 909	11 991	11 991	5 465	5 465
FINANCIAMIENTO																
1 FONDOS FINANCIEROS																
1.1 Intereses BID	-	6 641	6 641	6 641	-	-	109	109	-	-	374	374	-	-	881	881
1.2 Intereses Proveedores	-	4 463	4 463	4 463	-	-	480	480	-	-	606	606	-	-	209	209
1.3 Intereses Compañias	-	4 465	4 465	4 465	-	-	73	73	-	-	97	97	-	-	943	943
1.4 Intereses Multilaterales	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.5 Intereses bancos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Categoría 3	-	16 169	16 169	16 169	-	-	662	662	-	-	1 077	1 077	-	-	1 297	1 297
SIN ASIGNACION ESPECIFICA																
1 Proveedores generales	3 745	6 491	10 236	10 236	33	33	269	269	563	563	663	663	1 246	1 246	732	732
2 Provision escalacion	3 599	9 682	12 921	12 921	-	-	171	171	229	229	894	894	556	556	1 584	1 584
Total Categoría 4	7 044	16 173	23 157	23 157	33	33	366	366	865	865	1 557	1 557	1 802	1 802	2 316	2 316
INVERSION TOTAL	28 566	86 517	111 483	111 483	235	235	220	220	4 002	4 002	7 909	7 909	11 991	11 991	5 465	5 465
FINANCIAMIENTO																
1 FONDOS FINANCIEROS																
1.1 Intereses BID	-	6 641	6 641	6 641	-	-	109	109	-	-	374	374	-	-	881	881
1.2 Intereses Proveedores	-	4 463	4 463	4 463	-	-	480	480	-	-	606	606	-	-	209	209
1.3 Intereses Compañias	-	4 465	4 465	4 465	-	-	73	73	-	-	97	97	-	-	943	943
1.4 Intereses Multilaterales	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.5 Intereses bancos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Categoría 3	-	16 169	16 169	16 169	-	-	662	662	-	-	1 077	1 077	-	-	1 297	1 297
SIN ASIGNACION ESPECIFICA																
1 Proveedores generales	3 745	6 491	10 236	10 236	33	33	269	269	563	563	663	663	1 246	1 246	732	732
2 Provision escalacion	3 599	9 682	12 921	12 921	-	-	171	171	229	229	894	894	556	556	1 584	1 584
Total Categoría 4	7 044	16 173	23													

TERMINOS DE REFERENCIA DE LA JUNTA DE CONSULTORES ESPECIALES

1. Funciones de los Consultores

El "Board of Consultants" que, en principio, se considera debería quedar integrado por tres Especialistas de reconocida experiencia internacional en los campos de geología, mecánica de suelos e ingeniería civil de obras hidroeléctricas, serán contratados por ISA, y prestarán su asesoramiento a esta Institución en aspectos técnicos de diseño y construcción del Proyecto Chivor en su conjunto.

Programarán de acuerdo con ISA, visitas periódicas al sitio del Proyecto para supervisar la marcha de los trabajos emitiendo además un concepto sobre los métodos constructivos empleados por el contratista. Atenderían también problemas específicos que pudieran presentarse en la ejecución del Proyecto, recomendando las medidas adecuadas para dar solución a los mismos.

2. Costo de los servicios

Para la estimación de costos se ha supuesto que el grupo de consultores dedique a las labores anotadas un promedio de cuatro visitas al terreno por año, tres de carácter periódico y una para problemas específicos. Dichos viajes, incluyendo el tiempo para la preparación de informes, llevarían unos ocho días. Se supone, en base a la experiencia anterior en servicios similares, que cada consultor costará diariamente en honorarios US\$400 y tendrá un viático de US\$100. El costo de los pasajes sería de US\$1000.

Considerando una duración del Proyecto de cinco años se tiene la siguiente estimación:

Honorarios:	3 x 8 días x US\$400 x 20 viajes	=	US\$192.000
Viáticos:	3 x 8 días x US\$100 x 20 viajes	=	48.000
Transporte:	3 x US\$1.000 x 20 viajes	=	60.000
	Total		<u>US\$300.000</u>

3. Justificación de la contratación

La constitución de esta Junta de Consultores, se considera ampliamente justificada por la magnitud de esta obra, la más importante que se está llevando a cabo hoy día en Colombia, y por el hecho de que gracias al concurso de estos Especialistas, los técnicos de ISA irán fortaleciendo sus conocimientos y experiencia, lo que será de gran utilidad para esta Institución a cuyo cargo se ha encomendado la realización de todo el programa de generación del país.

INTERCONEXION ELECTRICA S. A.
BALANCE GENERAL A 31 DICIEMBRE
(Expresado en miles de dólares americanos)

	1969	1970	1971	1972
<u>ACTIVO</u>				
ACTIVO FIJO AL COSTO				
No depreciable				
Obras en construcción				
Sistema de interconexión	6.004	18.048	23.222	71
Planta de generación Chivor		1.700	13.256	30.629
Línea Guatapé-Barranca		293	441	865
Anticipo a contratistas		8.998	9.214	9.891
Total no depreciable	6.004	29.039	46.133	41.456
Depreciable				
Planta de transmisión	-	-	-	22.002
Planta general	157	236	410	1.768
	157	236	410	23.770
Menos depreciación-acumulada	(13)	(37)	(79)	(595)
Total depreciable	144	199	331	23.175
Total activo fijo	6.148	29.238	46.464	64.631
OTROS ACTIVOS				
Contratos en construcción				630
Cuentas por cobrar a largo plazo				10
	-	-	-	640
CUENTAS POR COBRAR ACCIONISTAS.				
Bonos Chivor	-	-	-	3.046
Cuentas sobre suscripción de acciones	668	2.544	60	1.226
Gastos de admón. reembolsables, de operación, mantenimiento, por depreciación y financieros	82	162	510	1.692
Total cuentas por cobrar accionistas	750	2.706	570	5.964
CARGOS DIFERIDOS	12	100	278	1.274
ACTIVO CORRIENTE				
Caja y bancos	670	475	857	1.083
Fondo Rotatorio BID			3.173	3.235
Fondo Rotatorio Proyecto Chivor		366	430	394
Inversiones	33	35	-	4
Cuentas por cobrar a empleados	11	11	8	
Cuentas por cobrar otros	19	29	19	63
Cuentas por cobrar energía vendida	-	-	-	595
Garantía sobre depósitos y otros	6	4	4	443
Materiales y suministros			199	663
Gastos pagados por adelantado	3	4	2	20
Total activo corriente	742	924	4.692	6.500
TOTAL ACTIVO	7.652	32.968	52.004	79.009
	=====	=====	=====	=====

INTERCONEXION ELECTRICA S. A.
BALANCE GENERAL A 31 DICIEMBRE
(Expresado en miles de dólares americanos)

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
<u>PASIVO</u>				
CAPITALIZACION				
Préstamos a largo plazo menos porción corriente	3.233	19.092	28.168	37.923
Cuentas por pagar a accionistas, a largo plazo, menos porción corriente			1.124	1.081
Retenciones a contratistas	596	650	800	1.862
Bonos Chivor emisión 1970		1.124	2.877	9.226
	<u>3.829</u>	<u>20.866</u>	<u>32.969</u>	<u>50.092</u>
Capital social y superavit				
Capital social				
Acciones suscritas y pagadas	2.970	4.896	10.452	18.159
Acciones suscritas por pagar	668	2.544	60	1.226
Reserva legal	7	13	20	29
Superavit ganado(ingresos miscelaneos)	6	7	9	57
Anticipos de accionistas para suscripción de acciones	-	-	866	-
	<u>3.651</u>	<u>7.460</u>	<u>11.407</u>	<u>19.471</u>
Total capitalización	<u>7.480</u>	<u>28.326</u>	<u>44.376</u>	<u>69.563</u>
CESANTIAS CONSOLIDADAS	-	-	46	72
PASIVO CORRIENTE				
Obligaciones bancarias		268	209	664
Cuentas por pagar a contratistas	135	2.294	3.363	5.029
Compra de energía	-	-	-	820
Gastos financieros acumulados	-	247	1.080	1.178
Porción corriente de préstamos a largo plazo	-	-	1.328	923
Porción corriente de cuentas por pagar a largo plazo - accionistas	-	-	375	375
Retenciones a contratistas	-	1.808	1.172	284
Prestaciones sociales acumuladas	15	25	13	19
Otras cuentas por pagar	22	-	42	82
Total pasivo corriente	<u>172</u>	<u>4.642</u>	<u>7.652</u>	<u>9.374</u>
TOTAL PASIVO	<u>7.652</u>	<u>32.968</u>	<u>52.004</u>	<u>79.009</u>

INTERCONEXION ELECTRICA S. A.
ESTADO DE PERDIDAS Y GANANCIAS Y UTILIDADES RETENIDAS
POR LOS EJERCICIOS TERMINADOS EN 31 DICIEMBRE

(Expresado en miles de dólares americanos)

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
OPERACION DEL SISTEMA DE INTERCONEXION				
Ventas de energía para intercambios				2.260
Compra de energía para intercambios	<u>-</u>	<u>-</u>	<u>-</u>	<u>2.260</u>
				<u>- 0 -</u>
Costos y gastos directos				
Operación	-			225
Mantenimiento	-			92
Administración	248	546	855	441
Depreciación	<u>13</u>	<u>24</u>	<u>42</u>	<u>516</u>
	<u>261</u>	<u>570</u>	<u>897</u>	<u>1.274</u>
Otros gastos				
Gastos financieros deuda a largo plazo	-			974
Otros	-			31
	<u>-</u>	<u>-</u>	<u>-</u>	<u>1.005</u>
Total distribución accionistas	<u>261</u>	<u>570</u>	<u>897</u>	<u>2.279</u>
Contribuciones de los accionistas	<u>(261)</u>	<u>(570)</u>	<u>(897)</u>	<u>(2.279)</u>
	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
OTROS INGRESOS				
Intereses en inversiones	5	4	3	6
Diferencias en cambio	1	3	5	6
Varios	<u>-</u>	<u>-</u>	<u>1</u>	<u>45</u>
	<u>6</u>	<u>7</u>	<u>9</u>	<u>57</u>
UTILIDADES RETENIDAS NO APROPIADAS				
Al comienzo del período	7	6	7	9
Apropiaciones durante el período				
Reserva legal	<u>(7)</u>	<u>(6)</u>	<u>(7)</u>	<u>(9)</u>
Utilidades no apropiadas	<u>6</u>	<u>7</u>	<u>9</u>	<u>57</u>

INTERCONEXION ELECTRICA S.A.
ESTADO DE ORIGEN Y APLICACION DE FONDOS
 (En miles de US\$)

	Al 31 de diciembre de:			
	<u>1969/1970</u>	<u>1970/1971</u>	<u>1971/1972</u>	<u>1972/1973</u>
<u>FONDOS</u>				
Patrimonial				
suscrito	3.802	3.072	8.873	15.000
des retenidas	7	9	57	
o accionistas suscripción acciones	-	866	(866)	
	<u>3.809</u>	<u>3.947</u>	<u>8.064</u>	<u>15.000</u>
éstamos a largo plazo	15.859	10.200	9.712	35.000
nos Chivor	1.124	1.753	6.349	9.000
tenciones a contratistas	54	150	1.062	1.000
sivo corriente	4.470	2.940	1.792	9.000
	<u>-</u>	<u>46</u>	<u>26</u>	<u>-</u>
Total origen de fondos	<u>25.316</u>	<u>19.036</u>	<u>27.005</u>	<u>71.000</u>
<u>FONDOS</u>				
o bruto	23.114	17.268	18.683	59.000
Depreciación acumulada	(24)	(42)	(516)	(1.000)
o neto	<u>23.090</u>	<u>17.226</u>	<u>18.167</u>	<u>58.000</u>
eridos	88	178	996	1.000
riente (incluye ctas.por cobrar accionistas)	2.138	1.632	7.202	10.000
	<u>-</u>	<u>-</u>	<u>640</u>	<u>-</u>
Total fondos aplicados	<u>25.316</u>	<u>19.036</u>	<u>27.005</u>	<u>71.000</u>

Balance General de Situación - Comparativo -

Ejercicios 1969-1972 Real. Ejercicios 1973-1982 Proforma

En millones US\$

	- Real -				- Pronóstico -									
	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
<u>Activo</u>														
<u>Activo Fijo:</u>														
Obras e Instalaciones en servicio - Chivor I y II	-	-	-	-	-	-	62,8	165,1	165,1	165,1	219,1	265,5	265,5	265,5
Depreciación	-	-	-	-	-	-	1,7	6,0	10,4	14,7	20,7	28,0	35,3	42,6
Sub-Total	-	-	-	-	-	-	61,1	159,1	154,7	150,4	198,4	237,5	230,2	222,9
Obras e Inst. en servicio y en construcción, neto	6,2	29,2	46,5	64,6	115,1	173,3	156,8	89,5	127,9	152,9	109,6	61,0	58,8	56,6
Total Activo Fijo	6,2	29,2	46,5	64,6	115,1	173,3	217,9	248,6	282,6	303,3	308,0	298,5	289,0	279,5
<u>Activo Corriente:</u>														
Cuentas por cobrar a accionistas	0,8	2,7	0,6	6,0	13,3	14,2	12,0	12,5	16,1	20,6	23,7	26,4	33,0	39,7
Otras Cuentas (caja, bancos, etc.)	0,7	0,9	4,7	6,5										
Total activo corriente	1,5	3,6	5,3	12,5	13,3	14,2	12,0	12,5	16,1	20,6	23,7	26,4	33,0	39,7
<u>Otros Activos</u>														
Cargos diferidos y otros	-	0,1	0,2	1,9	2,8	3,3	1,1	1,4	2,8	2,5	3,8	8,0	8,0	8,2
Total del Activo	7,7	32,9	52,0	79,0	131,2	190,8	231,0	262,5	301,5	326,4	335,5	332,9	330,0	327,4
<u>Patrimonio y Pasivo</u>														
<u>Patrimonio:</u>														
Capital social	3,6	7,4	10,5	19,4	30,7	42,3	50,6	56,7	63,0	69,3	72,6	74,1	75,1	76,5
Utilidad acumulada	-	-	-	-	-	-	0,3	1,5	4,0	7,0	11,6	17,0	22,7	30,3
Otras (reservas, etc.)	0,1	0,1	0,9	0,1	0,1	0,1	0,1	0,3	0,5	0,9	1,4	2,0	2,6	3,5
Sub-Total	3,7	7,5	11,4	19,5	30,8	42,4	51,0	58,5	67,5	77,2	85,6	93,1	100,4	110,3
<u>Deuda a largo plazo</u>														
Préstamos y Bonos	3,2	20,2	31,1	47,1	86,6	133,9	162,8	185,4	213,4	225,8	224,1	213,8	201,2	188,0
Otros	0,6	0,6	1,9	2,9	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0
Sub-Total	3,8	20,8	33,0	50,0	89,6	136,9	165,8	188,4	216,4	228,8	227,1	216,8	204,2	191,0
Capitalización	7,5	28,3	44,4	69,5	120,4	179,3	216,8	246,9	283,9	306,0	312,7	309,9	304,6	301,3
<u>Pasivo Corriente</u>														
Porción corriente deuda largo plazo	-	-	1,7	1,3	1,6	1,8	4,2	4,6	5,6	7,9	10,2	10,3	12,6	13,1
Otros (contratistas, etc.)	0,2	4,6	5,9	8,1	9,0	9,5	7,0	6,0	8,0	7,5	6,6	5,7	7,8	7,0
Sub-Total	0,2	4,6	7,6	9,4	10,6	11,3	11,2	10,6	13,6	15,4	16,8	16,0	20,4	20,1
Otros Pasivos	-	-	-	0,1	0,2	0,2	3,0	5,0	4,0	5,0	6,0	7,0	5,0	6,0
Total del Patrimonio y Pasivo	7,7	32,9	52,0	79,0	131,2	190,8	231,0	262,5	301,5	326,4	335,5	332,9	330,0	327,4
Deuda Total					100,2	148,2	180,0	204,0	234,0	249,2	249,9	239,8	229,6	217,1

APENDICE R

INTERCONEXION ELECTRICA, S.A. - ISA -

Estados Financieros: Estados Comparativos de Explotación
y de Ganancias y Pérdidas

Período 1972 real. Período 1973 a 1982 proyectado

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
<u>Costos de Explotación</u>											
Energía de centrales pro-											
(Ver Apéndice)	-	-	-	6.05	17.47	17.47	17.92	24.85	30.89	30.37	31.78
Distribución socios 1/	1.27	1.65	1.97	2.13	2.14	2.77	3.02	3.12	3.13	3.14	3.16
Energía - socios	2.26	3.33	3.20	0.20	-	-	-	-	-	-	-
Total Ingresos Explotación	3.53	4.98	5.17	8.38	19.61	20.24	20.94	27.97	34.02	33.51	34.94
<u>Costos de Explotación</u>											
Salarios y Trasm.											
Reparación y Mantenimiento	-	-	-	0.15	0.85	0.85	0.85	1.07	1.32	1.32	1.32
Administración y gastos generales	-	-	-	0.06	0.32	0.32	0.32	0.40	0.50	0.50	0.50
Depreciación	-	-	-	1.66	4.36	4.36	4.36	5.95	7.31	7.31	7.31
Total gastos de Explot. Centrales	-	-	-	1.87	5.53	5.53	5.53	7.42	9.13	9.13	9.13
<u>Costos de Interconexión</u>											
Reparación y mantenimiento	0.32	0.34	0.34	0.42	0.43	0.43	0.45	0.50	0.50	0.50	0.50
Salarios y gastos generales	0.43	0.21	0.21	0.26	0.26	0.26	0.28	0.31	0.31	0.31	0.31
Depreciación	0.52	1.10	1.42	1.45	1.45	2.08	2.29	2.31	2.32	2.33	2.35
Total gastos explotación Red	1.27	1.65	1.97	2.13	2.14	2.77	3.02	3.12	3.13	3.14	3.16
<u>Energía</u>											
	-	1.13	0.77	-	-	-	-	-	-	-	-
	-	1.33	1.86	0.10	-	-	-	-	-	-	-
	-	-	-	0.10	-	-	-	-	-	-	-
	-	0.87	0.67	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-
Total Compra Energía	2.26	3.33	3.20	0.20	-	-	-	-	-	-	-
Total Gastos de Explotación	3.53	4.98	5.17	4.20	7.67	8.30	8.55	10.54	12.26	12.27	12.29
Resultado Neto de Explotación	-	-	-	4.18	11.94	11.94	12.39	17.43	21.76	21.24	22.65
Contribución accionistas (intereses)	1.00	0.84	0.89	1.59	1.69	1.58	1.48	1.37	1.27	1.18	1.10
Total	-	0.84	0.89	5.77	13.63	13.52	13.87	18.80	23.03	22.42	23.75
<u>Financieros:</u>											
Intereses I y II	-	-	-	3.80	10.62	9.24	8.98	12.38	15.68	14.93	14.18
Costos de Interconexión	1.00	0.84	0.89	1.59	1.69	1.58	1.48	1.37	1.27	1.18	1.10
	1.00	0.84	0.89	5.39	12.31	10.82	10.46	13.75	16.95	16.11	15.28
Resultado Neta	-	-	-	0.38	1.32	2.70	3.41	5.05	6.08	6.31	8.47

ESTADOS FINANCIEROS: PRONOSTICO DE ESTADO DE ORIGEN Y APLICACION DE RECURSOS
PERIODO: 1973 A 1982

(millones de US\$)

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
<u>ORIGEN RECURSOS</u>										
<u>Generación Interna (explotación)</u>										
Ingreso neto de explotaciones	-	-	4.18	11.94	11.94	12.39	17.43	21.76	21.24	22.65
Depreciación Red Interconexión	1.10	1.42	1.45	1.45	2.08	2.29	2.31	2.32	2.33	2.35
Depreciación Centrales y Transmisión	-	-	1.66	4.36	4.36	4.36	5.95	7.31	7.31	7.31
Subtotal	1.10	1.42	7.29	17.75	18.38	19.04	25.69	31.39	30.88	32.31
<u>Otras Fuentes Internas</u>										
Aumento de Capital	10.69	12.23	8.23	6.13	6.34	6.30	3.32	1.41	1.06	1.40
Emisión de bonos	11.33	12.86	8.74	4.23	4.84	4.79	1.28	-	-	-
Contribuciones socios	0.84	0.89	1.59	1.69	1.58	1.48	1.37	1.27	1.18	1.10
Total Fuentes Internas	22.86	25.98	18.56	12.05	12.76	12.57	5.97	2.68	2.24	2.50
<u>Fuentes Externas</u>										
Préstamo BID 214/OC	7.73	11.42	9.31	7.48	0.10	-	-	-	-	-
Préstamo BIRF 575/CO	4.12	1.40	0.29	-	-	-	-	-	-	-
Préstamo BIRF 681/CO	14.68	12.41	6.14	1.68	-	-	-	-	-	-
Otras financiaciones Chivor I	2.32	5.51	0.92	-	-	-	-	-	-	-
Bancos Suizos	0.15	-	-	-	-	-	-	-	-	-
Préstamo ICEL	1.30	0.94	0.30	-	-	-	-	-	-	-
Préstamo FONADE	0.50	0.87	1.35	0.93	0.89	0.86	0.45	-	-	-
Préstamo BID, Chivor II	0.22	3.74	6.02	6.46	16.88	7.93	5.25	-	-	-
Préstamo Proveedores Chivor II	-	-	-	6.45	8.90	6.75	1.51	-	-	-
Total Fuentes Externas	31.02	36.29	24.33	23.00	28.77	15.54	7.21	-	-	-
	54.98	63.69	50.18	52.80	59.91	47.15	38.87	34.07	33.12	34.81
<u>APLICACION DE RECURSOS</u>										
<u>Inversiones</u>										
Planta General	0.35	0.13	0.26	0.07	0.07	0.07	0.18	0.18	0.07	0.18
Central Chivor I	43.02	47.59	29.69	13.98	1.50	-	-	-	-	-
Central Chivor II y Telecomunicación	0.46	6.21	11.99	20.61	37.28	24.14	10.79	-	-	-
Red Central	0.56	-	-	-	-	-	-	-	-	-
Línea Guatapé-Bea	4.21	2.18	0.51	-	-	-	-	-	-	-
Estudios en ejecución	2.96	3.47	1.66	1.45	2.63	2.60	2.76	1.00	-	-
Total Inversiones	51.56	59.58	44.11	36.11	41.48	26.81	13.73	1.18	0.07	0.18
<u>Servicio de la Deuda</u>										
Amortización	1.29	1.61	1.79	4.17	4.61	5.65	7.90	10.22	10.33	12.62
Intereses	0.84	0.89	5.39	12.31	10.82	10.46	13.75	16.95	16.11	15.28
Total Servicio Deuda	2.13	2.50	7.18	16.48	15.43	16.11	21.65	27.17	26.44	27.90
Incremento Capital Trabajo	0.52	0.60	0.44	0.36	0.41	0.27	0.13	-	-	-
TOTAL	54.21	62.68	51.73	52.95	57.32	43.19	35.51	28.35	26.51	28.08
<u>RESUMEN</u>										
Total Origen Recursos	54.98	63.69	50.18	52.80	59.91	47.15	38.87	34.07	33.12	34.81
Total Aplicación Fondos	54.21	62.68	51.73	52.95	57.32	43.19	35.51	28.35	26.51	28.08
Superavit (Déficit) Anual	0.77	1.01	(1.55)	(0.15)	2.59	3.96	3.36	5.72	6.61	6.73
Superavit (Déficit) Acumulado	0.77	1.78	0.23	0.08	2.67	6.63	9.99	15.71	22.32	29.05

INTERCONEXION ELECTRICA S. A. - ISA -

PRONOSTICO DE ESTADO DE EXPLOTACION Y DE GANANCIAS Y PERDIDAS

PROYECTO CHIVOR I y II - Período 1973 a 1982

(Millones de US\$)

	1973	1974	1975	1976	1977	1978	1979	1980	1981
<u>Costos de Explotación:</u>									
Energía-socios	-	-	6,05	17,47	17,47	17,92	24,85	30,89	30,37
<u>Costos de Explotación</u>									
Mano de obra y gastos	-	-	0,15	0,85	0,85	0,85	1,07	1,32	1,32
Depreciación y gastos	-	-	0,06	0,32	0,32	0,32	0,40	0,50	0,50
Valor Activo Fijo	-	-	1,66	4,36	4,36	4,36	5,95	7,31	7,31
Costo de explotac.	-	-	1,87	5,53	5,53	5,53	7,42	9,13	9,13
	-	-	4,18	11,94	11,94	12,39	17,43	21,76	21,24
Ganancias financieras	-	-	3,80	10,62	9,24	8,98	12,38	15,68	14,93
Utilidad neta	-	-	0,38	1,32	2,70	3,41	5,05	6,08	6,31
Utilidad neta inmovilizada	-	-	61,70	162,90	158,50	154,09	203,40	243,15	236,18
Utilidad neta inmovilizada - %	-	-	6,77	7,33	7,53	8,04	8,57	8,95	9,00

RESULTADOS DE EXPLOTACION

Las bases de cálculo seguidas para el análisis de los resultados de explotación fueron las siguientes:

A. Gastos de Explotación

1. Centrales de Generación y Sus Sistemas de Transmisión: Los gastos de operación, mantenimiento y administración se calcularon en base a índices de la Federal Power Commission, los que fueron ajustados en base a la experiencia obtenida en otras empresas de servicio eléctrico en Colombia.

La depreciación se calculó adoptando para los equipos una vida útil de 25 años y para las obras civiles de 50 años, lo que nos da una tasa del 4% y el 2%, respectivamente.

2. Red de Interconexión: Los gastos de operación, mantenimiento y administración se adoptaron de las proyecciones de ISA, las que fueron encontradas razonables por la misión del BID.

Para la depreciación de la Red se adoptó una tasa ponderada de 3,7% que es la misma utilizada en el actual Sistema Central en servicio. La tasa de depreciación de la Planta General en servicio se fijó en un 10%.

3. Compras de Energía: Se determina con base a los precios medios de compra establecidos para los distintos socios vendedores y de la energía a ser suministrada por los mismo, para abastecer el mercado deficitario de CVC en el período 1972-1975.

B. Ingresos de Explotación

1. Ventas de Energía de las Centrales Propias de ISA: Su cálculo se detalla en el Sub-Apéndice U-1 y se establece de acuerdo a los Estatutos de la Sociedad, que en su Artículo 17 establece que las tarifas de venta que se fijan para la energía generada en la planta de ISA deberían incluir los gastos de explotación, los intereses de los préstamos internos y externos, la amortización de los mismos en aquella parte que exceda la depreciación y una suma que permita pagar un dividendo sobre las acciones equivalente a la tasa de interés normal en Colombia.
2. Contribución de los Socios: Su monto es tal que permita cubrir en su totalidad los gastos de explotación de la Red.

3. Reventas de Energía a sus Socios: Obitiéndose del producto de la energía suministrada a sus socios con déficits en sus sistemas, por el precio de venta que resulta de una ponderación de los precios de compra a los socios con excedentes. Su monto es igual al de los gastos por compra de energía.

De la diferencia entre los ingresos y los gastos de explotación, obtiéndose el ingreso neto, que como se deduce de lo anteriormente expuesto, representa solamente los beneficios que a ISA le produce la generación de sus centrales, ya que la Red es operada al costo.

Una vez determinada la inversión inmovilizada, (véase Sub-Apéndice U-2) calcúlase la rentabilidad del sistema de la planta de generación.

Como se puede apreciar en el Apéndice T, se obtienen rentabilidades razonables cuando la central opera a plena capacidad, lo que era de esperar en virtud de la metodología seguida para la determinación de los ingresos por ventas de ISA a los sistemas de sus socios.

COMPUTO DE LOS PAGOS QUE DEBE RECIBIR ISA DE SUS SOCIOS POR VENTA DE ENERGIA
 PRODUCIDA POR SUS CENTRALES PROPIAS
 (millones US dólares)

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
<u>CHIVOR I y II</u>								
Gastos explotación	1,87	5,53	5,53	5,53	7,42	9,13	9,13	9,13
Intereses externos Chivor I	3,80	7,44	6,06	5,90	5,71	5,62	5,42	5,21
Intereses bonos Chivor I	-	3,18	3,18	3,08	2,94	2,81	2,67	2,53
Intereses préstamo BID								
Chivor II	-	-	-	-	1,96	3,80	3,65	3,50
Intereses préstamo proveed.								
Chivor II	-	-	-	-	0,92	1,79	1,60	1,42
Intereses bonos Chivor II	-	-	-	-	0,85	1,66	1,59	1,52
Amortización en exceso de-								
depreciación	-	-	-	-	0,67	1,70	1,93	4,09
Total cargos fijos	5,67	16,15	14,77	14,51	20,47	26,51	25,99	27,40
Cargos Variables	0,38	1,32	2,70	3,41	4,38	4,38	4,38	4,38
Total Ingresos Chivor	6,05	17,47	17,47	17,92	24,85	30,89	30,37	31,78

DETERMINACION DE LA INVERSION INMOVILIZADA
CENTRAL CHIVOR I y II
(millones US dólares)

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
bruto (comienzos año)	-	62.75	165.13	165.13	165.13	219.10	265.49
al año	62.75	102.38	-	-	53.97	46.39	-
bruto (fines de año)	62.75	165.13	165.13	165.13	219.10	265.49	265.49
depreciación (comienzo año)	-	1.66	6.02	10.38	14.74	20.69	28.00
anual depreciación	1.66	4.36	4.36	4.36	5.95	7.31	7.31
depreciación (fin año)	1.66	6.02	10.38	14.74	20.69	28.00	35.31
neto (fin año)	61.09	159.11	154.75	150.39	198.41	237.49	230.18
neto (promedio año)	61.09	161.29	156.93	152.57	201.39	241.14	233.84
trabajo (1% AFN)	0.61	1.61	1.57	1.52	2.01	2.41	2.34
inmovilizada	61.70	162.90	158.50	154.09	203.40	243.15	236.18

INTERCONEXION ELECTRICA S.A. ISA

Datos e Indices financieros. Período 1973 a 1982

(En millones US\$)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Activo fijo total, neto ISA	64,6	115,1	173,3	217,9	248,6	282,6	303,3	308,0	298,5	289,0	289,0
Índice (1972 = 100)	100	178	268	337	385	437	470	477	462	447	447
Activo fijo neto, Chivor I y II (servicio)	-	-	-	61,1	159,1	154,7	150,4	198,4	237,5	230,2	230,2
Salario de trabajo, neto	3,1	2,7	2,9	0,8	1,9	2,5	5,1	6,9	10,4	12,6	12,6
Patrimonio (capital y Utilidad Acumulada)	19,5	30,8	42,4	51,0	58,5	67,5	77,2	85,6	93,1	100,4	100,4
Exceso sobre capitalización a largo plazo	-	25,6	23,6	22,7	23,7	23,8	25,2	27,4	30,0	33,0	33,0
Estados y bonos	50,0	89,6	136,9	165,8	188,4	216,4	228,8	227,1	216,8	204,2	204,2
Exceso sobre capitalización (patrimonio más a largo plazo)	69,5	120,4	179,3	216,8	246,9	283,9	306,0	312,7	309,9	304,6	304,6
Exceso sobre activo fijo neto (inmovilizada, neta medio del año):	-	104,6	103,5	99,5	99,3	100,5	100,9	101,5	103,8	105,4	105,4
Activo fijo neto, Chivor I y II	-	-	-	61,7	162,9	158,5	154,1	203,4	243,2	236,2	236,2
Gastos de Explotación: Chivor I y II	-	-	-	6,05	17,5	17,5	17,9	24,9	30,9	30,4	30,4
Gastos de Explotación Chivor I y II	-	-	-	1,87	5,53	5,53	5,53	7,42	9,13	9,13	9,13
Gastos netos de Explotación Chivor I y II	-	-	-	4,18	11,94	11,9	12,39	17,4	21,8	21,2	21,2
Exceso sobre ingresos de explotación	-	-	-	69,09	68,22	68,0	69,22	69,88	70,55	69,74	69,74
Exceso sobre inversión inmovilizada	-	-	-	6,77	7,33	7,53	8,04	8,57	8,95	9,00	9,00
Indices financieros:											
Índice corriente	-	1,25	1,26	1,07	1,18	1,18	1,34	1,41	1,65	1,62	1,62
Índice de cobertura (Chivor I y II)	-	-	-	1,54	1,23	1,32	1,26	1,23	1,18	1,18	1,18
Índice de endeudamiento (relación deuda total (Patrimonio))	-	3,25	3,50	3,53	3,49	3,47	3,23	2,92	2,57	2,29	2,29
Índice de operación (Chivor I y II) (2) %	-	-	-	3,5%	6,7%	6,7%	6,5%	5,9%	5,9%	6,0%	6,0%

Ingresos neto de Explotación más depreciación dividida por el servicio deuda (Chivor I y II).

En la relación porcentual entre los gastos de explotación antes de depreciación y los ingresos de explotación (Chivor I y II).

INTERCONEXION ELECTRICA S.A. ISA

Requerimientos de aportes por los accionistas de ISA

(capital y emisión de bonos)

En millones de US\$

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
<u>E E E B</u>									
Chivor II y Telecom.	8.61	10.15	7.44	4.54	5.34	5.43	1.45	--	--
Emisión deuda Red Interc.	0.42	0.60	0.57	0.44	0.44	0.32	0.32	0.31	0.25
Estudios, Planta	0.55	0.67	0.39	0.47	0.45	0.45	0.30	0.04	0.02
Total	9.58	11.42	8.40	5.45	6.23	6.20	2.07	0.35	0.27
<u>E E P M</u>									
Chivor II y Telecom.	2.98	3.21	1.97	0.76	0.79	0.80	0.21	--	--
Emisión deuda	0.29	0.34	0.30	0.35	0.35	0.32	0.32	0.31	0.25
Estudios, Planta	0.55	0.67	0.39	0.47	0.45	0.45	0.30	0.04	0.02
Total	3.82	4.22	2.66	1.58	1.59	1.57	0.83	0.35	0.27
<u>E - CHIDRAL</u>									
Chivor II y Telecom.	1.85	2.07	1.39	0.70	0.79	0.80	0.21	--	--
Emisión deuda	0.27	0.31	0.28	0.35	0.35	0.32	0.32	0.30	0.25
Estudios, Planta	0.55	0.67	0.39	0.47	0.45	0.45	0.30	0.05	0.02
Total	2.67	3.05	2.06	1.52	1.59	1.57	0.83	0.35	0.27
<u>I C E L</u>									
Chivor II y Telecom.	5.09	5.35	3.11	0.96	0.94	0.96	0.26	--	--
Emisión deuda	0.31	0.38	0.35	0.38	0.38	0.32	0.32	0.31	0.25
Estudios, planta	0.55	0.67	0.39	0.47	0.45	0.45	0.30	0.05	0.02
Total	5.95	6.40	3.85	1.81	1.77	1.73	0.88	0.36	0.27
Total	22.02	25.09	16.97	10.36	11.18	11.07	4.61	1.41	1.08

INTERCONEXION ELECTRICA S.A. ISA
Resumen Estados Flujo de Fondos de los Accionistas en
relación con los requerimientos previstos por ISA
En millones de US\$

APENDICE X

<u>Accionistas:</u>	<u>Superávit</u> <u>(déficit)</u> <u>31/12/72</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
<u>E E E B</u>										
Entos según proyecciones ISA	--	9.58	11.42	8.40	5.45	6.23	6.20	2.07	0.35	--
" " " EEEB(1)	--	6.51	8.08	9.82	10.65	9.34	13.56	11.70	2.74	--
a Positiva (Negativa)	--	(3.07)	(3.34)	1.42	5.20	3.11	7.36	9.63	2.39	--
(Déficit) según EEEB	2.78	(1.03)	1.24	1.11	0.91	0.64	5.20	13.51	31.00	--
" " ISA	--	(4.10)	(2.10)	2.53	6.11	3.75	12.56	23.14	33.39	--
Endos sobre acc. ISA	--	--	--	0.08	0.30	0.62	1.03	1.45	1.81	--
t (déficit) ajustado (pe-	--	(4.10)	(2.10)	2.61	6.41	4.37	13.59	24.59	35.20	--
t (déficit) acumulado	--	(1.32)	(3.42)	(0.81)	5.60	9.97	23.56	48.15	83.35	--
<u>E E P M</u>										
Entos según proyecciones ISA	--	3.82	4.22	2.66	1.58	1.59	1.57	0.83	0.35	0.27
" " " EEP(1)	--	4.30	3.93	3.36	2.95	3.23	3.81	5.61	7.82	8.46
a Positiva (negativa)	--	0.48	(0.29)	0.70	1.37	1.64	2.24	4.78	7.47	8.19
(Déficit) Caja s/EEP	3.42	(1.90)	(1.80)	(1.78)	(2.43)	4.23	(2.85)	(0.41)	(3.44)	(2.18)
" " ISA	--	(1.42)	(1.51)	(1.08)	(1.06)	5.87	(0.61)	4.37	4.03	6.01
Endos sobre acciones ISA	--	--	--	0.08	0.30	0.62	1.03	1.45	1.81	1.87
t (déficit) ajustado (pe-	--	(1.42)	(1.51)	(1.00)	(0.76)	6.49	0.42	5.82	5.84	7.88
t (déficit) acumulado	--	2.00	0.49	(0.51)	(1.27)	5.22	5.64	11.46	17.30	25.18
<u>VC - CHIDRAL</u>										
Entos según proyecciones ISA	--	2.67	3.05	2.06	1.52	1.59	1.57	0.83	0.35	0.27
" " CVC(1)	--	1.95	2.54	2.10	1.85	1.78	1.13	1.31	1.41	0.94
a Positiva (Negativa)	--	(0.72)	(0.51)	0.04	0.33	0.19	(0.44)	0.48	1.06	0.67
(Déficit)Caja s/CVC	--	(1.56)	(6.86)	(2.03)	(1.92)	(2.85)	(0.01)	1.39	2.96	6.10
" " ISA	--	(2.28)	(7.37)	(1.99)	(1.59)	(2.66)	(0.45)	1.87	4.02	6.77
Endos sobre acciones ISA	--	--	--	0.08	0.30	0.62	1.03	1.45	1.81	1.87
t (déficit) ajustado	--	(2.28)	(7.37)	(1.91)	(1.29)	(2.04)	0.58	3.32	5.83	8.64
<u>ICEL</u>										
Entos según proyecciones ISA	--	5.95	6.40	3.85	1.81	1.77	1.73	0.88	0.36	0.27

Incluye otras inversiones además de los proyectos Chivor I, Chivor II y Telecomunicaciones.

COLOMBIA: ACONTECIMIENTOS ECONOMICOS RECIENTES

A. Crecimiento económico general

De acuerdo con estimaciones preliminares, el PIB de Colombia a precios constantes aumentó en un 7,1 por ciento en 1972, lo cual representó una significativa aceleración del ritmo de crecimiento con respecto al año anterior (5,5 por ciento) y al promedio del trienio 1969 - 71 (6,1 por ciento). Los principales factores que han coadyuvado en este comportamiento fueron la recuperación de los precios del café y de la producción agropecuaria, el fuerte incremento de las exportaciones menores y el crecimiento sostenido de la inversión pública. Dentro de este cuadro de la evolución de la economía colombiana, satisfactorio en términos generales, cabe señalar la tendencia creciente del aumento de los precios internos, iniciada en 1971 y acentuada en 1972, lo que se ha constituido en un elemento preocupante para las autoridades del país, sobre todo si se tiene en cuenta que en el período 1967-70 se había logrado una reducción en el crecimiento de los precios. Además, en 1972 se observó una notoria disminución del ritmo de aumento de las recaudaciones fiscales.

B. Sectores principales

El sector agropecuario es el de mayor importancia relativa dentro de la estructura económica colombiana, representando en 1971 el 27,6 por ciento del PIB, generando el 73 por ciento de los ingresos de exportación y dando ocupación al 40 por ciento de la población económicamente activa. En 1972 creció en un 5,4 por ciento, o sea a un ritmo inferior que el resto de la economía; sin embargo, esta tasa de aumento representó una importante recuperación en comparación con el año anterior, que fue del 2,2 por ciento, y con respecto al promedio del trienio 1969-1971 (3,9 por ciento). El bajo nivel observado en 1971 se debió, principalmente, a las condiciones adversas de tipo climático que afectaron las cosechas de buena parte de los productos agrícolas. El crecimiento de 1972 se reflejó particularmente en los incrementos de la producción del trigo, algodón, sorgo, soya, papa, y arroz.

El café ha sido el producto dominante en la economía colombiana, sin embargo en los últimos años ha disminuido su importancia relativa debido a los esfuerzos de diversificación de la producción agrícola y de las exportaciones. Dentro de estas últimas el café representaba el 72 por ciento en 1962 y en 1972 había descendido al 52 por ciento. Los precios del café en el mercado internacional se recuperaron, de un precio promedio de US\$0,49 la libra en 1971 subieron a US\$0,57 de promedio en 1972, y en 1973 continúan con tendencia creciente.

El sector manufacturero, uno de los más dinámicos de la estructura económica colombiana, creció en un 9,6 por ciento en 1972 de acuerdo con cifras preliminares, lo que significa que en este año se habría logrado la tasa de aumento más alta del período 1968-72. En base a datos parciales para 1972, la producción de cemento aumentó en un 7 por ciento (enero-agosto 1972), la soda cáustica en un 49,1 por ciento (enero-agosto 1972), la producción de lingotes de acero en un 16,6 por ciento (enero-octubre 1972) y la producción

de electricidad para usos industriales en un 12,7 por ciento.

El sector de la construcción creció un 5,0 por ciento en 1972 (cifra preliminar), o sea que disminuyó su tasa de crecimiento en comparación con el año anterior, que fue de 7,3 por ciento. La construcción urbana ha sido declarada actividad prioritaria en el último Plan de Desarrollo, y se está incentivando además la canalización del ahorro hacia este sector mediante la creación de un sistema de ahorro y préstamo con ajuste monetario, es de esperar, entonces, que esta actividad experimentará un notable impulso en el período 1973-74.

C. Situación fiscal

Los ingresos ordinarios del Gobierno Central a precios corrientes crecieron en un 12,9 por ciento, lo que representó una importante disminución de la tasa de aumento en comparación con los años 1970 y 1971, que registraron 26,2 y 20,6 por ciento, respectivamente. Asimismo, el crecimiento de 1972 se habría deteriorado en términos reales ante el aumento de las presiones inflacionarias experimentadas en ese año. El impuesto a la renta y complementarios aumentó en un 14,1 por ciento y los tributos sobre el comercio exterior lo hicieron en un 7,5 por ciento, incrementos notoriamente por debajo de los observados en los años anteriores. El Gobierno está adoptando un conjunto de medidas tendientes a mejorar los instrumentos tributarios y presupuestarios, con el objeto de obtener mayores ingresos que le permitan intensificar la inversión pública y lograr un control fiscal más eficiente.

Los gastos corrientes crecieron en un 12,1 por ciento en 1972, mientras que la inversión pública aumentó en un 21,3 por ciento. Los gastos e inversiones del Gobierno Central en este año muestran una saludable reorientación de los recursos hacia estas últimas, ya que el año anterior los gastos corrientes aumentaron en un 23,7 por ciento y la inversión pública en un 15,4 por ciento.

El déficit fiscal en 1972 alcanzó a 2.625 millones de pesos colombianos, lo que representó el 16,1 por ciento de los ingresos ordinarios netos 1/, mientras que el año anterior esta proporción fue del 11,5 por ciento. El financiamiento del déficit se realizó prácticamente a través del crédito externo, que aumentó en términos netos en un 167 por ciento respecto del año anterior, mientras que el crédito interno neto fue negativo, o sea que la política de endeudamiento permitió disminuir la deuda pública interna.

D. Oferta monetaria y desarrollo de los precios

Los medios de pago crecieron en 1972 en un 24,3 por ciento, o sea un incremento relativo de más del doble del observado en 1971, que fue de un 11,1 por ciento. Este fuerte aumento del medio circulante se debió, principalmente, a la expansión primaria derivada del importante aumento de las reservas netas internacionales del Banco de la República, el incremento del

1/ Netos de los Certificados de Abono Tributario (CAT).

crédito neto al Fondo de Promoción de las Exportaciones y la reducción de los depósitos del Gobierno Nacional. El índice promedio de los precios al consumidor obrero creció en un 13,8 por ciento en 1972, ritmo superior al del año anterior que fue de un 11,8 por ciento, y por encima del promedio del período 1967-70 (7,0 por ciento). El rubro alimentos dentro del índice de precios es el que acusó el mayor aumento (15,4 por ciento), debido en parte a deficiencias de abastecimiento interno como consecuencia de las malas cosechas de 1971, fallas en el sistema de mercadeo y orientación de la producción hacia la exportación.

E. Balanza de pagos y reservas internacionales

Las exportaciones registradas aumentaron en un 29,2 por ciento en 1972, lo que representa una significativa recuperación con respecto al año anterior, en el que habían disminuido en un 4,4 por ciento. Las importaciones registradas también crecieron en un 14,8 por ciento, mientras que en 1971 habían declinado en un 14,7 por ciento. El importante incremento de las exportaciones se debió principalmente, al fuerte aumento de las exportaciones no tradicionales, que lo hicieron en un 66,6 por ciento, superando holgadamente las metas propuestas en el Plan Cuatrienal de Exportaciones. Las exportaciones de café crecieron en un 7,1 por ciento, como consecuencia del mejoramiento de sus precios en el mercado internacional, lo que se compara favorablemente con la declinación del 1,3 por ciento observada en el año anterior.

El saldo de la balanza de pagos en cuenta corriente continuó siendo negativo y fue compensado en parte con los ingresos netos de capital. Como resultado del movimiento de las cuentas del sector externo las reservas netas internacionales del Banco de la República aumentaron en US\$ 183 millones, alcanzando el nivel sin precedentes de US\$ 353 millones a fines de 1972. Este importante crecimiento de las reservas del Banco de la República se debió fundamentalmente al incremento de las exportaciones y de los flujos del crédito externo neto. Las reservas del sistema bancario comercial también aumentaron en US\$ 6 millones, aunque continúan siendo negativas por US\$ 316 millones.

F. Deuda externa y capacidad de pago

El endeudamiento externo a largo plazo y pagadero en divisas alcanzaba a US\$ 2.226 millones al 31 de diciembre de 1972, de los cuales un 32,5 por ciento quedaba por utilizar. La amortización de las obligaciones contraídas se distribuyeron de la siguiente manera: más de 10 años, 53,9 por ciento; de seis a diez años, 21,6 por ciento; hasta cinco años, 24,5 por ciento.

Deuda Pública Externa a Largo Plazo Pagadera en Divisas
al 31 de Diciembre de 1972 a/
(en millones de US\$)

	Total	Desembolsada	Por Desembolsar
<u>Préstamos de Organismos Internacio- nales</u>	<u>973,9</u>	<u>565,0</u>	<u>408,9</u>
BID	192,2	93,4	98,8
BIRF	762,5	452,4	310,1
IDA	19,2	19,2	---
<u>Préstamos de Gobiernos Extranjeros</u>	<u>942,1</u>	<u>754,1</u>	<u>188,0</u>
EE.UU.	869,2	694,1	175,1
Canadá	18,1	13,0	5,1
Alemania	33,3	26,5	6,8
Italia	12,1	11,7	0,4
Otros	9,4	8,8	0,6
<u>Otros</u>	<u>310,6</u>	<u>170,9</u>	<u>139,7</u>
Bonos	13,0	13,0	---
Crédito de proveedores y bancos privados	<u>297,6</u>	<u>157,9</u>	<u>139,7</u>
TOTAL	<u>2.226,6</u>	<u>1.490,0</u>	<u>736,6</u>

a/ Con vencimiento original de un año o más.
Fuente: BIRF

De acuerdo con el cuadro siguiente, en 1972 el servicio de la deuda pendiente representa una relación de un 15,7 por ciento de los ingresos en divisas por concepto de las exportaciones de bienes y servicios en dicho año, aumento hasta 17,3 en 1978 y luego disminuye en los años posteriores.

Servicio de la Deuda Externa al 31 de Dic. de 1971

	<u>1972</u>	<u>1973</u>	<u>1975</u>	<u>1976</u>	<u>1980</u>	<u>1982</u>
Servicio (US\$ millones)	170,8	185,8	184,9	186,3	192,2	186,7
Porcentaje de las Exportaciones de 1972 <u>a/</u>	15,7	17,0	16,9	17,3	13,4	10,7

a/ Ingresos por bienes y servicios de US\$ 1.091 millones.

Teniendo en cuenta que la estructura de la deuda pública externa de Colombia es relativamente satisfactoria, y suponiendo la continuación de la política cambiaria y de la balanza de pagos en términos adecuados, este país parece tener una razonable capacidad para absorber el servicio adicional derivado de un aumento de la deuda pública externa, en términos y condiciones que no deterioren la situación actual.