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COLOMBIA

**LOANS TO CENTRAL HIDROELÉCTRICA DE CALDAS, S.A. (CHEC)
GENERATION, TRANSMISSION AND DISTRIBUTION PROJECT**

(CO0002, CO0001; 258/OC-CO, 374/SF-CO)

LOAN PROPOSAL

1973

COLOMBIA. GENERATION, TRANSMISSION AND DISTRIBUTION PROJECT

LOAN TO CENTRAL HIDROELECTRICA DE CALDAS (CHEC)

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BASIC COUNTRY DATA FOR COLOMBIA

(Preliminary data for 1971 and partially estimated for 1972)

AREA: 1,138,400 Km²
439,513 m²

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
Life Expectancy at Birth (1970): 53.3 years
Percentage of Literacy (1971): 78.5

Gross Domestic Product (GDP) (1971)

Total: 7,886 (millions of 1970 dollars)
Per Capita: 362 (1970 dollars)
Average rate of growth: 6.1% (1961-71)

Gross Domestic Product (GDP) (1972)

Average rate of growth: 7.1% (estimated)

Gross Investment (1971)

Total: 1,774 (millions of 1970 dollars)

Public Finances

Effective Central Government Operations (1971)

	(Col \$ Men.)	% of GDP
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 (end of year)

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
Money (million Col\$)	18,448	21,627	23,995	29,842
Consumer Prices (Workers 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	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

CURRENCY EQUIVALENTS

US\$ 1.00 = Colombian Pesos (Col.\$) 22.13 1/
Col.\$ 1 million = US\$ 45 187

UNITS AND EQUIVALENTS

1 kilovolt (Kv)	=	1 000 volts (v)
1 kilowatt (Kw)	=	1 000 watts (w)
1 kilowatt hour (Kwh)	=	1 000 watt hours (wh)
1 kilovolt ampere (Kva)	=	1 000 volt amperes (va)
1 megawatt (MW)	=	1 000 kilowatts (Kw)
1 megavolt ampere (MVA)	=	1 000 kilovolt amperes (Kva)
1 gigawatt hour (Gwh)	=	1 000 000 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 Regional del Cauca
EEEB	-Empresa de Energía Eléctrica de Bogotá
EMCALI	-Empresas Municipales de Cali
EPA	-Empresa Pública de Armenia
EPM	-Empresas Públicas de Medellín
ICEL	-Instituto Colombiano de Energía Eléctrica <u>2/</u>
IBRD	-International Bank for Reconstruction and Development
ISA	-Interconexión Eléctrica, S.A.
JNT	-Junta Nacional de Tarifas de Servicios Públicos

1/ Unless otherwise specified, this is the exchange rate used in this document for 1972 cost determination.

2/ Formerly Instituto de Aprovechamiento de Aguas y Fomento Eléctrico (ELECTRAGUAS)

 Foreign Trade and Net International Reserves of The Central Bank

	1969	1970	1971	1972
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)
Net International Reserves (in millions of US\$)	61.4	55.4	18.4	183.0
External Debt (in millions of US\$)				

Total (1972): 2,226.6

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

(x) Registered imports and exports.

COLOMBIA - GENERATION, TRANSMISSION AND DISTRIBUTION PROJECT

LOANS TO CENTRAL HIDROELECTRICA DE CALDAS (CHEC)

SUMMARY AND CONCLUSIONS

1. BORROWER AND EXECUTING AGENCY: The Central Hidroeléctrica de Caldas, S.A., a public corporation with headquarters in the city of Manizales, Department of Caldas.
2. GUARANTOR: The Republic of Colombia.
3. AMOUNT OF LOANS: The equivalent of US\$6,900,000.
4. SOURCE OF FUNDS: The equivalent of US\$4,500,000 from the Ordinary Capital resources of the Bank and US\$2,400,000 from the Fund for Special Operations, **entirely** in foreign exchange for direct and indirect foreign costs. 1/
5. TERMS: a) Loan from the Ordinary Capital: Amortization in 20 years, with the first of 32 equal installments of amortization and interest (level payments) payable 4 1/2 years from the date of the loan contract, with an interest rate of 8% per annum (including the Bank's 1% special commission) and a commitment fee of 1 1/4 % per annum. The loan would be disbursed in a 4 year period.
b) Loan from the Fund for Special Operations: Amortization in 30 years, with the first of 52 equal installments of amortization and interest (level payments) payable 4 1/2 years from the date of the loan contract, with an interest of 2% per annum, and a commitment fee of 1/2% per annum. The loan would be disbursed in a 4 year period.
6. OBJECTIVES OF THE LOANS: To finance 98.6% of the foreign exchange cost of the project. (The loans would include the financing of the interest during construction and the fee for IDB Project Supervision, but would exclude commitment fees).
7. PROJECT OBJECTIVE: The expansion and improvement of the generation, transmission and distribution facilities of the Central Hidroeléctrica de Caldas (CHEC) to help meet the projected growth in customer demand in its service area which has been exceeding 14% per year over the last five years, to raise the efficiency and reliability levels of electric service in the area, and to continue with the extension of its system to the rural areas of the Departments of Caldas, Quindio and Risaralda.
8. PROJECT DESCRIPTION: The project would consist of: a) the construction of small dams, spillways, intake works, canals, tunnels and desilting facilities to convey water from the San Francisco and Campoalegre Rivers, and the installation of the third 7,500 Kw unit at La Insula Hydroelectric Plant, to increase electricity production in the La Insula-Esmeralda-San Francisco complex of hydroelectric plants by approximately 100 million Kwh annually; b) the expansion of switching facilities

1/ The proceeds of the loan from the Fund of Special Operations would be used to finance the foreign costs on the transmission and distribution works to be carried out in areas outside Manizales.

at three 115 Kv substations and the construction or expansion of 8-33/13.2 Kv substations involving the installation of approximately 4,450 Kva in new power transformer capacity; c) the expansion and improvement of the primary and secondary distribution system in Manizales including related work in the Alta Suiza feeder substation, the construction of 7.3 kilometers of underground and aerial 13.2 Kv distribution feeders, the installation of distribution transformers having a total capacity of some 15,000 Kva, the construction of 63 kilometers of 220/110 secondary lines and the installation of 11,000 customer watt-hour meters; d) the expansion and improvement of the distribution systems outside Manizales including the construction of 59.4 kilometers of 13.2 Kv distribution feeders to serve urban centers in the eastern part of Caldas and the construction of 730 kilometers of rural lines; and, e) the acquisition of communication, maintenance and line construction equipment.

9. COST AND FINANCING OF THE PROJECT: The total cost of the proposed project is estimated at US\$ 13,200,000 and would be financed as follows:

Categories and Principal Sub-divisions ^{2/}	IDB Loans			CHEC		Other ^{1/} Loans and Contributions	Total
	OC F.Ex.	FSO F.Ex.	Sub-Total	F.Ex.	Loc. Curr.	Loc. Curr.	
1. ENGINEERING AND ADMINISTRATION							
1.1 Engineering and Sup. of Const.	343	-	343	-	714	-	1 057
1.2 Administration and Gen. Exp.	-	-	-	-	470	-	470
Total Category 1	343	-	343	-	1 184	-	1 527
2. DIRECT COST OF CONSTRUCTION							
2.1 Generation	2 385	-	2 385	-	975	1 497	4 857
2.2 Transmission	-	545	545	-	39	134	718
2.3 Distribution							
2.31 Distribution-Manizales	422	-	422	-	251	162	835
2.32 Distribution-Outside Manizales	-	1 398	1 398	-	735	659	2 792
2.4 General Installations	180	-	180	-	27	-	207
Total Category 2	2 987	1 943	4 930	-	2 027	2 452	9 409
3. FIN. CHARGES DURING CONSTR.							
3.1 Interest IDB Loans	698	103	801	-	-	-	801
3.2 Comm. Fees IDB Loans	-	-	-	99	-	-	99
3.3 IDB Project Supervision	45	24	69	-	-	-	69
Total Category 3	743	127	870	99	-	-	969
5. UNALLOCATED							
5.1 Contingency	267	208	467	-	538	-	1 005
5.2 Provision for Escalation	160	130	290	-	-	-	290
Total Category 5	427	338	767	-	538	-	1 295
TOTAL	4 500	2 400	6 900 ^{3/}	99	3 749	2 452	13 200
Percentages	34.1	18.3	52.4	0.7	28.3	18.6	100.0

1/ Loans and capital contributions from the Comités Cafeteros de Risaralda, Caldas and ICEL.

2/ Only those categories of investment appropriate to this project have been shown.

3/ Includes indirect foreign exchange costs equivalent to US\$802,000, of which the equivalent of US\$335,000 corresponds to the possible OC loan and US\$ 467,000 to the FSO loan.

10. BIDDING REQUIREMENTS: Goods and service contracts for the entire project, which exceed the equivalent of US\$25,000 in the case of the FSO financed works and US\$50,000 in the case of the OC financed works would be acquired through public bidding. When goods and services are financed in whole or in part with the foreign exchange resources of the Bank's loans (OC) and (FSO), international competition procedures would be used, based on a list and contracting program of goods and services acceptable to the Bank.
11. TECHNICAL ASSISTANCE: This project does not provide resources for technical assistance, but a sum of approximately US\$350,000 has been included in the foreign exchange portion of the Engineering and Administration category of investment in order that CHEC may contract the services of an engineering consulting firm to assist it in the engineering designs, preparation of specifications and bidding documents, as well as the analysis of bids, selection of best bids and the supervision of all work related to the generation part of the project. The contracting of the engineering consulting firm would be effected in accordance with the Bank's procedures.
12. PREVIOUS IDB LOAN TO CHEC: In December, 1965, the Bank approved loan 125/OC-CC to CHEC, for the equivalent of US\$8,100,000 for the construction of the San Francisco Hydroelectric Plant and its complementary installations. The principal facilities included in that loan were satisfactorily completed and in operation by 1970. (An evaluation of this loan is presented in chapter III and in Appendix I of the loan document).
13. CONCLUSIONS: The CHEC organization, management, and financial and technical administration are considered competent and acceptable. Its technical unit, however, requires specialized engineering assistance in the design and supervision of large civil works, although it is capable of executing all other types of work normal to a utility entity. In addition there is a need to complete its financial administration by engaging two qualified professionals to fill one vacancy (Chief, Finance Division) and one new position (Internal Auditor). It has the authority and sufficient legal capacity to operate as an integrated electric utility entity and to enter into contracts and agreements in foreign or in local currencies. It is operating efficiently as evidenced by a highly satisfactory operating ratio of 49% for 1972. The financial situation over the 1968-1972 period was generally acceptable although the rates of return on net utility investment were low (3.8% to 5.0%) in comparison with those of the larger Colombian utility entities. It has also maintained unsatisfactory current ratio but is expected to improve its liquidity situation in the future, in part by the contracting of credit from local sources to pay off some of its current obligations. The CHEC tariffs have been in the lower quarter of the scale of tariffs for Colombian utilities, although tariff increases have recently been authorized. CHEC's physical facilities are in good to excellent condition. The 4.16 kv. underground distribution system in Manizales is overloaded and measures are being taken for its substantial improvement. There are no restrictions in service and all applications for new services are being attended. The project has been found to be feasible from the legal, technical and economic aspects, and in keeping with latest engineering practices. Its construction cost is considered reasonable, containing sufficient allowance for contingencies and escalation. The project can be executed by CHEC in the 4-year period envisaged, using its usual policy

of contracting the major civil and erection services with experienced national firms, and providing most materials and equipment from its own stock acquired through public international bidding. The continuation of rural electrification works included in the project would be carried out on a "global" procedure using criteria acceptable to the Bank.

Procurement for the project would be in accordance with a contracting program and public bidding procedures that are satisfactory. The projected average increase of around 10% per year in sales of the CHEC system over the 1973-1982 period is considered reasonable with the installation of the new facilities of the project and the commitment of ISA to furnish energy and peak power after 1977. The financial projections based on the estimated sales and recently approved increased tariffs that will be fully implemented by 1974, clearly show a gradually improving tendency in CHEC's financial situation and that the project is viable within the total operations of the utility.

I. INTRODUCTION

A. The Application

1.01 On April 9, 1973, the Central Hidroeléctrica de Caldas (CHEC) submitted to the Bank a formal loan application for the equivalent of approximately US\$7,300,000, to finance the foreign exchange cost of a project for the expansion and improvement of the generating, transmission and distribution facilities of the CHEC for the period 1973-77. From this total approximately US\$5,950,000 was requested from the Ordinary Capital and approximately US\$1,350,000 from the Fund for Special Operations.

B. Priority

1.02 On June 5, 1973, the Departamento Nacional de Planeación sent a letter to the Bank stating that the project to expand and improve the La Insula-Esmeralda-San Francisco generation system and the expansion and improvement in the transmission, subtransmission and distribution (urban and rural) system of CHEC, fits into the general guidelines of the National Development Plan of Colombia, is considered of high priority within the energy sector and has been included by the Colombian authorities in the list of projects for external financing in 1973-74 presented to the meeting of the Consultative Group for Colombia, held in June, 1973. During this meeting, the IDB expressed its interest in participating in the financing of the project.

C. Bank Missions

1.03 An Orientation Mission remained in Colombia (Manizales) between February 26-27, 1973 for the purpose of a preliminary review of the project for which CHEC had informally requested the Bank's financing. On the basis of the studies carried out in the field, a Summary of the Application was prepared and on April 24, 1973, the Loan Committee considered it and recommended the creation of the Project Committee.

1.04 After the establishment of the Project Committee, an Analysis and Negotiation Mission was sent to Colombia and remained there from May 29 to June 19, 1973 for the purpose of evaluating the technical, financial, economic and institutional aspects of the project, discussing with CHEC executives the basic conditions under which the Bank could study its financing of the project and making a detailed evaluation of the Bank's previous loan to CHEC (Loan 125/OC-CO). In the light of more accurate estimates of cost made by CHEC, and a detailed analysis by the Project Committee at Headquarters, it was concluded that the financing required from IDB should be reduced to US\$ 6,900,000 and that US\$ 4,500,000 should be from the Ordinary Capital resources of the Bank and US\$ 2,400,000 from the Fund for Special Operations.

D. The Electric Power Sector in Colombia 1/

1.05 In the period 1965-1972 the average annual growth in generating capacity reached 13% culminating in a total installed capacity at the end of 1972

1/ For details of the planning and financing aspects of the electric power sector in Colombia, see EEBB Loan Document, PR-574 of March 29, 1973.

of 2,540 MW in the electric power sector of Colombia. Approximately 71% of this capacity was installed in hydroelectric plants and the remaining 29% in thermal plants. The hydroelectric plants are located in central Colombia serving the Bogotá, Medellín, Cali and CHEC markets. The principal thermal plants are located in the coal producing regions outside Bogotá, the Atlantic Coast Region and the Northeast of Colombia. Self producers associated with industrial plants represented 10% of the installed capacity in 1972. The most important public service companies in the electric power sector of Colombia (supplying 95% of the energy produced by all public service companies) were: 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 de Valle del Cauca (CVC). ICEL is a government-owned enterprise with national responsibility for power supply. It controls 15 "Electrificadoras", including CHEC, which provide service to 20 of the country's 29 Departments outside the areas of service of EEEB, EPM and CVC. Of all the "Electrificadoras", CHEC is considered to be the most important, in view of the strategic location of Manizales and its interconnecting substations at the center of the triangle having at its points the cities of Medellín, Bogotá and Cali. EEEB and EPM are municipally-owned public service corporations, generating and distributing power in Bogotá and Medellín, and their outskirts, respectively. CVC is a multiple-purpose, autonomous regional entity responsible for developing mainly agriculture and power in the Cauca Valley. It operates the Central Hidroeléctrica del Río Anchicayá Ltda., (CHIDRAL) which sells energy in bulk for distribution to Empresas Municipales de Cali (EMCALI) and to several other smaller distributors.

1.06 In 1967 two other principal entities were created in the electric power sector in Colombia; the Corporación Eléctrica de la Costa Atlántica (CORELCA), responsible for interconnecting the major markets of the northern region, and Interconexión Eléctrica (ISA) which was founded by the four large public service entities (ICEL, EEEB, EPM, and CVC) for the interconnection of the hydroelectric plants of the central zone of Colombia. Plans are underway to interconnect the CORELCA and ISA systems.

1.07 Present plans call for expanding the installed generating capacity to some 5,000 MW by the end of the present decade, which is expected to involve an estimated US\$ 1.6 billion in additional investment. This expansion would imply an annual rate of growth of generating capacity of approximately 10% during that period.

II. THE PROJECT

A. The Project Service Area

(1) Geographical Area and its Characteristics

2.01 The area of influence of the project includes the Departments of Caldas, Risaralda and Quindío, in the western-central region of Colombia, having a combined land surface of some 13,070 km². With a population of 1.8 million inhabitants, the area has one of the highest demographic densities in Colombia at 130 inhabitants/km². The population growth in the period between 1951 and 1964 was an average of 2.3% per year, which was less than the 3.2% for the country as a whole. Notwithstanding, the principal urban centers of the area, Manizales, Pereira and Armenia, are growing at a rate of 5.5% per year as a result of the process of urbanization which is taking place throughout Colombia. Of the total population in the area, some 66% live in urban centers.

2.02 The principal economic activity in the area is the cultivation of coffee. The three departments produce around one-third of the total Colombian coffee production from a preponderance of small land-holdings. There is also some production of cattle and a variety of crops, but such production is of much less importance than coffee in the area, even though the much larger expanses of land utilized in the holdings for the former are in sharp contrast to the small sizes of the coffee producing farms. The Colombian authorities, through the Fondo de Diversificación de Zonas Cafeteras in cooperation with the Comités Cafeteros, are intensifying a program of encouraging and assisting farmers in diversification of agricultural production to lessen the areas dependence on only one principal crop.

2.03 Industrial activity is beginning to develop in the area with the completion of a cement plant and a number of textile plants in Armenia, Pereira and Manizales. This industrial activity, although relatively important in the area, represents only 4% of the total value added in the country. The area also has some mineral resources (mercury, antimony, asbestos, carbon and gold) that are being mined industrially on a small scale.

2.04 It is estimated that the family income levels in the area are lower than the published income levels for Manizales which are shown below for the year 1970:

<u>Average Monthly Income</u>		<u>Percentage of</u>
<u>Pesos</u>	<u>US Dollars</u> ^{1/}	<u>Families</u>
to 750	to 39.12	9.52
751-1 500	39.13-78.24	27.55
1 501-2 500	78.25-130.41	25.06
2 501-3 500	130.42-182.77	8.80
3 501-4 500	182.78-234.74	10.03
4 501-6 000	234.75-312.98	6.19
6 001-8 000	312.99-417.31	6.26
8 001-10 000	417.32-521.65	3.59
Over 10 000	Over 521.65	3.00
		<u>100.00</u>

^{1/} Conversion into US dollars based on US\$1 = Col. Pesos 19.17, the average 1970 exchange rate.

2.05 It can be noted from the table shown in the preceding paragraph that some 62% of all families in the area had income levels of less than US\$130 per month and that 37% had income levels of less than US\$78 per month. The average size of a family in these income levels was six persons.

2.06 Of the total number of city dwellers, estimated at 1.2 million persons, more than 64% are concentrated in the Manizales, Pereira, Armenia and Calarcá area, and the rest are distributed in 45 much smaller towns. The urban areas of 47 out of the 49 municipalities in the area receive CHEC energy. The other two have their own electric plants. The municipality of Manizales with an urban center of more than 300,000 inhabitants is the largest in the area and the only one in Caldas having an urbanized nucleus of more than 40,000 persons.

2.07 Practically all the urbanized centers of population and some rural sections in the area receive electric service from a public service system. With the exception of certain isolated villages in the eastern and western parts of Caldas, all the rest of the area is served via an interconnected transmission and subtransmission system that reaches some 65 population centers, among these the principal cities, and numerous rural extensions. The most important public service entity in the area is CHEC, serving 33 urban centers directly, including the city of Manizales, and selling in bulk to 34 other municipal distributors, some of which (Armenia, Pereira and Calarcá) produce part of their energy requirements from their own generating equipment.

2.08 The installed generating capacity (nameplate) in the region is approximately 210 MW, of which 187.5 MW is part of CHEC's plant-in-service and the rest pertain to other municipal public service entities, i.e., Pereira (17 MW), Armenia (2 MW), Calarcá (1 MW) and other smaller entities (2 MW). With the exception of the Pereira Diesel Plant (4 MW) and CHEC's La Dorada Diesel Plant (2 MW), all the interconnected plants in the area are hydroelectric.

2.09 In the following table recent annual electric energy production figures for the area are shown, segregating production in CHEC's facilities from that of the other enterprises:

<u>Year</u>	<u>CHEC Production</u> <u>(millions Kwh)</u>	<u>Other Production</u> <u>(millions Kwh)</u>	<u>Total</u> <u>(millions Kwh)</u>
1968	292.6	118.0	410.6
1969	411.0	117.6	528.6
1970	532.0	113.7	645.7
1971	551.0	109.8	660.8
1972	535.7	109.0	644.7

(2) Description of existing electric power facilities in operation and under construction

2.10 CHEC is the principal distributor of electric energy in the project area, producing around 85% of the energy used from one small diesel plant and seven hydroelectric generating plants it owns and operates, having a

total capacity of 187.1 MW. The principal CHEC hydroelectric plants (San Juan, 140 MW; La Esmeralda, 30 MW; and La Insula, 15 MW) are interconnected with the principal load centers of the CHEC area, as well as the CVC and EEEB systems by 280 kms of 115 Kv transmission line.

2.11 The subtransmission system includes 270 kms of 33 Kv lines and some 600 kms of 132 Kv and 4.16 Kv feeders. CHEC also has five main 115/33 Kv substations in operation at Regivit, La Dorada, Manizales, La Insula and La Rosa having a total capacity in power transformers of 200 MVA, as well as 23-33/13.2 receiving substations having a total capacity of some 115 MVA.

2.12 CHEC served over 63,000 consumers directly through this system in 1972, whose consumption approached 335 million Kwh. Bulk sales to ISA and others resulted in total sales of 482 million Kwh in 1972.

2.13 The 33 Kv and 13.2 Kv feeder system is continuing to be extended into the less populated areas at the system limits. The only sections in CHEC's service area that CHEC lines did not reach at the beginning of 1971 were those in the eastern part of Caldas situated between the Cordillera Central and the Magdalena River: i.e., La Dorada, Manzanares, Victoria, Samaná, Marquetalia, Pensilvania and Marulandia. To electrify this important coffee growing area, a 115 Kv transmission line was designed, constructed and placed in operation in 1972 between Manizales and La Dorada and is serving also as the backbone in the development of the 33 Kv and 13.2 Kv rural electrification feeders in the eastern part of Caldas.

2.14 In general, the CHEC generating, transmission and subtransmission facilities can be considered in good to excellent condition; however, the principal feeders of the underground distribution system in Manizales are overloaded contributing to higher than normal system losses. Measures are being taken to eliminate the situation through construction of additional underground distribution substations and the installation of larger and more conductors in the affected zones of the project. There are no restrictions in service and all applications for new services are being attended to within a 15-day period.

(3) Present and Future Market for Electric Power

2.15 In 1972, total CHEC production was 535.7 million Kwh and that of the other entities operating in the Caldas-Quindío-Risaralda area was 109.0 million Kwh for a total of 644.7 million Kwh. It is expected that the production from the facilities pertaining to the other operating entities will remain constant at around 110.0 million Kwh per year and that the balance of the area requirements will be met by CHEC.

2.16 CHEC sales for the years 1968-1972 are shown in the following table, along with other market highlights for this period:

	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
No. of Consumers Directly Served (000's)	49.5	52.2	54.9	57.9	63.3
<u>Sales (millions of Kwh)</u>					
- CHEC System	199.3	225.7	262.9	305.8	334.7
- ISA and Others	55.2	143.9	222.7	197.2	147.4
Total Sales	254.5	369.6	485.6	503.0	482.1
CHEC System Average Level of Consumption (Kwh/Consumer)	4 026	4 324	4 789	5 282	5 288
System Losses % of Sales	18.7	18.6	17.7	16.1	15.0
Maximum Demand (MW)	54.0	71.0	83.0	89.2	104.6
System Load Factor (%)	51.3	43.5	42.7	45.1	43.6

2.17 From the above table it can be seen that total sales increased at an average of some 14% per year, although sales to consumers directly served by CHEC increased by some 11% per year over the 1968-1972 period. The increase in sales to CHEC consumers reflect an average increase of a little over 5% per year in number of consumers and a 6% increase in average annual use per consumer (from 4,026 Kwh to 5,288 Kwh per year). Maximum demand on the system increased by an average of 15% per year which is higher than the growth being experienced in the country as a whole.

2.18 The projections of sales were prepared by CHEC's Technical and Administrative Divisions and take into account the following factors:

- the population growth in the larger urban centers in the area, from DANE and census estimates;
- the average annual consumption level per consumer (by classification of user) and its growth, based on past trends;
- the average annual increase in number of consumers (by classification of user);
- the increases brought about by larger industries to be connected to the system during the period of the projections;
- the estimate of purchases by ISA assigned to CHEC, based on its market requirements;
- the elimination of bulk sales to other ICEL "Electrificadoras" and to the CVC as their generating requirements are met by their own facilities coming on stream during the period of the projections.

2.19 Using these factors the projections of sales for the CHEC system are shown in Appendix C. The average annual increase in sales indicated during the 1973-1982 period is around 10% per year which compares favorably with the 11% obtained during the 1960 to 1971 period in Colombia. The average annual percent increases in maximum demand and consumers are indicated as 10% and 6% respectively, which are considered conservative and satisfactory.

B. The Project

(1) Objectives of the Project

2.20 The objectives of the project are:

- (a) The expansion and improvement of the generation, transmission and distribution facilities of the CHEC system to help meet the projected growth in customer demand in its service area through 1977;
- (b) to raise the efficiency and reliability levels of electric service in its concession area, particularly in Manizales, by properly distributing loads among substations, reducing system losses and improving voltage regulation by replacing overloaded conductors and increasing current carrying capacity; and
- (c) to continue the electrification of the coffee growing rural areas in the eastern and western parts of Caldas.

(2) Project Description

2.21 The generation, transmission and distribution project, which is expected to be constructed in the next four years, will consist of two water conveyance works, and the installation of new generating capacity at La Insula to increase the total CHEC production in its La Insula-Esmeralda-San Francisco system by some 100 million Kwh annually by 1977 and complementary transmission, subtransmission and distribution works in Manizales and other localities in the service area. A description of the work included in the project by classification is given in the subsequent paragraphs.

2.22 Generation - The generation works, located as indicated in the general map included in Appendix D-1, cover: (i) the conveyance of an average of $3.9 \text{ m}^3/\text{sec}$ of water from the San Francisco River to the San Francisco Reservoir, via a small diverting dam with a spillway section, an intake structure, some 4.5 kilometers of canals, steel pipe and tunnels and a desilting basin; (ii) the conveyance of an average of $6.6 \text{ m}^3/\text{sec}$ of water from the Campoalegre River to the Camadeguadua Reservoir via a small diverting dam with a spillway section, an intake structure, some 2.7 kilometers of canals and tunnels and a desilting basin; and, (iii) the acquisition and installation of the third 7,500 Kw unit at La Insula, for which provision had already been made at the time the plant was built, complete with 10,000 Kva step-up substation.

2.23 Transmission - The transmission works, indicated in the transmission map for the CHEC system included in Appendix D-2 include: (i) the expansion of the Regivit Substation by two 115 Kv switching positions, including all equipment to tap the Ibaguè to Zarzal 115 Kv Line fed from the Flandes Substation in Tolima; and, (ii) the expansion of one position and a spare at the 115 Kv substation at La Dorada.

2.24 Subtransmission - The subtransmission works include the construction of 53 kilometers of 33 Kv line in the western and northeastern parts of Caldas, together with the installation of 4,450 Kva of power transformer capacity in 8 new or expanded 33/13.2 Kv substation in these areas.

2.25 Distribution in Manizales - These works include the expansion and improvement of the primary and secondary distribution system in Manizales including related work in the Alta Guiza feeder substation, the construction of 7.3 kilometers of underground and aerial 13.2 Kv distribution feeders, the installation of distribution transformers having a total capacity of some 15 000 Kva, the construction of 63 kilometers of 220/110 v secondary lines and the installation of 11,000 customer watt-hour meter.

2.26 Distribution outside Manizales - This portion of the project, which would be the main portion financed by the possible FSO loan, includes the expansion and improvement of the distribution systems outside of Manizales, including the construction of 59.4 kilometers of 13.2 Kv distribution feeders to serve urban center in the eastern part of Caldas and the construction of 730 kilometers of rural lines.

2.27 General Installations - Also included in the project are the acquisition of carrier communications and radiotelephone equipment, line maintenance and construction equipment and a traveling crane for the maintenance shop.

(3) Cost and Financing of the Project

2.28 The total cost estimate of the project is the equivalent of US\$13,200,000 and is detailed in Appendix E. A summary of Appendix E is shown below, grouping the items into categories of investment and principal subdivisions and indicating the amounts in thousands of equivalent US dollars:

Categories and Principal Sub-divisions	Foreign Exchange			Local		%
	Direct	Indirect	Total	Currency	Total	
1. <u>ENGINEERING AND ADMINISTRATION</u>	343	-	343	1 184	1 527	11.6
2. <u>DIRECT COST OF CONSTRUCTION</u>						
2.1 Generation	2 192	193	2 385	2 472	4 857	36.8
2.2 Transmission	498	47	545	173	718	5.4
2.3 Distribution						
2.31 Distribution-Manizales	339	83	422	413	835	6.3
2.32 Distribution-Outside Manizales	1 023	375	1 398	1 394	2 792	21.2
2.4 General Installations	180	-	180	27	207	1.6
Total Category 2	4 232	698	4 930	4 479	9 409	71.3
3. <u>FIN. CHARGES DURING CONSTRUCTION</u>						
3.1 Interest IDB Loans	801	-	801	-	801	6.0
3.2 Comm. Fees IDB Loans	99	-	99	-	99	0.8
3.3 IDB Project Supervision	69	-	69	-	69	0.6
Total Category 3	969	-	969	-	969	7.4
5. <u>UNALLOCATED</u>						
5.1 Contingency	403	64	467	538	1 005	7.5
5.2 Provision for Escalation	250	40	290	-	290	2.2
Total Category 5	653	104	757	538	1 295	9.7
TOTAL COST OF PROJECT	6 197	802	6 999	6 201	13 200	100.0
Percentages	47.0	6.1	53.1	46.9	100.0	

2.29 Under the Direct Cost of Construction category, the generation classification cost of the project was based on the feasibility study and bidding-level documents prepared by Syndibel, a Belgian consulting engineering firm, in fulfillment of a contract for these services signed with CHEC in 1970.

2.30 For all other classifications, the costs were based on CHEC's estimates, up-rated during the Analysis Mission to reflect costs in effect in February, 1973. In order to take into account the capability of Colombian industry to furnish a portion of the supply, analysis indicated that 50% of the conductor and distribution transformer requirements could be produced in Colombia from raw materials imported following international competitive bidding. The costs of the raw materials are shown as indirect foreign exchange costs. The only items that would not be acquired in international bidding are poles, crossarms, pin and disc insulators, common hardware and mercury street lighting fixtures that are currently satisfactorily produced in Colombia. Payment for these items would be made from the counterpart funds.

2.31 The Direct Cost of construction category of the project, amounting to US\$9,409,000, is summarized in paragraph 2.28 and is detailed on pages 2, 3 and 4 of Appendix E

2.32 Costs for the items indicated below were computed as percentages of the Direct Cost of Construction category, using the experience of Loan 125/OC-CO in this determination, and are as follows:

For Engineering and Supervision of Construction

- Conveyance Works	7.2%
- Transmission and Distribution	15.0%

Administration and General Expense

- All classifications of works	5.0%
--------------------------------	------

Contingencies (to cover omissions and unforeseen items)

- Conveyance Works	
On Civil Works	15.0%
On Equipment	10.0%
- Transmission and Distribution	8.0%

2.33 The Direct Cost of Construction and the General Construction Costs (Engineering and Administration and General Contingency items of investment) amount to approximately US\$11,041,000, which is the Total Construction Cost of the project before a provision for escalation and before financial charges during construction. Included in the estimate for the Engineering and Administration category are the foreign exchange costs of a consulting firm to be contracted by CHEC for engineering design and supervision of the construction services related to the conveyance works of the project included in the Generation classification.

2.34 A provision for escalation of approximately US\$290,000, distributed over the 1973-1977 period, was added to the foreign exchange component of the total construction cost, and was based on trends of construction and price indices within Colombia and the depreciation in purchasing power of the US dollar, the currency in which the cost estimates are represented. In determining the provision for escalation, it was assumed that the annual local currency investments in the construction cost, converted into US dollars at the average official 1972 rate of exchange, would adequately reflect the Colombian peso expenditures to be made for the project over the 1973-1977 period of execution, supposing there is no substantial change of work scope. For the foreign exchange component, a rate of 5% per year cumulative was used to adjust the construction cost. The construction cost of US\$11,941,000 (see paragraph 2.32) plus the provision for escalation of US\$290,000, or US\$12,231,000, represents the project cost before financial charges and is considered reasonable, with sufficient allowance for contingencies.

2.35 To determine the amount of the investment that is required to be financed, the financial charges that are payable during the construction period are added to the project cost. The computation of these financial charges was made on the basis of the following financial scheme agreed to in principle by the Bank and CHEC:

- The Bank would consider the financing of the foreign exchange costs of the project, except for the commitment fees.
- In accordance with the criteria already established for other energy sector projects in Colombia (ICEL loans 211/OC and 290/SF) the Bank would consider using OC for the generation and general installations classification, as well as for subtransmission and distribution works in urban centers having 40,000 or more inhabitants; and FSO for transmission, subtransmission and distribution works that would benefit urban centers of under 40,000 inhabitants and rural users;
- Usage of loans and contributions available from the Comités de Cafeteros, and shareholders; and,
- The maximum advisable participation of CHEC to cover as much as possible of the local currency costs from internal cash generation over the construction period.

2.36 The criteria referred to above for the allocation of FSO resources in the ICEL project were based upon a reasoning which it is also felt is applicable to the proposed CHEC project, given the similarity of objectives. The ICEL project includes: i) rehabilitation of distribution systems in 127 urban centers, and (ii) the expansion of such systems in 112 of these urban centers, those with fewer than 40,000 inhabitants. This difference in the planning of the project was due to the premise considered in preparation of the ICEL project that the 15 largest cities included in the project, all of which have considerably more than 40,000 inhabitants would be able to generate the funds needed to finance the expansion of their own distribution systems.

Although no detailed statistics exist in Colombia on the distribution of personal incomes in rural urban areas, studies on this subject concur in the conclusion that the existence of large urban centers in all regions and/or departments of Colombia which have sizable populations has resulted in regional income differentials in Colombia being less than those prevailing in most of the developing countries.^{1/} Income is, however, concentrated in the comparatively larger cities whose higher average personal incomes exert a decisive influence on the average income obtained for the departments where these cities are located. In short, although there is relatively little difference in the average personal incomes of the various regions or departments of Colombia, there is a substantial difference within regions or departments according to where people live.

On the basis of the concepts set forth in the preceding paragraph, which were verified by Bank analysts, it was agreed in the ICEL project that a combination of soft and hard resources would be the formula best

^{1/} Source. Reseña de los Estudios de Distribución de Ingresos en Colombia, Miguel Urrutia Montoya, Revista del Banco de la República de Colombia, February 1970.

suited to the nature and objectives of the project, since it would equitably and reasonably take account of the economic capacity of the potential beneficiaries of the investments to be made and would therefore be consistent with Bank policy in this area. The recommended share of each type of financing was determined in the light of the economic capacity of the prospective beneficiaries. In accordance with this criterion, it was considered in the ICEL case and is proposed in the CHEC case that cities with more than 40,000 inhabitants could cover the harder investment financing costs represented by the ordinary capital resources of the Bank, since their larger electric power markets permit the provision of electric energy on a cheaper per person basis. In contrast, other urban and rural centers included in the project, with limited electric power markets and a large majority of marginal, very low-income consumers, would be eligible for financing with resources of the Fund for Special Operations.

The benefit to be derived from the lower financial costs resulting from partial utilization of the Fund for Special Operations (FSO) in these cases is passed on in full to the ultimate beneficiaries of the investments. In a project such as that for ICEL or the one under study, this is done not through different energy rates, which are quite impractical in a system such as CHEC's, but rather through: a) the mere fact of providing service to persons in small towns or rural areas, and b) the maintaining of uniform tariff rates. In other words, if it were not for the lower financial costs of FSO resources, it would not be feasible to provide service to persons who live in small towns or rural areas except by establishing much higher rates for these dispersed customers than for those who live in larger urban concentrations. Not only would this latter possibility result in bookkeeping problems for the institution, but it would also result in a socially unacceptable situation where the poorer people in a given system pay rates not only higher in absolute terms than those living in cities, but also much higher in terms of percentage of their average personal income.

2.37 In accordance with an estimated program of disbursements of the Bank's loans as required in the scheduled execution of the project, the financial charges during construction were computed as follows, in thousands of US dollars.

	<u>OC Loan</u>	<u>FSO Loan</u>	<u>Total</u>
Interest and Service Charge	698	103	801
Commitment Fees	83	16	99
Supervision Charges	<u>45</u>	<u>24</u>	<u>69</u>
TOTAL	<u>826</u>	<u>143</u>	<u>969</u>

2.38 The IDB loans (US\$6.9 million), covering approximately 52.4% of the total project cost, would finance all foreign exchange costs^{1/} (including the financial charges on IDB loans except the Commitment Fees). The detailed financial plan of the project is shown in Appendix E and is summarized by Categories of Investment and principal subdivisions, in thousands of US dollars, as follows:

^{1/} US\$6,098,000 would be for direct foreign exchange costs and US\$802,000 would be for indirect foreign exchange costs.

CATEGORIES AND PRINCIPAL SUB-CATEGORIES									
1. ENGINEERING AND ADMINISTRATION									
OC	F.Ex.	FSO	Sub-	F.Ex.	Loc.	Loc. Curr.	Other	Total	
1.1 Engineering and Sup. of Const.	-	-	343	-	714	-	-	1 014	
1.2 Administration and Gen. Exp.	-	-	-	-	470	-	-	470	
Total Category 1	-	-	343	-	1 184	-	-	1 184	
2. DIRECT COST OF CONSTRUCTION									
2.1 Generation	2 385	-	2 385	-	975	1 497	-	4 857	
2.2 Transmission	-	545	545	-	39	134	-	718	
2.3 Distribution	-	-	-	-	-	-	-	-	
2.31 Distribution-Manizales	422	-	422	-	251	162	-	935	
2.32 Distribution-Outside	-	-	-	-	-	-	-	-	
2.4 General Installations	-	1 398	1 398	-	735	659	-	2 792	
Total Category 2	2 987	1 943	4 930	-	2 027	2 452	-	9 439	
3. MIN. CHARGES DURING CONSTR.									
3.1 Interest IDB Loans	698	103	801	-	-	-	-	801	
3.2 Comm. Fees IDB Loans	-	-	-	-	99	-	-	99	
3.3 IDB Project Supervision	45	24	69	-	-	-	-	93	
Total Category 3	743	127	870	-	99	-	-	969	
UNALLOCATED									
5.1 Contingency	267	200	467	-	528	-	-	1 009	
5.2 Provision for Escalation	160	130	290	-	-	-	-	290	
Total Category 5	427	330	757	-	528	-	-	1 285	
TOTAL FINANCING OF PROJECT									
4 500	2 400	6 900	1	99	3 749	2 452	-	13 200	
34.1	18.3	52.4	0.7	28.3	18.6	100.0			
Percentages									

2.39 It should be noted that some 18.6% of the Project cost (US\$2.45 millions) is expected to be financed as follows by loans other than the proposed IDB loans and from contributions:

1/ Included indirect foreign exchange costs equivalent to US\$ 802,000, of which the equivalent of US\$335,000 corresponds to the possible OC loan and US\$467,000 to the FSO loan.

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2.39 It should be noted that some 18.6% of the Project Cost (US\$2.45 millions) is expected to be financed as follows by loans other than the proposed IDB loans and from contributions:

<u>Other Loans</u>	<u>Amount</u> Thousands US Dollars Equiv.	<u>Term 1/</u> Years	<u>Annual Interest</u>
Comité Cafetero Caldas	833	10	12
Comité Cafetero Risaralda	833	10	12
Comité Cafetero Risaralda	33	6	12
Comité Cafetero Caldas	33	6	12
IOEL	33	6	12
Subtotal other loans	<u>1,765</u>		
<u>Contributions</u>			
Depto. Caldas	170		
Comité Cafetero Caldas	347		
Beneficiaries	<u>170</u>		
Subtotal contributions	<u>687</u>		
<u>Total other loans and contributions</u>	<u>2,452</u>		

The loans from the Comité Cafetero de Risaralda and the Comité Cafetero de Caldas in the amount of the equivalent of US\$833,000 each, have been committed and copies of the letters of commitment have been received by the Bank.

The smaller loans from the Comités Cafeteros de Risaralda and Caldas, and, IOEL, each for the equivalent of US\$33,000, for a total of approximately US\$100,000, have already been signed by CHEC in 1973, with the respective lenders, and the corresponding contracts have been reviewed by bank analysts and found satisfactory.

The capital contributions from the Department of Caldas (the equivalent of US\$170,000), the Comité Cafetero de Caldas (the equivalent of US\$347,000) and the beneficiaries (the equivalent of US\$170,000) would be for the rural electrification part of the project, and were agreed upon on May 4, 1973. A copy of the contract has been reviewed by the Bank and found satisfactory. The contributions are to be provided in the form of stock purchases in CHEC and CHEC would be obliged to use these amounts only for the rural lines established in the contract.

Apart from the above contributions for the financing of the project, CHEC would use others loans for working capital purposes and to cover temporary cash deficits. These loans are described in the appropriate part of this document and include the following: (a) CHEC has a letter of commitment from the Comité Cafetero de Quindío for a loan in the amount of US\$416,000, dated August 27, 1973, under the following conditions: amortization in 8 years, first of 8 installments of amortization and interest payable 4 years

1/ Within the term stated, each loan has a 4 year grace period.

from the date of the loan contract, and interest of 12% per annum. This loan will be used to help alleviate the problems presented by its low current ratio and negative working capital; (b) it also has a letter of commitment for a loan from the Banco Frances Italiano in the amount of US\$208,000, under the following conditions: amortization in 3 years, installments of amortization and interest payable monthly and interest of 14% per annum. This loan will be used to cover the deficit in its financial projection foreseen in 1973.

Copies of both of these letters of commitment have been reviewed by the Bank and found satisfactory.

The balance of the financial plan, 29.0%, would be covered from CHEC's internal resources augmented by medium term borrowing in the early years of execution as necessary. This financing scheme is considered satisfactory.

2.40 The source of funds and the expenditure for the project under this financing scheme would be as follows, in thousands of US dollars equivalent:

<u>Sources</u>	<u>Sources of Funds</u>		<u>Expenditures</u>		<u>Total</u>	<u>%</u>
	<u>For. Exch.</u>	<u>Loc. Curr.</u>	<u>For. Exch.</u>	<u>Loc. Curr.</u>		
IDB Loans:						
OC	4500	---	4500	---	4500	34.1
PSO	2400	---	2400	---	2400	18.3
Subtotal IDB Loans	6900	---	6900	---	6900	52.4
CHEC	---	3848	99	3749	3848	29.0
Loans & contributions	---	2452	---	2452	2452	18.6
TOTALS	6900	6300	6999	6201	13200	100.0
Percentages	52.4	47.6	53.4	46.6	100.0	

(4) Technical and Economic Justification

2.41 As the CHEC system is now interconnected with the national system of ISA, the requirements of the CHEC service area will be met in the future through the production of its own facilities augmented by purchases from ISA as necessary. Further, the bulk sales to other Electrificadoras and other distributors outside the CHEC service area will be discontinued as the nearly completed generating units of these entities come on stream. The following energy and demand balance, summarize the projections of CHEC operating data detailed in Appendix C, shows how the system requirements, net of the 100,000,000 Kwh produced in plants not owned by CHEC, are expected to be met, assuming operation of CHEC hydroelectric plants under average water conditions:

Year	System Demand MW	System Energy Requirement GWH ^{1/}	Available CHEC Capacity MW	Net Energy to System GWH	Capacity Balance MW	Net Energy Balance GWH
1973	116	556	187.5	556	+ 71.5	0
1974	129	556	187.5	556	+ 58.5	0
1975	141	556	187.5	556	+ 46.5	0
1976	155	607	195.0 ^{2/}	607 ^{3/}	+ 40.0	0
1977	170	660	195.0	660 ^{4/}	+ 25.0	0
1978	187	727	195.0	727 ^{5/}	+ 3.0 ^{6/}	0
1979	205	794	195.0	794	- 10.0	0
1980	225	874	195.0	874	- 30.0	0
1981	247	962	195.0	962	- 52.0	0
1982	271	1 058	195.0	1 058	- 76.0	0

- 1/ Net of energy requirement in the area served from plants other than CHEC-owned.
- 2/ Operation of 3d-7.5 MW Unit at La Insula.
- 3/ Includes almost 50 Gwh resulting from initiation of 3d Unit La Insula operation and partly improved utilization at San Francisco.
- 4/ Includes approximately 104 Gwh resulting from full usage of 3d Unit La Insula and improved utilization at San Francisco.
- 5/ From 1978 on energy to system over approximately 660Gwh purchased from ISA.
- 6/ From 1978 on, all peaking over CHEC's capability will be from ISA's generating plants.

2.42 The above tabulation clearly indicates that CHEC should not encounter problems in meeting its energy and demand system requirements with its own facilities until 1976. From 1976 and thereafter, CHEC must depend on purchases from ISA, to provide the energy and demand requirements over its capabilities. (By 1978, ISA expects to have 1,000 MW in operation at CHIVOR, which can easily cover CHEC's deficits).

2.43 In order to examine the economic feasibility of the additional generating facilities in the project, the cost of producing one kilowatthour annually by means of the proposed hydroelectric scheme was compared with: (i) fuel costs only from an alternate thermal plant situated in the CHEC service area and (ii) purchasing one Kwh of energy from the newest thermal plant at Zipaquirá, over the EEEB-CHEC interconnection.

2.44 For the calculation of the cost of one Kwh from the proposed hydroelectric alternative, the following factors were taken into account:

- Installed capacity	7.5 MW
- Annual production	103 Gwh
- Total Investment	US\$6.1 million ^{1/}
- Useful life of facilities	50 years
- Discount rate	8%, 10% and 12%
- Annual operation, maintenance and administrative costs	US\$52.7 thousand ^{2/}

Using the parameters stated above the series of costs per Kwh for each of the discount rates selected are indicated in the following tabulation:

Cost per Kwh (US cents/Kwh)	<u>8%</u>	<u>10%</u>	<u>12%</u>
	0.45	0.51	0.58

2.45 Although constructing a thermal plant around the principal load center of the CHEC system would be impractical due to the terrain and the difficulty and cost of transporting fuel, a thermal alternative of a fuel-oil burning generating plant was studied assuming the following:

- Station heat rate	13,000 Btu/Kwh
- Annual production	103 Gwh
- Bunker "C" Fuel Oil	
Cost per barrel delivered to Manizales	US\$6.00
Btu/barrel	6,300,000

Without considering capital charges on alternative thermal generating facilities and without taking into account the necessity of total replacement of these facilities much sooner than the 50-year life of the hydroelectric plant, the fuel cost alone would be US cents 1.24 per Kwh or over two times the total cost of producing a Kwh from the proposed hydroelectric facilities, assuming a 10% discount rate. Moreover, the fuel oil would have to be imported and thus have an adverse effect on the balance of payments.

^{1/} Including engineering and contingency.

^{2/} Including replacement of depreciated elements and insurance.

2.46 As a more practical alternative the production cost of a Kwh at the Zipaquirá thermal plant outside of Bogotá was computed from actual 1972 figures at US cents 0.75 per Kwh. Adding 10% to this figure to cover its transport to Manizales, the cost per Kwh at the load center would be in the order of US cents 0.83 per kilowatthour or some 62% higher than the cost per Kwh using the hydroelectric facilities proposed, assuming a 10% discount rate.

2.47 It is concluded from the analysis of system energy requirements and alternative generating sources that the generating facilities proposed in the project are technically and economically justified.

2.48 The distribution systems of the larger cities in the service area require improvements. This has been confirmed particularly in the case of the 4.16 Kv underground Manizales system which is seriously overloaded and has an unacceptable voltage drop and a consequent high energy loss. Correcting these deficiencies in decreasing losses to 15% of consumption (as anticipated in the project criteria) would have the effect of adding around 4% to the effective supply of that city.

2.49 The project includes the construction of 33 Kv and 13.2 Kv lines outside of Manizales which will permit the continuation of the rural electrification development in the coffee growing regions in the eastern and western parts of Caldas. The reasons these regions were selected are stated below:

- coffee is the principal product sustaining the economy of the region;
- the beneficiaries of the electric service would be the operators of small farms in relatively densely populated localities having low income levels;
- the beneficiaries are those who have expressed to CHEC an interest in obtaining electric services.
- the investment envisaged over the next four-year period to connect all those who have expressed an interest would provide household electricity to around 100,000 inhabitants in these regions (around 16,700 families); and

- the rural electrification in these regions would facilitate the diversification of production now being promoted by the Comités de Cafeteros.

2.50 In order to assure that the rural electrification lines selected would have the greatest socio-economic impact, the formula set forth in Appendix F would be used for determining those to be included in the project. The criteria set forth in this formula take into account such factors as the cost of the lines, the related energy sales, population density and availability of road, schools, water and sanitary facilities. In order to assure a satisfactory selection, CHEC would review about twice the number of lines permitted within the cost estimate, selecting those that have the highest indices for inclusion in the project.

2.51 As a result of the technical and economic analyses carried out, it is concluded that the project: (i) has been adequately planned and sized to accommodate expected system requirements; (ii) is technically sound and in keeping with the latest engineering practices; (iii) can be constructed without major difficulties, and (iv) has a cost that may be considered as meeting the criterion of being a least cost alternative

III. THE BORROWER AND PROJECT EXECUTION

A. Institutional, Organization and Legal Capacity

(1) Nature, Purpose and Legal Capacity

3.01 The borrower and executing agency would be Central Hidroeléctrica de Caldas, S.A. (CHEC) founded in 1944 as a limited liability company with stock owned by the Central Government and five municipalities. In 1950 CHEC was reorganized and the stock held by the Central Government was transferred to the Instituto de Aprovechamiento de Aguas y Fomento Eléctrico (ELECTRAGUAS) now ICEL, the Departamento de Caldas and eight municipalities. In December, 1963, it was decided to transform this entity into a corporation under the name of "Central Hidroeléctrica de Caldas, S.A." which is legally classified as a decentralized public corporation of Colombian nationality, subject to the policies governing partially government-owned industrial and trade firms. On June 23, 1973, during the General Assembly of CHEC, the new Statutes were approved. Its domicile is the city of Manizales and the organization has 100 years of lifetime which will expire in the year 2073.

3.02 CHEC's main objectives are to develop the energy resources in the Departments of Caldas, Risaralda and Quindío and to execute the necessary works to supply electric energy in the area.

3.03 The principal stockholders in CHEC are ICEL, with 86.6% of its capital, the Department of Caldas with 11.2%, the municipality of Manizales with 3.5%, and others, mostly private users, with 1.7%. All dividends are distributed to the shareholders in the form of shares of CHEC, at par value, until all authorized capital (which is now Col.\$350,000,000) or increases made thereto in the future, have been subscribed. Paid in capital as of June 22, 1973 was Col.\$268,580,000. In view of this situation and the position of ICEL as "rector" of the electric sector in Colombia, CHEC's annual budgets and all decision making in technical matters, such as the approval of projects for constructing and installing power plants and, in fact, all work plans in general, require the approval of the Instituto Colombiano de Energía Eléctrica (ICEL). The corporation has sufficient legal capacity to enter into contracts and agreements in foreign and/or local currencies at home and abroad. CHEC is authorized to operate its own power plants and install transmission lines along the roads and public streets of the municipalities it serves. The latter authorization was included in its founding decrees for a period which will expire in 1993. In accordance with Colombian legislation, franchises for providing electric service can only be extended during the last year of the existing authorization. It is therefore recommended that in the loan and guarantee contracts there be included the obligation for CHEC to request and the guarantor to agree to extend, at the appropriate time, the necessary authorization for a period not less than that period covering the life of the loans approved by the Bank.

(2) Organization and Management

3.04 The management and control of CHEC are carried out by the following principal bodies: (i) The General Assembly of Stockholders; (ii) The Board of Directors; (iii) The Office of the Management; and (iv) The Offices of the Deputy Management. The activities of the General Assembly are described in the Firm's Charter and include the power to elect and dismiss members of the Board of Directors, the Manager and his deputies. The Board of Directors is composed of five directors with their respective personal deputies, who elect, from among their members, a President and Vice President. The Directors remain in their posts for two (2) years, but they may be reelected for an indefinite number of terms or removed at any time.

3.05 The legal representation and the executive management of the firm are the responsibility of the Manager. He is appointed at the General Assembly of stockholders for a term of two (2) years and he may be reelected. CHEC has on its staff one "revisor fiscal" and his alternate who are also appointed at the General Assembly for a term of two (2) years and may also be reelected. The Organization Chart of CHEC is presented in Appendix G.

3.06 The structure of CHEC's general organization is based on the recommendation of a consultant that was contracted for that purpose. 1/ He designed and developed the general Organization Manual that contains a description of the organization of the corporation and the duties and basic responsibilities delegated to its various departments. This basic organizational structure has been executed by CHEC almost in its entirety, and only small adjustments were made to the original placement of some lower-level departments. The manual is generally acceptable from a technical-administrative standpoint however to improve and perfect its management it is recommended that CHEC should (i) create an Office of Internal Auditing and (ii) fill the position provided for the Chief of the Finance Division. (See paragraph 3.08)

3.07 CHEC's staff as of December 31, 1972 was composed of 922 employees, 2/ of which 39 belonged to the professional staff, in the upper and middle-level employment grades, 179 were administrative and technical employees and 704 were laborers. The personnel turnover is approximately 2% which is considered to be very low. In 1972 CHEC had one employee-official for every 69 users. The ratio is reasonable considering the size of the service area and the number of towns where electricity is distributed directly, (33), each with its own regional office.

1/ The consultant also did other work related to financial administration described in paragraph 3.08.

2/ The number of employees did not vary basically up to April 30, 1973.

B. Technical-Financial Administration

(1) Financial Administration

3.08 A consultant was hired to design the accounting and financial management systems and procedures as well as the Organization Manual previously mentioned. The work of the consultant covered the administrative reorganization, the administrative procedures, system of internal control and the development of the accounting system. The recommendations formulated by the Consultant were implemented by CHEC in a generally acceptable way, except with regard to the following points that require some improvements: (i) The Budget Section should be strengthened as annual investment plans or financial projections are not formulated. Furthermore, a systematic budget control is not performed in connection with revenue and expense items; (ii) the administrative manuals and procedures are not kept on a current basis nor are they integrated; therefore it is considered necessary that the Organization and Methods Section should be restructured in a more technical manner; and (iii) the independent auditors made some suggestions on improving the accounting procedures and internal system of control, which have not yet been followed for the most part. The principal observations relate to planning of physical inventories; bank reconciliations; determination and scrapping of obsolete material; inventory control of furniture and office equipment; control of personnel attendance; actuarial study of pensions and control of imprest funds. With respect to these observations, the following recommendations are being formulated: Within 6 months from the date of the loan contract, the borrower shall submit to the Bank evidence that it has reorganized the Budget Department and the Section of Organization and Methods. Within 12 months from the date of the loan contract it should show that it has implemented the recommendations relating to the improvement of accounting procedures made by its firm of independent auditors in its memorandum to CHEC dated April 1973.

3.09 The accounting system suggested by the consultant was implemented by CHEC and conforms to standards and practices established for public service electric companies. It was approved with some modifications by the General Controllers's Office of the Republic of Colombia. CHEC has contracted the services of the "Centro de Procesamiento Electrónico de Datos de Manizales, S.A." (PRODATOS) to process the personnel payroll, the customer billing and collection control by a data processing system, all of which are operating satisfactorily. Furthermore, CHEC has plans to incorporate other operations into this computer system in 1974, including accounting and inventory control.

3.10 The external audit of CHEC is carried out by (i) a "revisor fiscal" who is appointed by the General Assembly from a slate of three candidates submitted by the General Controller's Office of the Republic; and (ii) a firm of independent auditors acceptable to the Bank. For purposes of the IDB loans both the financial statements of the institution and of the project would be presented by a firm of external independent auditors acceptable to the Bank.

3.11 The capacity and competence of CHEC's key personnel in financial management matters is generally acceptable. Nonetheless, financial management should be reinforced by incorporating two qualified professionals to fill the offices of Chief of the Finance Department, currently vacant, and of Internal Auditor. As previously mentioned specific recommendations are being formulated so that the corporation would fill these jobs and therefore be in a better position to efficiently manage the project under study and carry out its other activities.

(2) Technical Capacity

3.12 In addition to relying on the technical advice provided by ICEL in geology matters, CHEC has also contracted the services of engineering consultants and engineering firms in the design and execution of major projects.

3.13 As for its technical capacity, at the end of 1972, CHEC employed 27 professional engineers in the Office of the Technical Deputy Manager. These engineers were employed in the technical management operations, planning and construction. CHEC's technical staff is generally competent and experienced in all aspects of utility operation, as well as in engineering and the supervision of projects related to transmission and distribution. However, CHEC's Office of the Deputy Manager for Technical Affairs is understaffed presently in personnel who are experienced in engineering and in the supervision of large civil works. In view of that fact, it is being recommended that prior to the first disbursement, CHEC contract the services of consultants acceptable to the Bank to assist it in the preparations of engineering designs, specifications and bidding documents as well as in the analysis of bids, the selection of the most appropriate bid and supervision of the works related to the generation phase of the project. (See paragraph 3.48)

(3) Electricity Tariffs

3.14 The electric power rates charged by CHEC for the electric services are regulated by the Junta Nacional de Tarifas de Servicios Públicos (JNT). The JNT is made up of the Chief of the National Planning Department (Departamento de Planeación Nacional) and three full time members appointed by the President of the Republic. The decree which established the JNT at the end of 1968 (Decreto No. 3609 of December 18, 1968) also provides that the tariffs charged by the electric power entities must generate sufficient revenue to cover real costs of the service and must yield a reasonable return on assets to permit the financing of expansion of the electric power systems. To insure the coverage of timely service of all financial obligations of the electric power entities, the JNT (in conformance with its Document JNT-144-UINF of February 1973) is now basing the increases it approves on cash-flow analyses of the enterprises seeking new rates with the view towards guaranteeing the financial viability of their operations through the tariff mechanism.

3.15 The JNT authorized an increase of over 15% in the CHEC tariffs in December 1971. This increase was implemented in steps during 1972 which was reflected in raising the average revenue per kilowatt/hour sold in the CHEC at January 1, 1973 for an increase of some 7% (from US cents 0.92 per Kwh to US cents 0.92 per Kwh). At this tariff level of US cents 0.98 CHEC expects to attain a rate of return on net utility investment of 3.74% which is considered low. In June, 1973, CHEC was again granted a tariff increase by the Junta. This tariff increase, which follows a trend of past annual increase would be sufficient for CHEC to keep ahead of the normal annual rate of inflation of 8% to 9% which Colombia has experienced historically, but it would not be able to head off effects of the higher inflation rates Colombia has had in the last 18 months. CHEC has indicated that it will implement the recently approved tariffs in steps from the end of 1973 through 1974.

The new tariff schedule will permit increases in all classifications over those presently in effect. The principal increases are as follows:

<u>Classification of User</u>	<u>Existing Tariffs Approved</u>		<u>New Tariffs Approved</u>	
	by JNT December 1971		by JNT June 1973	
	<u>Col. Centavos/Kwh</u>		<u>Col. Centavos/Kwh</u>	
				<u>Increase</u> <u>(in pesos)</u>
1. Official & Street Ltg.	11.00		13.00	18.2
2. Residential	23.00		27.00	17.4
3. Commercial	40.00		48.00	20.0
4. Industrial	15.00		19.00	27.0

3.16 It is anticipated that the tariff increases will result in an increase in the average revenue from the present US cents 0.98 Kwh to US cents 1.08 during 1974, or an increase of some 10% in terms of US dollars. At this tariff level, which is considered reasonable and within the range of tariff levels for Colombian utilities, CHEC expects to attain an improved rate of return of 4.82%, which although lower than normal for the larger municipally-owned utilities in Colombia, fits into a pattern of improvement for the ICEL subsidiaries wherein all are expected to attain 6% between the 1975-1978 period.

3.17 During negotiations it was agreed with CHEC that tariffs should be established to yield at least a 6% return on net utility investment on or before January 1, 1978. (See Appendix A and Draft Resolution). A 6% rate of return is considered reasonable for this operation based on the following reasons: (i) the net utility investment on which the rate of return is computed has been established in U.S. dollar equivalents, rather than Colombian pesos as indicated on CHEC's balance sheets; (ii) even though CHEC's operating ratio is considered acceptable, its tariffs are lower than the average in Latin America; (iii) for similar state public utility entities in Colombia participating in recently approved loans 211/OC-CO and 290/SF-CO and in the already mentioned ICEL loans the Bank has accepted 6% as a reasonable rate of return; and (iv) the higher rates required in other distribution operations such as the Bogotá electrification project have generally been for large cities with more concentrated markets and where the cash flow requirements for future investment are much heavier. On the basis of the steady increases in the CHEC tariffs in the past and the likelihood that this trend will continue, it is expected that CHEC will encounter no difficulties in fulfilling this requirement.

C. Financial Situation and Projections

(1) Financial Situation from 1968 to 1972

3.18 Appendices H-1, H-3, and H-4 are the financial statements covering the period 1968 to 1972 (general balance sheets; profit and loss statements and the operating data and determination of the rate of return) which were converted to United States dollars by applying the method generally accepted in these cases. The financial position of CHEC was generally acceptable between 1968 and 1973, but, nonetheless, the following observations should be mentioned: (i) the rate of return on net utility investment (3.8% to 5%) was low in comparison with those for the larger utilities in Colombia; (ii) the net working capital was negative; (iii) the current liquidity indices and the acid test were rather low, but it should be pointed out that the current indices for public utilities, particularly in countries experiencing inflation tendencies, tend to be lower than 1:1 and that this circumstance does not normally hamper their operations, and, (iv) the customer accounts in arrears in the "official" sector were high. CHEC has not suffered substantially from

inflation because it has obtained annual rate increases that were greater than the rate of inflation and the devaluation rate of the Colombian peso compared to the United States dollar has normally been sufficient to compensate for the difference in the inflation rates of the two countries. However, such increases were not high enough for CHEC to show a rate of return of over 6%, which would have been considered reasonable, on its net utility investment. The adjustments due to inflation were reflected in the increased peso value of the fixed assets since debts in foreign currency were converted to pesos at the rate of exchange prevailing at the close of each fiscal year and the difference from the base year added to the fixed assets. Also during February, 1973, the exchange rate of the United States dollar changed and as a consequence, CHEC's obligations in foreign currencies other than US dollars increased by the equivalent of approximately US\$500,000. According to CHEC's policy, this amount also will be charged to fixed assets. This is considered satisfactory.

3.19 The factors causing the negative position in net working capital and low ratio of current liquidity were (i) the marked effect of the current amount of long-term obligations, which, over the last three years, has risen to a level of approximately US\$1.2 million a year, (ii) the customer rates in effect during the period examined were low in comparison with other large utilities in Colombia and (iii) the financing of investment in new operating facilities with CHEC's own funds. The net working capital was negative by the equivalent of US\$ million 1.5, in 1968, 1.7 in 1969, 0.8 in 1970, 1.3 in 1971 and 1.9 in 1972 and the current ratio was 0.39:1.00 in 1968; 0.41:1.00 in 1969; 0.65:1.00 in 1970; 0.48:1.00 in 1971 and 0.44:1.00 in 1972.

As previously mentioned, the indices are not as unsatisfactory as they would appear at first glance, due to the custom of public utilities of generally maintaining low current ratios, particularly in countries experiencing inflationary tendencies. No specific recommendations are being made on this point since a) the ratios shown are not the ones that would be derived from an examination of the CHEC Balance Sheets, but follow adjustments made during the Bank's financial analysis to both current assets and current liabilities; (b) these ratios have not affected CHEC's performance or ability to carry out its affairs; (c) the loan would have the guarantee of the Republic of Colombia; and (d) other recommendations are being made with regard to local contribution, making other investments, dividend payments, rates of return on net utility investment, and obtaining professional staff which taken together will probably be more effective than specifying given current ratio targets.

Furthermore, as previously mentioned, CHEC has received a letter of commitment for a loan for the equivalent of US\$ 416,000 from the "Comité Cafetero de Quindío", the resources of which will be contracted as soon as the possible IDB loans are approved, and applied to current assets (with the corresponding increase in long term liabilities). If one were to take the proforma Balance Sheets which have been prepared, the projected current ratio as of December 31, 1973, without the application of this loan from the Comité Cafetero, would be 0.41:1.00. However, applying the resources of the loan from the "Comité Cafetero de Quindío" as proposed, the current ratio would change to 0.54:1.00, which gives a satisfactory indication that CHEC can improve its current ratio.

3.20 The accounts receivable from users of electricity represented an average of 1.5; 2.1; and 2.2 months of billing in 1970, 1971 and 1972 respectively. From the standpoint of the averages mentioned, the situation is considered to be generally satisfactory. However, it should be pointed out that the sum of all the accounts in arrears as of December 31, 1972 represented an average of 56% of the total amount receivable from all customers. Of the total accounts receivable from the public sector, 69% was in arrears, although most of this, 67%, was past due only up to 90 days. Regarding the total accounts receivable from the private sector 11% was in arrears, of which 10% was past due only up to 90 days. Since the majority of these arrears is no more than 90 days past due it may be considered that there is a degree of collectability on these accounts which does not effect their value.

The following table reflects the status as of December 31, 1972:

	Total Receivable		Current	Past Due	A g e i n g			
	US\$ (000)	%			Up to 30 days	31 to 60 days	61 to 90 days	More than 90 days
Public Sector	544.1	100	31%	69%	32%	20%	15%	2%
Private Sector	160.6	100	89%	11%	5%	3%	2%	1%
Total	704.7	100	44	56%				

Among the accounts in arrears corresponding to the public sector, the Empresa Pública de Armenia - (EPA) - and the Empresa Interconexión Eléctrica, S.A.-(ISA)- are listed as owing the equivalent of US\$107,400 and 179,100 respectively, which represents 72% of the total accounts in arrears in this sector. With respect to Empresas Públicas de Armenia, an effective arrangement was agreed upon in March 1973, whereby payments are to be made on the basis of six promisory notes to be paid monthly, from April 28, 1973 to September 28, 1973. ISA's overdue account is fundamentally due to ISA's bimonthly billing procedures to its customers, which causes delays in its paying CHEC, which bills on a monthly basis. As of December 31, 1972, CHEC maintained a reserve for uncollectable accounts equivalent to 11.3% of the total amount of its accounts receivable, which is considered satisfactory, since only very small portion of its accounts receivable are overdue more than 90 days. Its policy up to the end of 1972, was to increase this reserve by 0.005% of the billings. Since 1973, this rate has dropped to 0.003% because the reserve is considered to have reached an adequate level. The fact that the arrears do not show excessive ageing, and that satisfactory arrangements have been made recently with one of the main public sector entities which show arrears to a certain extent alleviates any tendency of excessive concern over the effect these arrears might have on the financial condition of CHEC. However, it obviously is a situation which must be improved. Therefore it is recommended that within 12 months from the date of the loan contract, CHEC shall submit to the Bank a report indicating the measures that it has taken and will continue to take in order to collect the accounts owed to the borrower by public entities, which are overdue more than 60 days.

3.21 Net fixed assets were up to US\$36.1 million as of December 31, 1972, representing 92% of the total assets. From 1968 to 1972, it had risen by US\$6.2 million, (equivalent to 21%). This increase was financed by funds provided by external credit (approximately US\$4.7 million) and CHEC's own funds (US\$1.5 million). The capitalization of CHEC on the same date was US\$35.3 million, thereby maintaining a reasonable ratio with the fixed assets. The long-term debt as of December 31, 1972, including the current liabilities, was composed of: US\$6.5 million to the IDB; US\$2.3 million to the IBRD and the equivalent (in local currency) of US\$0.5 million to other institutions.

3.22 In Appendix No. H-4 other financial highlights and indicators are given for CHEC. Notes on some of these highlights follow: (i) the degree of indebtedness (debt/equity ratio) was satisfactory from 1968 to 1972, ranging from 0.52:1.00 in 1968 to 0.44:1.00 in 1972; (ii) CHEC's margin of coverage on long-term debt servicing was acceptable between 1968 and 1970, but was a little tight in 1971 and 1972 at 1.2 and 1.3 respectively; and (iii) its equity increased from 1969 to 1972 by the equivalent of US\$6.0 million, rising to the equivalent of US\$27.2 million at December 31, 1972. The structure of the equity was: capital stock 87%; retained earnings 8%; customer advances 3% and stockholders' advances 2%.

(2) Financial Projections - 1973-1982

3.23 The financial projections of CHEC (in thousands of equivalent 1972 constant US dollars), are shown in the Proforma Balance Sheets, Income Statements and Statements of Sources and Application of Funds attached in Appendix H. Operating revenues for the 10-year period were computed on the basis of the projected energy sales described in paragraphs 2.17 and 2.18, using the present tariff level for 1973 and then for the years 1974-1982 the tariffs already approved for full implementation in 1974. Operating expenses were projected as follows: generation, operation and maintenance expenses per Kwh for 1972 were used throughout the period; indices relating 1972 transmission and distribution operating and maintenance expenses were computed based on kilometers of line installed at that time and kilometers of lines projected to be installed throughout the period; energy purchased from ISA was estimated at approximately US cents 0.50 per Kwh based on existing tariff agreements; administrating and billing and collecting expenses were projected using indices relating 1972 expenses to the number of consumers, and the annual provision for depreciation was projected at 2.3% of the gross fixed assets in service for each of the corresponding year.

3.24 The projections of the Operating Income, reflecting the difference between revenues estimated at conservative tariff levels and expenses (not including depreciation) indicate satisfactory results and efficient operations as demonstrated by the operating ratios ranging from 41% to 48% over the 10-year period.

3.25 The projections of annual rate of return on net utility investment range from 3.7% to 5.9% during the period 1973-1978, and exceed 6% thereafter. The relatively low rates of return in the early years of the projection are

due to high recent additions to fixed assets and the heavy investments anticipated which will enter service during the period of construction of the project, and the relatively low tariff levels already commented.

3.26 To estimate the cash flow during the period of the projections, the investments to be made in the project were included and the terms of the corresponding financing as well as the repayment conditions were taken into account. Debt service on existing loans was shown on the basis of contracted conditions. Only programmed investments in the project and other works already under construction or scheduled to be done concurrently with the execution of the project were considered. As can be noted from the Statement of Sources and Applications of Funds, annual shortfalls would result in the CHEC cash flow in the first three years of the project execution as follows, in thousands of US dollars:

<u>Year</u>	<u>Shortfall</u>
1973	203
1974	15
1975	505

Furthermore, it can be noted that commencing in 1976, substantial annual cash balances are expected in the CHEC cash flow which may be invested in subtransmission and distribution system expansion as the need arises. It is estimated that such needs could approach US\$2.8 million per year as an average after 1977. In connection with the deficit situation of the years 1973-1975, CHEC has already presented evidence of a commitment of the Banco Francés-Italiano for a loan which would cover the 1973 deficit; CHEC would have to resort to further borrowing of this sort if the deficits projected for 1974 and 1975 occur. However, it should be pointed out that the financial projections include investments in each of the years between 1973 and 1977 of US\$200,000 per year on other projects, that is a total of approximately US\$1,000,000. Of this amount, approximately the equivalent of US\$700,000 refers to a new headquarters building for CHEC which, although it would save the institution some rent money, is obviously an investment that can be postponed unless financing is found for it. The postponement of this building would eliminate the uncovered 1974-1975 deficits. It is therefore recommended that the Bank require as conditions for its loans that CHEC shall not make (a) any investment in the expansion, maintenance or improvement of its plant in service whose cost exceeds the equivalent of US\$500,000, without the prior consent of the Bank, nor (b) any investment not related to its plant-in-service whose cost exceeds the equivalent of US\$50,000, without the Bank's approval. Since the improvements in the plant-in-service that are foreseen for this critical period are almost all included in the project under analysis, and since the other investments not related to the plant-in-service refer principally to the headquarters building, it is felt that the combination of these two requirements would give the Bank satisfactory protection.

3.27 Further conclusions that have been formed as a result of the analysis of the CHEC projections are as follows: - net working capital would remain low and the current ratio would continue to be less than 1.0 during the

1973-1977 period of project execution, ranging from 0.41 to 0.88. Obviously, this would be affected by the loan from the "Comité Cafetero de Quindío", mentioned previously (see paragraph 3.19) as well as possible postponement of the headquarters building investment. However, commencing in 1978, the ratio would reach a satisfactory 1.32, reflecting the fact that no additional construction investments have been contemplated in the cash flow for the period after 1978.

- Debt equity ratio ranges from 0.18 to 0.48 in the 1973-1982 period, and is satisfactory;
- Debt service coverage would be satisfactory during the period of the projections ranging from 1.6 in 1974 to 3.9 in 1982.

CHEC's net worth would increase by the equivalent of US\$19.8 million by December, 1982, of which US\$19.1 million would be provided by retained earnings, and an increase of paid in capital of US\$0.7 million during 1973 and 1974 which would be provided by share owners as follows: Departamento de Caldas US\$170 thousand; Comité Cafetero de Caldas US\$347 thousand and several consumers US\$170 thousand.

3.28 The financial projections indicate in general, that CHEC will be undergoing a gradual improvement in its financial situation and that the Project is financially viable with the assurances previously mentioned regarding the coverage of the 1973-1975 cash shortfalls.

D. Evaluation of Loan 125/OC-CO

3.29 Loan 125/OC-CO was granted to CHEC at the end of 1965 to finance 48% of the construction cost of the San Francisco Hydroelectric Plant, related transmission and subtransmission facilities and distribution facilities in Manizales, as well as a technical assistance program to guide CHEC in the improvement of its financial and administrative organization.

3.30 The project financed by this loan was 98% complete as of June, 1973. The 145 MW San Francisco Hydroelectric Plant, related transmission and subtransmission works had been satisfactorily completed and placed into operation in 1969 on schedule. Only small non-urgent distribution works, which were added to the project, during its execution, remain to be done outside Manizales. It is expected that these works will be completed in 1973.

3.31 As a result of the low prices that existed at that specific time (the producers of electrical equipment were working at under capacity and the Japanese producers were trying to get into this specific market), CHEC reviewed the project plans, and with the Bank's approval increased the scope of the project in all areas with the exception of the distribution and the technical assistance.

3.32 All contractors completed their work in accordance with CHEC specifications and the general supervision of the project was done jointly by CHEC and Syndibel in a satisfactory manner.

3.33 The loan contract contained a tariff clause which would now correspond approximately to the standard clause alternative 2, that is: "The borrower shall take the necessary steps to the satisfaction of the Bank, in order that the tariffs from the project financed with the resources of the loan generate sufficient income to cover the ordinary costs of operation of the system, including administrative costs, interest, maintenance and depreciation and if the resources generated are not sufficient to attend the service of all financial obligations of the Borrower, such additional income as shall be required for this purpose. As previously mentioned, CHEC has not only been complying with this clause, but is also generating a return on its net utility investment of approximately 3.7%.

3.34 CHEC has been honoring all its financial obligations with the Bank and has provided all the reports required in the loan contract. The reports contained satisfactory information and details about the project's execution.

3.35 The first disbursement should have been made on August 18, 1966 as specified in the loan contract, but as a result of some delay by CHEC to satisfy several of the conditions precedent, a postponement to December 22, 1966 was necessary. The last disbursement planned for February 18, 1970 was also postponed to February 18, 1971 resulting in delays in the period of execution of the project.

3.36 The bidding procedures used by CHEC during the execution of the project were in conformance with the Bank's requirement and the Colombian Law.

3.37 An additional investment of 10% of the project's estimated cost resulted in a much greater than 10% increase in the rated capacity of the total project. (See estimated project total cost and effective project total cost on table of page 3, Appendix I).

3.38 The execution of Loan 125/OC-CO is considered satisfactory. The objectives of the project financed by this loan are fulfilled. All technical, and most financial and administrative problems presented during the execution of the project have been resolved. Measures are being taken by CHEC to resolve those still outstanding. From the analysis of Loan 125/OC-CO, it can be anticipated that CHEC has the capacity to execute the proposed loan adequately and satisfactorily.

3.39 A complete detail of the evaluation of Loan 125/OC-CO is given in Appendix I.

F. Other Loans

3.40 In the international area, besides the Loan 125/OC-CO from IDB, CHEC has had two previous loans from the World Bank which are briefly described in the following paragraphs:

Loan IC-39 C.O. to finance partially the construction of the Hydroelectric Plant La Insula, considered as the first stage of the present CHEC system. The loan was in the amount of US\$2,600,000. The contract was signed in December, 1950, the project was satisfactorily built, has been in operation since 1955 and the loan has been totally paid since February, 1971.

Loan IX-217 C.O. to partially finance the construction of the Hydroelectric Plant La Esmeralda, second stage of the CHEC system (the third stage is considered the Hydroelectric Plant San Francisco, financed partially with the Loan 125/OC-CO). The loan was in the amount of US\$4,500,000, the contract was signed in January 1959 and has an amortization period of 20 years ending in 1979. The project is totally executed and in operation since 1964, and a review of the Loan contract of this loan shows that no conflict would exist if the Bank grants the loans for the project under study. Specially the IBRD limits CHEC's contracting new long term loan to the condition that CHEC must demonstrate that with the new loans, its long term indebtedness would not exceed its capital and surplus. As previously indicated, the financial projections prepared indicate that at no time in the period analyzed

would the long term debt/equity ratio exceed 0,48:1,00

F. Project Execution

(1) Construction, Investment and Procurement Schedules

3.41 The construction and disbursement of the project is scheduled from October 1, 1973 through September 30, 1977, a 4-year period. The construction of the water conveyance facilities and the transmission lines are expected to commence in the second half of 1973 and to be completed in the second half of 1976. The distribution expansion and improvements planned for Manizales, are scheduled to be carried out in two years starting in the second half of 1973. The subtransmission and distribution works, including rural electrification pertaining to the regions outside Manizales, would be carried out throughout the four-year period. The miscellaneous equipment included in the project would be acquired during 1973 and 1974.

3.42 CHEC would engage national contractors for all civil works and to provide erection services for all substations, transmission and subtransmission line and rural distribution work. CHEC would use its own personnel to carry out some minor underground and other distribution works in Manizales, for a total amount of some US\$50,000 over the four year period. CHEC would furnish construction and specialized equipment and tunnel lining to the civil contractors in the case of the conveyance works. In all other cases, CHEC would furnish all materials and equipment and the contractors would provide only the mounting and erection services. This same practice was used successfully by CHEC in the execution of the project financed under 125/OC-CO.

3.43 Procurement for the project would be carried out using public bidding procedures that have already been reviewed by the Bank staff and conform to IDB requirements. A program of contracting goods and services to be financed with the proceeds of the proposed IDB loans is being followed to insure the fulfillment of the construction schedule and is detailed in Appendix K together with the preliminary Categories of Investments of each IDB loan. The bidding documents related to the civil works of the water conveyance projects are being completed and an announcement is to be published in August. All other bidding documents for which announcements are scheduled in August are being prepared.

3.44. The annual schedule of investments and disbursements has been estimated to meet the anticipated progress of the project during the construction period and is shown in Appendix J. A summary of the annual project investments is tabulated in thousands of US dollars and in currencies of use as follows:

<u>Investments</u>	<u>Prior to Oct.1, 1973</u>	<u>4th Quarter 1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>January thru September 1977</u>	<u>Total</u>
Foreign Exchange	-	962	2,176	2,148	1,211	502	6,999
Local Currency	222	1,002	1,781	1,884	1,136	176	6,201
Total Investment	222	1,964	3,957	4,032	2,347	678	13,200
<u>Sources of Financing</u>							
<u>IDB Loans</u>							
- OC Foreign Exchange	-	404	1,413	1,617	797	269	4,500
- IDB Foreign Exchange	-	541	714	506	406	233	2,400
Total IDB	-	945	2,127	2,123	1,203	502	6,900
<u>Other Loans and Contributions</u>							
Local Currency	51	622	949	418	412	-	2,452
<u>CHEC</u>							
Foreign Exchange	-	17	49	25	8	-	99
Local Currency	171	380	832	1,466	724	176	3,749
Total CHEC	171	397	881	1,491	732	176	3,848
Total Sources	222	1,964	3,957	4,032	2,347	678	13,200

Some necessary rural electrification construction work and improvements to a section of the Manizales underground distribution system were started during the first half of 1973, and it is expected by the time of contract signing the equivalent of US\$222,000 will have been spent. It is proposed that this amount be recognized as a part of the local currency cost of the project and included in the financing plan as a part of the local counterpart funds. It should be noted that of the US\$222,000 equivalent expected to be spent before the loan contract signing, approximately US\$35,000 applies to the parts of the project to be financed with OC and US\$187,000 to those parts to be financed with FSO.

(2) Status of Designs and Specifications.

3.45 The outline designs of the conveyance works are complete and the specifications for the corresponding civil works contracts have been completed. The specifications for the electromechanical equipment related to these designs are under preparation and were 50% complete at the time of the Analysis and Negotiation Mission.

3.46 The transmission and urban distribution drawings are considered 80% complete. Inasmuch as CHEC standard design drawings are being used for substation expansion and that the complete distribution system of Manizales is already plotted on scale drawings, additions and modifications are quickly sketched on these drawings.

3.47 As previously discussed, and as is shown in Appendix "E", the FSO resources would be used for transmission and distribution works outside Manizales, as well as for the corresponding financial charges. The status of the transmission drawings is described in the previous paragraph. The distribution works, in turn can be divided into those benefiting urban centers of less than 40,000 persons and those which are purely rural electrification works. The status of the former is also discussed in the previous paragraph. The latter works would involve a total investment from the IDB FSO loan of the equivalent of US\$928,000 as shown in Appendix "E". The drawings and material lists are complete for slightly over 1/3 of these works, for a total IDB value of something more than US\$300,000. The remainder, that is works with an IDB loan component of around US\$600,000 would be continued on a global basis. All of the remaining works for the mentioned total of around US\$600,000 would have to be presented to the Bank within 18 months from the date of the loan contract and would be selected in accordance with the criteria and procedures indicated in paragraphs 2.49 and 2.50. Following approval by the Bank of those works selected to complete this portion of the project, all of the works would have to be in execution within 40 months of the signing of the FSO loan contract. Since this is in excess of the 24 month period for the physical initiation of works required by the standard Bank policy with regard to global programs involving multiple works, it is recommended that an exception be made in this case. This exception is recommended given the characteristics of this part of the project, particularly the fact that the physical construction time of the lines included in any of the works, once the materials have been received, requires a maximum period of only around six months.

3.48 On the basis of the above, it is estimated that a weighted average of 45% of all the drawings required for the project is complete.

(3) Project Engineering and Technical Supervision

3.49 Project engineering and technical supervision would be carried out by CHEC for all phases of the project, except for the works related to the water conveyance construction, particularly the tunneling, since it must be effected through fractured rock. For the engineering services related to the conveyance works including supervision of all corresponding construction, CHEC proposes to continue the services of Syndibel, formally hiring it prior to the first disbursement of the loans. The Bank has examined this question and it has been determined that Syndibel can be contracted for this purpose, in accordance with Bank policy on this matter. This Belgian consulting firm prepared the feasibility study for this part of the project as part of Loan 125/OC-00 providing satisfactory service and maintaining harmonious relations. Execution of these services over the three year period of the construction of the conveyance works, is estimated at US\$343,000 and the amount has been included in the project as an IDB-financed item, exclusively with OC resources. The terms of reference of these services would include assistance to CHEC in the following aspects:

- preparation of construction drawings and specifications;
- preparation of bidding documents, as well as the bid analyses and the selection of best bid;
- supervision of all work related to the generation classification of the project.

3.50 For project inspection and supervision by the Bank, it is proposed to utilize the part term services of the Energy Project Specialist currently performing duties in Cali.

3.51 The above outlined scheme for engineering and technical supervision is considered satisfactory to assure a proper and adequate project execution.

IV. RECOMMENDATIONS

4.01 As a result of the analysis made of the Generation, Transmission and Distribution Project of CHEC, summarized in this document, and the conclusions stated therein, it is recommended that two loans be granted to Central Hidroeléctrica de Caldas, S.A. for a total amount up to the equivalent of US\$6,900,000: US\$4,500,000 from the ordinary capital resources of the Bank and US\$2,400,000 from the Fund for Special Operations. These loans shall be used to finance up to 52.4% of the cost of the project, whose cost is estimated at the equivalent of US\$13,200,000.

4.02 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 proposed resolution, the following special conditions which shall be fulfilled to the satisfaction of the Bank:

(a) Prior to the signature of the loan contracts, the borrower must demonstrate to the Bank that it will have sufficient resources during 1974 to cover the corresponding local contribution and its normal operating expenses for that year. (Resolutions, 8c).

(b) As a condition prior to the first disbursement of each loan, the borrower should contract the services of a consulting firm acceptable to the Bank to assist it in the preparation of engineering designs, specifications and bidding documents, as well as in the analysis of bids, the selection of the most appropriate bid and supervision of the works related to the generation phase of the project. (resolutions, 8a).

(c) The standard dividend payment limitation used in loans to mixed capital and private borrowers would be included in the loan contracts. (Resolutions, 8e).

(d) The borrower should take appropriate measures acceptable to the Bank to ensure that the rates for the sale of electric energy in its entire system are maintained at levels which will yield a reasonable rate of return on net utility investment and sufficient funds to cover the borrower's financial obligations. (Resolutions, 8f).

(e) Without the prior consent of the Bank and during the execution period of the project, the borrower shall not make any investment in the expansion, improvement or maintenance of its plant in service whose cost exceeds the equivalent of US\$500,000, or in any other project not related to its plant in service whose cost exceeds the equivalente of US\$50,000. (Resolutions, 8g).

4.03 It is also recommended that there be included in the loan and guarantee contracts, as appropriate, the following conditions, in addition to those mentioned under paragraph 4.02 above, which shall be fulfilled to the satisfaction of the Bank:

(a) Prior to first disbursement of either loan, the borrower shall present to the Bank: (i) a communication in which competent authorities of Colombia express their intention to grant such import permits as may be necessary for the acquisition abroad of the goods and services payable in foreign exchange required for the execution of the project, and (ii) evidence that the loan contracts have been recorded in the appropriate foreign exchange registry office of the Colombian Government.

(b) Within 6 months from the date of the loan contracts, the borrower shall submit to the Bank evidence that: (i) it has reorganized its Budget Department and its Section of Organization and Methods, and (ii) contracted a professional with experience in the field of finance, to fill the position of Chief of the Finance Division.

(c) Within 12 months from the date of the loan contracts, the borrower shall submit to the Bank: (i) a report indicating the measures that it has taken and will continue to take in order to implement the recommendations relating to the improvement of accounting procedures made by the borrower's firm of independent auditors; (ii) a plan for the reduction of the level of accounts owed to the borrower by public entities, which are overdue more than 60 days; and (iii) evidence that it has established an Office of Internal Auditor and has hired sufficient qualified professionals to staff it.

(d) Within 18 months from the date of the loan contracts, the borrower shall have submitted to the Bank for its approval the complete technical and economic details of all the rural electrification works it proposes for inclusion in the project. The borrower shall demonstrate that in selecting these works it has reviewed works with a total value of approximately double the amount budgeted for such works in the project, and that the ones that it proposes for inclusion have been chosen after having previously applied the criteria established in Appendix F of this document.

(e) Within 40 months following the signing of the FSO loan contract, the borrower shall submit to the Bank evidence that it has completed or has under construction all of the rural electrification works included in the project.

(f) The Bank may recognize as part of the local contribution to the project up to a total equivalent to US\$222,000 invested by the borrower in the project prior to the signing of the loan contracts, but after January 1, 1973, provided that requirements similar to those in the resolutions and the loan contracts have been fulfilled. This amount includes: the equivalent of up to US\$187,000 for distribution works outside of Manizales, with the related engineering and administrative costs, which represents part of the local contribution relating to the loan from the Fund for Special Operations; and the equivalent of US\$35,000 for engineering and administrative costs for distribution works within Manizales, which represents part of the local contribution relating to the loan from the ordinary capital resources.

(g) The borrower shall commit itself to request and the guarantor to grant the extension of the franchises of the borrower relating to the project, for a period of not less than the life of the loan contract.

4.04 In the loan contracts there shall be established the form in which the financial statements of the borrower and the project shall be audited, taking into account the contents of paragraph 3.10 of this document.

4.05 In the loan contracts, there shall be included an annex substantially similar in content to Appendix A (Description of the Project) of this document, including the specification of 6% as the minimum rate of return on net utility investment considered under 4.02 (d) above.

4.06 Of the resources of the loans, US\$69,000 (US\$45,000 from the loan from the Ordinary Capital and US\$24,000 from the loan from the Fund for Special Operations) shall be utilized to cover the commission of the Bank for general inspection and supervision.

4.07 The United States dollars to be utilized in the loan from the Fund for Special Operations shall be drawn from the resources contributed to such Fund by virtue of the increases approved by Resolutions AG-2/65 and/or AG-10/67 and/or AG-12/70.

CENTRAL HIDROELECTRICA DE CALDAS (CHEC)
GENERATION, TRANSMISSION AND DISTRIBUTION PROJECT
(Annex B of the Loan Contract)

I. Project Objective:

Expansion and improvement of the generation, transmission and distribution facilities of the Central Hidroeléctrica de Caldas (CHEC) to help meet the projected growth in customer demand in its service area, which as been exceeding 14% per year over the last five years, to raise the efficiency and reliability levels of electric service in the area, and to continue with the extension of its system to the rural areas of the Department of Caldas, Quindío and Risaralda.

II. Description of the Project:

A. For Partial Financing with the loan from the ordinary capital resources:

- the construction of small dams, spillways, intake works, canals, tunnels and desilting facilities to convey water from the San Francisco and Campoalegre Rivers, and the installation of the third 7,500 Kw unit at La Insula Hydroelectric Plant, to increase electricity production in the La Insula-Esmeralda-San Francisco complex of hydroelectric plants;
- the expansion and improvement of the primary and secondary distribution systems in Manizales, including related work in the Alta Suiza feeder substation, the construction of 7.3 kilometers of underground and aerial 13.2 Kv distribution feeders, the installation of distribution transformers having a total capacity of some 15,000 Kva, the construction of 63 kilometers of 220/110 v secondary lines and the installation of 11,000 customer watt-hourmeters; and,
- the acquisition of communication, maintenance and line construction equipment.
- Engineering and Administration.

B. For Partial Financing with the loan from the Fund for Special Operations:

- the expansion of switching facilities at 115 Kv substations and the construction or expansion of 8-33/13.2 Kv substations outside of Manizales, involving the installation of approximately 4,450 Kva of power transformers; and,
- the expansion and improvement of the distribution systems outside of Manizales, including the construction of 59.4 kilometers of 13.2 Kv distribution feeders to serve urban centers in the eastern part of Caldas and the construction of 730 kilometers of rural lines.

III. Total Cost and Financing of the Project

The total cost of the project has been estimated as approximately the equivalent of US\$13,200,000, in accordance with the following estimate:

(in thousands of US dollars equivalent)

COST OF THE PROJECT

FINANCING OF THE PROJECT

Categories and Principal Subdivisions	Foreign Exchange			Loc.			Other Loans			CIEC			Other Loans and Contributions		
	Direct	Indirect	Total	Total	Curr.	Total	F.Ex.	F.Ex.	Total	F.Ex.	Curr.	Total	F.Ex.	Curr.	Total
1. Engineering and Administration	343	-	343	714	1,057		343	-	343	-	714	-	-	-	-
1.1 Engineering and Superv. of Construction	-	-	-	470	470		-	-	-	-	470	-	-	-	-
1.2 Administration and Gen. Exp.	343	-	343	1,184	1,527		343	-	343	-	1,184	-	-	-	-
Total Category 1															
2. Direct Cost of Construction	2,192	193	2,385	2,472	4,857		2,385	-	2,385	-	975	-	1,497	-	-
2.1 Generation	498	47	545	173	718		-	545	545	-	39	-	1,134	-	-
2.2 Transmission															
2.3 Distribution															
2.31 Distribution-Manizales	339	83	422	413	835		422	-	422	-	251	-	162	-	-
2.32 Distribution-Outside Manizales															
2.4 General Installations	1,023	375	1,398	1,394	2,792		-	1,398	1,398	-	735	-	659	-	-
Total Category 2	180	-	180	27	207		180	-	180	-	27	-	-	-	-
	4,232	698	4,930	4,479	9,409		2,987	1,943	4,930	-	2,027	-	2,452	-	-
3. Fin. Charges During Construction															
3.1 Interest IDB Loans	801	-	801	-	801		698	103	801	-	-	-	-	-	-
3.2 Comm. Fees IDB Loans	99	-	99	-	99		-	-	-	99	-	-	-	-	-
3.3 IDB Project Supervision	69	-	69	-	69		45	24	69	-	-	-	-	-	-
Total Category 3	969	-	969	-	969		743	127	870	99	-	-	-	-	-
4. Unallocated															
4.1 Contingency	403	64	467	538	1,005		267	200	467	-	538	-	-	-	-
4.2 Provision for Escalation	250	40	290	-	290		160	130	290	-	-	-	-	-	-
Total Category 5	653	104	757	538	1,295		427	330	757	-	538	-	-	-	-
TOTAL COST AND FINANCING OF PROJECT	5,197	802	6,999	6,201	13,200		4,500	2,400	6,900	99	3,749	-	2,452	-	-
Percentages	47.0	6.1	53.1	45.9	100.0		34.1	18.3	52.4	0.7	28.3	-	13.6	-	-

IV. Financing

The project shall be financed approximately as follows:

(in thousands of US dollars equivalent)

<u>Sources</u>	<u>Currency of Origin</u>		<u>Currency of Use</u>		<u>Total</u>	<u>%</u>
	<u>For. Exch.</u>	<u>Loc. Curr.</u>	<u>For. Exch.</u>	<u>Loc. Curr.</u>		
IDB Loans: OC	4,500	-	4,500	-	4,500	34.1
FSO	2,400	-	2,400	-	2,400	18.3
Subtotal IDB Loans	6,900	-	6,900 ^{1/}	-	6,900	52.4
CR 2	-	3,848	99	3,749	3,848	29.0
Other Loans, etc.	-	2,452	-	2,452	2,452	18.6
TOTALS	6,900	6,300	6,999	6,201	13,200	100.0
Percentages	52.4	47.6	53.4	46.6	100.0	

1/ Includes indirect foreign exchange costs of approximately US\$802,000, of which the equivalent of US\$335,000 corresponds to the loan from the Ordinary Capital and the equivalent of US\$467,000 to that from the Fund for Special Operations.

V. Bidding Requirements

When goods and services to be acquired through competitive bidding are to be financed in whole or in part with resources from Loan /OC-CO [/SF-CO/ (this loan), the applicable bidding procedures and specific bidding requirements shall be such as to permit free participation of bidders of or from countries which are eligible under eligibility rules governing the use of the resources from which the loan was made. Consequently, no conditions preventing or restricting the participation of such bidders shall be established in those procedures and/or the specific bidding requirements.

VI. Tariffs and Minimum Rate of Return

In order to meet the objective stipulated in Clause of Loan Contract /OC-CO [/SF-CO/, the tariffs for the sale of electricity of the system of the Central Hidroeléctrica de Caldas must be established to yield a rate of return on net utility investment of at least 6% per annum, commencing not later than the year 1978, unless the Bank shall agree to a different rate.

PROPOSED RESOLUTION

COLOMBIA. LOAN TO CENTRAL HIDROELECTRICA DE CALDAS, S.A. (CHEC)

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 Central Hidroelectrica de Caldas, S.A., of Manizales, Colombia, 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 the expansion and improvement of the electric power generation, transmission and distribution system of the Insula-Esmeralda-San Francisco Complex.

This loan shall be subject substantially to the following conditions:

1. Amount in currencies. Up to US\$4.500.000 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 may be specified in a loan contract. Payments of amortization and interest shall be affected 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 contract and payable semi-annually in dollars of the United States of America 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 32 equal and consecutive semiannual installments, each of which shall include the appropriate amounts of principal and interest. The first installment shall be paid 4-1/2 years after such date.
6. Interest. 8% per annum (including the 1% special commission of the Bank), payable semi-annually 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 disbursement period thereof.
7. Disbursement. Total disbursement of the loan shall be made within a period of 4 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 the basic regulations concerning the Central Hidroelectrica de Caldas, S.A. (CHEC) 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, together with that authorized by Resolution DE- is to participate in financing a project estimated at the equivalent of US\$ 13,200,000 and in no case shall the participation of the resources of the loan exceed 52.4% of the total amount of the project. Consequently, the loan contracts shall contain such provisions as the Bank deems appropriate to ensure such national resources as may be necessary, in addition to the two loans, for the complete execution of the project shall be duly provided, in an amount estimated at the equivalence of US\$6,300,000, including financing of local credits, in accordance with a schedule of investments satisfactory to the Bank.
- (c) Prior to the signature of the loan contract, the borrower shall demonstrate to the Bank that it will have available the necessary resources for financing the local contribution to the project and covering its normal operating expenses during 1974.
- (d) Prior to the first disbursement of the loan, the borrower shall engage the services of a consulting firm acceptable to the Bank to assist it in preparing the engineering designs, specifications and bidding documents and in analyzing proposals, selecting the most suitable proposal and supervizing the work relating to the generation part of the project.
- (e) When the borrower declares or pays dividends in a form other than its own shares, it 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 not be less than 125% of its current liabilities.
- (f) The borrower shall take appropriate measures acceptable to the Bank in order that the rates for the supply of electric energy in its system: (i) produce revenues at least sufficient to cover all operating expenses of the system, including those related to administration, and general expenses for operation, maintenance, billing and collections, taxes 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 servicing of all the financial obligations of the debtor attributable to the system, generate such additional revenues as shall be needed for this purpose.

- (g) During the execution of the project, the borrower shall not, without the prior consent of the Bank, make any investment in the expansion, improvement or maintenance of its plant in service, the cost of which exceeds the equivalent of US\$500,000, or in any other project related to its plant in service, the cost of which exceeds the equivalent of US\$50,000.
- (h) 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.
- (i) The Bank shall establish such inspection procedures as it deems necessary to assure the satisfactory execution of the project, and the borrower and the guarantor shall extend all cooperation which is required for the most effective accomplishment of this purpose. The contract shall establish the amount to be charged to the resources of the loan and credited to the general income accounts of the Bank to cover the commission of the Bank for general inspection and supervision.

PROPOSED RESOLUTION

COLOMBIA. LOAN TO CENTRAL HIDROELECTRICA DE CALDAS, S.A. (CHEC)

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 Central Hidroeléctrica de Caldas, S.A., of Manizales, Colombia, 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 the expansion and improvement of the electric power generation, transmission and distribution system of the Insula-Emeralda-San Francisco Complex.

This loan shall be subject substantially to the following conditions:

1. Amount and currencies. Up to US\$2,400,000 or the equivalent in other currencies (except that of Colombia) which are part of the Fund for Special Operations, to pay for goods and services acquired through international competition in the member countries of the Bank and for such other purposes as may be specified in the loan contract. Payments of amortization and interest shall be effected proportionately in the respective currencies disbursed, in a quantity equivalent to the corresponding amount owed calculated in terms of dollars of the United States of America at the rate of exchange in effect in the free market on the due date, or such other rate of exchange as may be appropriate in accordance with provisions to be included in the loan contract.
2. Source of Funds. The Fund for Special Operations.
3. Guarantee. Full guarantee of the Republic of Colombia.
4. Commitment Fee. 1/2 of 1% per annum on the undisbursed portion of the loan, commencing to accrue 60 days after the date of contract and payable semiannually in dollars of the United States of America on the same dates as interest.
5. Amortization. The borrower shall amortize the loan in a period of 30 years from the date of the contract, by means of 52 equal and consecutive semiannual installments, each of which shall include the appropriate amounts of principal and interest. The first installment shall be paid 4-1/2 years after the date of the contract.

6. Interest. 2% per annum, 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 disbursement period thereof.
7. Disbursement. Total disbursement of the loan shall be made within a period of 4 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 the basic regulations concerning the Central Hidroeléctrica de Caldas, S.A. (CHEC) 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, together with that authorized by Resolution DE- is to participate in financing a project estimated at the equivalent of US\$13,200,000 and in no case shall the participation of the resources of the loans exceed 52.4% of the total amount of the project. Consequently, the loan contracts shall contain such provisions as the Bank deems appropriate to ensure such national resources as may be necessary, in addition to the two loans, for the complete execution of the project shall be duly provided, in an amount estimated at the equivalent of US\$6,300,000, including financing of local credits, in accordance with a schedule of investments satisfactory to the Bank.
 - (c) Prior to the signature of the loan contract, the borrower shall demonstrate to the Bank that it will have available the necessary resources for financing the local contribution to the project and covering its normal operating expenses during 1974.
 - (d) Prior to the first disbursement of the loan, the borrower shall engage the services of a consulting firm acceptable to the Bank to assist it in preparing the engineering designs, specifications and bidding documents and in analyzing proposals, selecting the most suitable proposal and supervising the work relating to the generation part of the project.
 - (e) When the borrower declares or pays dividends in a form other than its own shares, it 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 not be less than 125% of its current liabilities.
- (f) The borrower shall take appropriate measures acceptable to the Bank in order that the rates for the supply of electric energy in its system: (i) produce revenues at least sufficient to cover all operating expenses of the system, including those related to administration, and general expenses for operation, maintenance, billing and collections, taxes 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 servicing of all the financial obligations of the debtor attributable to the system, generate such additional revenues as shall be needed for this purpose.
- (g) During the execution of the project, the borrower shall not, without the prior consent of the Bank, make any investments in the expansion, improvement or maintenance of its plant in service, the cost of which exceeds the equivalent of US\$500,000, or in any other project related to its plant in service, the cost of which exceeds the equivalent of US\$50,000.
- (h) 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\$25,000. 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.
- (i) The Bank shall establish such inspection procedures as it deems necessary to assure the satisfactory execution of the project, and the borrower and the guarantor shall extend all cooperation which is required for the most effective accomplishment of this purpose. The contract shall establish the amount to be charged to the resources of the loan and credited to the general income accounts of the Bank to cover the commission of the Bank for general inspection and supervision.

CHRC: MARKET AND OPERATING DATA
1962, 1965-1972 Actual; 1973-1982 Projected

APPENDIX C

	ACTUAL									PROJECTIONS					
	1962	1965	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
ers (thousands)	31.4	49.5	52.2	54.9	57.9	63.3	57.1	71.1	75.4	79.7	84.7	89.6	95.2	100.9	106.7
ons (KWh)	()	58.4	62.0	69.7	79.5	88.3	97.1	106.8	117.5	129.3	142.2	156.4	172.0	189.2	208.0
	()	19.6	21.4	21.5	23.1	26.0	28.6	31.5	34.6	38.1	41.9	46.1	50.7	55.8	61.4
	(89.9)	48.4	52.0	57.0	69.0	71.6	90.7	104.6	113.3	122.6	133.3	144.5	157.9	171.5	186.6
	()	4.8	4.8	4.8	4.8	5.9	6.1	6.7	7.4	8.1	8.9	9.8	10.8	11.9	13.1
	()	-	-	5.7	6.1	7.1	7.8	8.6	9.5	10.4	11.4	12.5	13.6	14.7	15.9
	()	9.0	9.3	3.6	3.5	3.3	3.6	4.0	4.4	4.8	5.3	5.8	6.4	7.0	7.7
Public Utilities	23.4	27.1	35.3	30.8	33.2	36.5	40.2	44.2	48.5	53.3	58.6	64.5	70.9	77.8	85.0
	19.4	35.7	49.0	64.3	89.0	22.7	102.7	120.7	132.7	146.1	160.7	176.6	194.5	213.9	235.0
ystem	109.3	199.3	225.7	262.9	395.8	334.7	380.1	423.0	463.6	508.1	557.0	610.5	670.2	735.4	807.0
	-	55.2	143.9	222.7	197.2	129.8	68.6	38.7	5.1	4.2	-	-	-	-	-
	-	-	-	-	-	17.6	34.9	17.0	5.0	2.0	5.0	5.6	-	-	-
on	109.3	254.5	369.6	485.6	503.0	482.1	483.6	478.7	473.7	517.3	562.6	615.8	676.2	735.4	807.0
ssion and Distribution	19.1	18.7	18.6	17.7	16.1	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
ons (KWh)	116.2	292.6	411.0	531.9	550.9	532.6	555.9	555.9	555.9	607.4	658.9	658.9	658.9	658.9	658.9
nelectric	-	3.2	7.0	3.0	3.0	0.7	-	-	-	-	-	-	-	-	-
ical	116.2	295.8	418.0	534.8	553.9	533.4	555.9	555.9	555.9	607.4	658.9	658.9	658.9	658.9	658.9
tion	18.9	6.3	2.2	5.9	6.4	2.3	-	-	-	-	1.7	4.7	139.5	214.9	302.0
	135.1	302.1	420.2	540.7	560.3	535.7	555.9	555.9	555.9	607.4	660.6	660.6	793.9	873.8	961.0
	53.0	51.3	43.5	42.7	45.1	43.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0
	29.0	54.0	71.0	83.0	89.2	104.7	116.1	128.9	140.3	155.4	170.4	186.8	205.0	225.0	246.0
y (MW)	-	-	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
Hydro	-	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Hydro	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	22.5	22.5	22.5	22.5	22.5	22.5
ro Plants	5.0	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
rada - Thermal	-	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Capacity	21.4	52.5	187.5	187.5	187.5	187.5	187.5	187.5	187.5	191.0	195.0	195.0	195.0	195.0	195.0

(PROYECTO 810)

SISTEMA	CHEC
LOCALIZACION	GENERAL

CHEC: GENERATION, TRANSMISSION AND DISTRIBUTION PROJECT

Project Investment and Financing Plan
(In thousands of US dollars)

Categories and Principal Subdivisions	Total Investment			IDB Loans			CHEC "Aporte"		Other Loans
	U.S.	Col.	Col.	U.S.	Col.	Col.	U.S.	Col.	Contributions
	Ex.	Currency		Ex.	Currency		Ex.	Currency	Local
Category 1 - ENGINEERING AND ADMINISTRATION									
1.1 Engineering and Supervision of Construction	343	714	1 057	343	-	343	-	714	-
1.2 Administration and General Expenses	-	470	470	-	-	-	-	470	-
Total Category 1	343	1 184	1 527	343	-	343	-	1 184	-
Category 2 - DIRECT COST OF CONSTRUCTION									
2.1 Generation									
2.11 Rio San Francisco Conveyance	467	1 365	1 832	467	-	467	-	532	832 ^{1/}
2.12 Rio Campoalegre Conveyance and 3d. Unit Inside	1 918	1 107	3 025	1 918	-	1 918	-	1 107	662 ^{1/}
Subtotal 2.1	2 385	2 472	4 857	2 385	-	2 385	-	1 639	1 494
2.2 Transmission	54	173	713	-	173	54	-	39	130 ^{3/}
2.3 Distribution									
2.31 Distribution in Manizales	422	413	835	422	-	422	-	211	162 ^{4/}
2.32 Distribution outside Manizales	1 398	1 394	2 792	-	1 398	1 398	-	735	652 ^{1/}
Subtotal 2.3	1 820	1 807	3 627	422	1 398	1 820	-	946	814
2.4 General Installations	180	27	207	180	-	180	-	27	-
Total Category 2	4 930	4 479	9 409	2 987	1 943	4 930	-	2 027	2 452
Category 3 - FINANCIAL CHARGES DURING CONSTRUCTION									
3.1 IDB Interest (Including Service Charge)									
3.11 Ordinary Capital (OC) at 8%	698	-	698	698	-	698	-	-	-
3.12 Special Funds (FSO) at 2%	103	-	103	-	103	103	-	-	-
Subtotal 3.1	801	-	801	698	103	801	-	-	-
3.2 IDB Commitment Fees									
3.21 Ordinary Capital (OC) at 1.25%	83	-	83	-	-	-	83	-	-
3.22 Special Funds (FSO) at 0.50%	16	-	16	-	-	-	16	-	-
Subtotal 3.2	99	-	99	-	-	-	99	-	-
3.3 IDB Project Supervision at 1%									
3.31 Ordinary Capital (OC)	45	-	45	45	-	45	-	-	-
3.32 Special Funds (FSO) at 0.50%	24	-	24	-	24	24	-	-	-
Subtotal 3.3	69	-	69	45	24	69	-	-	-
Total Category 3	969	-	969	743	127	870	99	-	-
Category 5 - UNALLOCATED									
5.1 Contingencies	467	538	1 005	267	200	467	-	538	-
5.2 Provision for Escalation	290	-	290	160	130	290	-	-	-
Total Category 5	757	538	1 295	427	330	757	-	538	-
TOTAL INVESTMENTS AND FINANCING	6 999^{6/}	6 201	13 200	4 500	2 400	6 900	99	3 749	2 452
Percentages	53.4	46.6	100.0	34.1	18.3	52.4	0.7	28.3	18.6

- 1/ Loan - Comité de Cafeteros de Quindío.
- 2/ Party Loan - Comité de Cafeteros de Risaralda.
- 3/ Part of contribution from Department of Caldas.
- 4/ Part of Contribution from Comité de Cafeteros de Caldas.
- 5/ Part of Contributions from Department of Caldas, Comité de Cafeteros de Caldas, Users; Loans from ICEL, Comité de Cafeteros de Quindío and Comité de Cafeteros de Risaralda.
- 6/ Includes indirect foreign exchange costs of approximately US\$802 000.

CHEC: GENERATION, TRANSMISSION AND DISTRIBUTION PROJECT

Estimated Construction Cost
(in thousands of US Dollars)

	Foreign Exchange			Local	Total
	Direct	Indirect	Total	Curr.	
<u>Category 1 - ENGINEERING AND ADMINISTRATION</u>					
1.1 <u>Engineering and Supervision of Construction</u>					
1.11 Rio San Francisco Conveyance at 7.2%	125	-	125	36	161
1.12 Rio Campoalegre Conveyance, 3d. Unit La Insula at 7.2%	218	-	218	19	237
1.13 Transmission and Distribution at 15%	-	-	-	659	659
Subtotal 1.1 Eng. and Sup. of Constr.	343	-	343	714	1 057
1.2 <u>Administration and General Expense at 5%</u>	-	-	-	470	470
Total Category 1	343	-	343	1 184	1 527
<u>Category 2 - DIRECT COST OF CONSTRUCTION</u>					
2.1 <u>Generation</u>					
2.11 <u>Rio San Francisco Conveyance</u>					
2.11.1 Preliminary Work	-	-	-	37	37
2.11.2 Civil Works					
- Dam and Intake	-	-	-	132	132
- Canals (2.5 x 2.9 m)3.5 kms	-	-	-	780	780
- Tunnels, concrete 2.0 m.d., 1 km	209	-	209	275	484
- Syphon,1.5 m.d.,steel,120 m	-	-	-	71	71
- Desilting Basin	-	-	-	70	70
Subtotal 2.11.2 Civil Works	209	-	209	1 328	1 537
2.11.3 Equipment and Materials					
- Gates, Coissons, Screens, Steel Conduit, Cranes	228	30	258	-	258
Subtotal 2.11 Rio S.Francisco Conv.	437	30	467	1 365	1 832
2.12 <u>Rio Campoalegre Conveyance, 3d. Unit La Insula</u>					
2.12.1 Preliminary Work	-	-	-	23	23
2.12.2 Civil Works					
- Dam and Intake	-	-	-	204	204
- Canals	-	-	-	303	303
- Tunnel	345	-	345	451	796
- Desilting Basin	-	-	-	113	113
- Third Unit La Insula	-	-	-	13	13
Subtotal 2.12.2 Civil Works	345	-	345	1 084	1 429

	Foreign Exchange			Local	Total
	Direct	Indirect	Total	Curr.	
2.12.3 Equipment and Materials					
- Gates, Caissons, Screens,					
Steel Conduit, Cranes	294	33	327	-	327
- Electromechanical Equipment La					
Insula (incl. step-up Subst.)	1 116	130	1 246	-	1 246
Subtotal 2.12.3 Equipment and Materials	1 410	163	1 573	-	1 573
Subtotal 2.12 Rio Campoalegre Conveyance					
and 3rd. Unit La Insula	1 755	163	1 918	1 107	3 025
Subtotal 2.1 Generation	2 192	193	2 385	2 472	4 857
2.2 Transmission					
2.21 115 KV Substations (2 bays					
Regivit for Ibague and Zarzal Lines;					
1 bay in La Dorada and 1 bay					
spare)	183	-	183	7	190
2.22 33 KV Lines and Substations outside					
Manizales					
33 KV Lines					
2.22.1 El Aguila-Viterbo, 8 kms, wood					
poles, 2/o ACSR, 1/c	6	5	11	14	25
2.22.2 El Aguila-La Virginia,					
13 kms, wood poles,					
2/o ACSR, 1/c	9	7	16	20	36
2.22.3 La Insula-La Virginia, 35 kms,					
wood poles, 2/o ACSR, 1/c	21	18	39	50	89
2.22.4 La Dorada-Norcasia, 32 kms,					
wood poles and steel profile					
structures, 2/o ACSR, 1/c	18	17	35	45	80
Subtotal 33 KV Lines	54	47	101	129	230
33 KV Substations					
2.22.5 New Viterbo S/S, 33/132 KV, Equipment	17	-	17	4	21
2.22.6 Marsella S/S, 33/13.2 KV, 300 KVA					
Expansion	21	-	21	3	24
2.22.7 New Belalcazar S/S, 33/13.2 KV,					
300 KVA	21	-	21	3	24
2.22.8 New La Virginia S/S, 33/13.2 KV, 1500 KVA	33	-	33	7	40
2.22.9 1 New and 3 S/S Expansions in the					
East of Caldas, 33/13.2 KV, total					
power transformer capacity,					
2 350 KVA	169	-	169	20	189
Subtotal 33 KV Substations	261	-	261	37	298
Subtotal 2.2 Transmission	498	47	545	173	718

		Foreign Exchange			Loc.	
		Direct	Indirect	Total	Curr.	Total
2.3	<u>Distribution</u>					
	2.31 Distribution in Manizales					
	- Improvements and expansion of the primary and secondary systems, including the expansion of the Alta Suiza Substation by 14 MVA and the installation of 15 MVA in distribution transformers	229	83	312	401	713
	- Customer watthour meters, 11000 units	110	-	110	12	122
	Subtotal 2.31 Distribution Manizales	339	83	422	413	835
	2.32 Distribution outside Manizales					
	- Improvements and expansion in all the urban centers served by 13.2 KV directly (167 kms secondary lines and 8.35 MVA in distribution transformer capacity)	345 ² / ₂	125	470	604	1 074
	- 13.2 KV feeders to small urban centers in the Eastern part of Caldas (594 kms) and rural electrification systems (730 kms)	678	250	928	790	1 718
	Subtotal 2.32 Distribution outside Manizales	1 023	375	1 398	1 394	2 792
	Subtotal 2.3 Distribution	1 362	458	1 820	1 807	3 627
2.4	<u>General Installations</u>					
	2.41 Carrier Communication and Radiotelephone	81	-	81	14	95
	2.42 Maintenance and Construction /equipt Vehicles	79	-	79	8	87
	2.43 Travelling Crane for Maintenance Shop	20	-	20	5	25
	Subtotal 2.4 General Installations	180	-	180	27	207
	Total Category 2	4 232	698	4 930	4 479	9 409
Category 5 - UNALLOCATED						
5.1	<u>Contingencies</u>					
	5.11 Rio San Francisco Conveyance					
	- Civil Works at 15%	32	-	32	199	231
	- Equipment at 10%	23	3	26	-	26
	Subtotal 5.11	55	3	58	199	257
	5.12 Rio Campoalegre Conveyance-3d Unit-Insula					
	- Civil Works at 15%	51	-	51	163	214
	- Equipment at 10%	141	16	157	-	157
	Subtotal 5.12	192	16	208	163	371

	Foreign Exchange			Loc. Curr.	Total
	Direct	Indirect	Total		
5.13 Transmission and Distribution at 8%	156	47	203	161	364
Subtotal 5.1 Contingencies	403	64	467	538	1 005
Total Estimated Construction Cost ^{1/}	4 978	762	5 740	6 207	11 947

- ^{1/} Before financial charges during construction and before adding a provision for Escalation.
- ^{2/} Including 10 000 customer watthour meters.

CENTRAL HYDROELECTRIFICATION OF CALDAS (CHEN)
Generation, Transmission and Distribution Project
Selection Criteria for Rural Electrification

The criteria indicated below shall be taken into account when selecting the subtransmission lines for each zone in the rural electrification portion of the project. The lines shall be constructed in the Caldas coffee producing regions, which is basically the broad criterion for establishing priorities. With respect to installing lines within an area, various alternatives will be studied. The established selection criteria will apply in selecting those lines that promise the greatest socioeconomic impact.

The selection criteria involved in weighing the alternatives for placing each subtransmission line will be made on the basis of an index calculated for each line and its area of influence, comprising two subindices, as follows:

I_1 = Discounted present value (D.P.V.) of $\frac{\text{benefits}}{\text{costs}}$, calculated according to the following formula at a 10 per cent discount rate:

$$= \frac{(\text{D.P.V. of expected energy sales})}{(\text{D.P.V. of cost of the line}) + (\text{D.P.V. of cost of energy purchased})}$$

$$I_2 = D + V + A + E + S$$

Where, for the area of influence:

- D = population density per Km²
- V = roads
- A = water supply
- E = schools
- S = health facilities

To calculate I_2 , whose maximum value is 1 (one), the following considerations will be used:

<u>Variable</u>	<u>Inhabitants per Km²</u>	<u>Points</u>
D	under 50	0
	50 to 100	0.5
	101 to 150	0.10
	151 to 200	0.15
	over 200	0.20
V	<u>Roads</u>	
	Trails	0.05
	Entrance Road	0.10
	Unpaved Road	0.15
	Paved Road	0.20

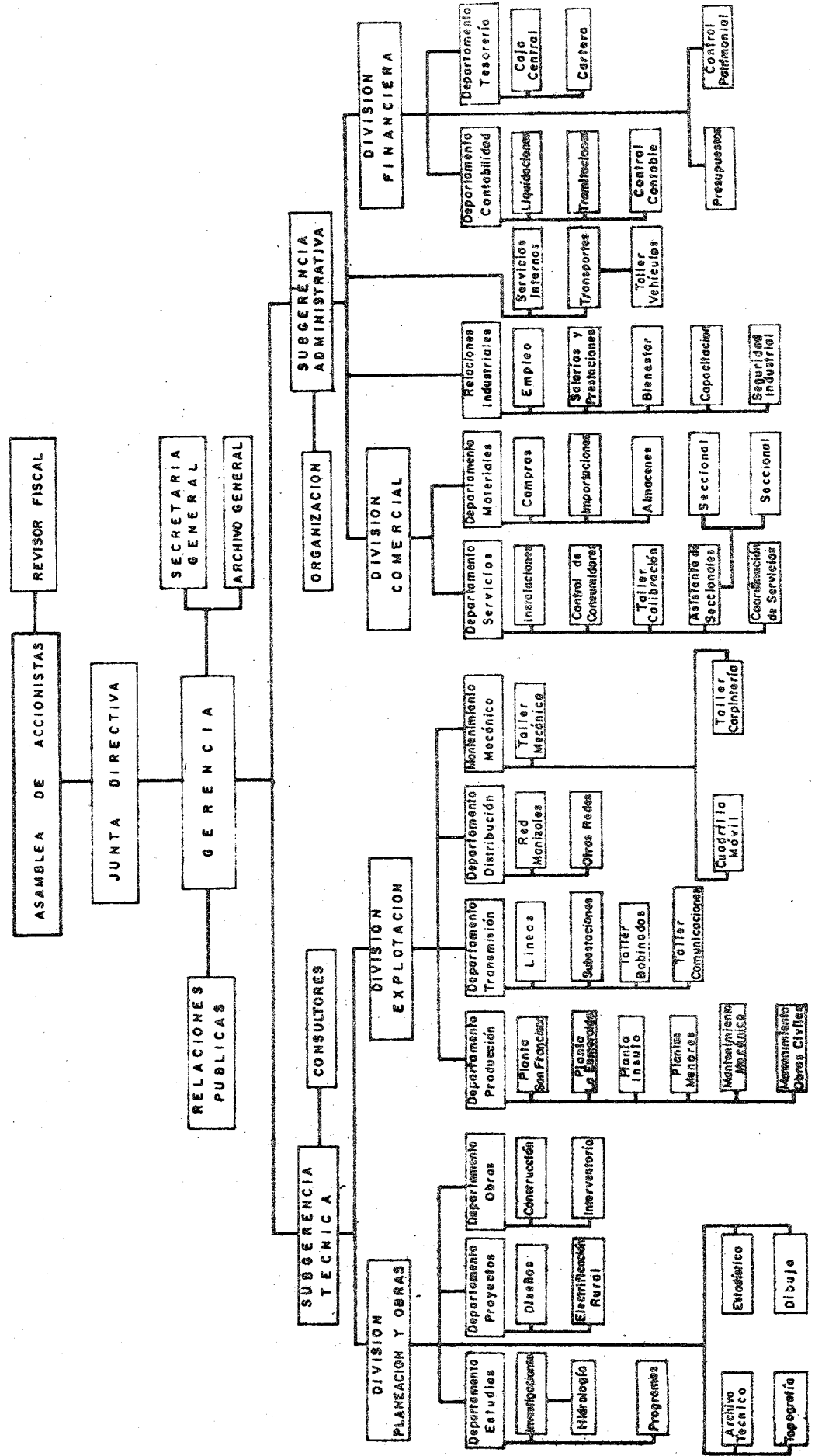
<u>Variable</u>	<u>Water Supply</u>	<u>Points</u>
A	Total coverage (To be calculated when necessary according to coverage)	0.20
E	<u>Schools</u> Total coverage (same as above)	0.20
S	<u>Health Facilities</u> Total coverage (same as above)	0.20

The total index for each subtransmission line will be the sum of I_1 and I_2 . Once the final indices are obtained, they shall be listed in decreasing order, and those with the highest indices will be selected. To apply these criteria, the following should be considered:

- a) For each zone in which the program is subdivided, calculate selection criteria for 200% of the number of lines to be constructed, whenever possible.
- b) Lines that have the lowest indices for each zone should be compared, so that the high index lines will be chosen for inclusion in the program.
- c) If the installation of substations and transmission lines should be required, alternative means of electric power shall be considered (basically thermal power). If thermal power is the better alternative, it shall be financed outside the IDB Program.
- d) The selection of rural electrification lines for the entire program should be completed within 18 months from the date of the IDB Loan Contract.

CENTRAL HIDROELECTRICA DE CALDAS S.A

ORGANIGRAMA



CENTRAL HIDROELECTRICA DE CALDAS S.A. - CHCS

Financial Statements: Condensed Comparative
Balance Sheets 1968-1972 Actual, 1973-1982 Projected
(in thousands of US dollars)

APENDICE B-1

	- A C T U A L -					- P R O J E C T E D -								
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
<u>A S S E T S</u>														
Plant in service at cost	24,757	35,266	37,123	37,459	40,961	43,649	45,618	46,995	55,866	56,843	56,843	56,843	56,843	56,843
Accumulated depreciation	5,052	5,652	6,376	7,122	7,905	8,909	9,958	11,039	12,324	13,631	14,938	16,245	17,552	18,859
Assets - Plant in service	19,705	29,614	30,747	30,337	33,056	34,740	35,660	35,956	43,542	43,212	41,905	40,598	39,291	37,984
Work in progress	10,172	3,022	4,896	5,881	2,999	2,697	4,885	7,740	1,416	-	-	-	-	-
Fixed assets	29,877	32,636	35,643	36,218	36,055	37,437	40,545	43,696	44,958	44,517	43,185	41,853	40,521	39,125
Cash, receivables, materials, etc.)	954	1,184	1,552	1,252	1,452	1,349	1,434	1,029	1,741	3,411	4,893	6,921	9,526	12,714
	1,466	1,706	1,596	1,760	1,707	1,500	1,148	1,148	1,148	1,148	1,148	1,146	1,146	1,146
Total Assets	32,297	35,526	38,791	39,230	39,214	40,286	43,127	45,873	47,847	49,076	49,226	49,922	51,195	52,501
<u>L I A B I L I T I E S</u>														
Reserves, earnings, etc.)(1)	21,182	23,407	25,808	26,782	27,206	28,060	29,751	31,026	32,471	34,439	36,199	38,311	40,805	43,704
Liabilities	8,015	8,544	9,726	9,045	8,129	8,548	10,023	11,478	11,849	10,744	9,328	8,107	6,872	5,467
Liabilities (accounts payable, current maturities on long-term loan, etc.)	2,447	2,859	2,376	2,584	3,320	3,326	3,353	3,369	3,527	3,893	3,690	3,504	3,218	3,152
Liabilities	653	716	881	819	559	352	--	--	--	--	--	--	--	--
Total Liabilities	11,115	12,119	12,983	12,448	12,008	12,226	13,376	14,847	15,376	14,537	13,027	11,611	10,390	9,155
Total Equity and Liabilities	32,297	35,526	38,791	39,230	39,214	40,286	43,127	45,873	47,847	49,076	49,226	49,922	51,195	52,501
Rate used US\$1.00 =	16.88	17.85	19.10	21.00	22.79	-	-	-	-	-	-	-	-	-
<u>Ratios of:</u>														
Current Liabilities	0.39	0.41	0.65	0.48	0.44	0.41	0.43	0.31	0.49	0.88	1.32	1.47	2.71	3.20
Equity	0.52	0.51	0.49	0.45	0.44	0.44	0.45	0.48	0.47	0.43	0.36	0.30	0.29	0.24
Equity	0.38	0.36	0.37	0.34	0.30	0.30	0.34	0.37	0.36	0.31	0.26	0.21	0.17	0.14

At December 31, 1972 was: 87% capital; 8% retained earnings and 5% others.

CENTRAL HIDROELECTRICA DE CALDAS S. A. - CHCC

Financial Statements: Net Utility Investment and Rate of Return Determination
1968-1972 Actual, 1973-1982 Projected
(in thousands US dollars)

DESCRIPTION	ACTUAL					PROJECTED				
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Fixed Assets - Plant in Service ^{1/}										
Beginning year balance	24 390	24 757	35 266	37 123	37 458	40 361	43 349	45 618	46 995	55 866
Net additions during year ^{2/}	367	10 509	1 857	332	3 503	2 658	1 469	1 377	8 871	977
Year-end balance	24 757	35 266	37 123	37 458	40 961	43 019	44 818	46 995	55 866	56 843
Accumulated Depreciation ^{3/}										
Beginning year balance	4 561	5 052	5 652	6 376	7 122	7 905	8 909	9 948	11 039	12 324
Provision during year	491	600	724	746	783	1 004	1 049	1 081	1 255	1 307
Year-end balance	5 052	5 652	6 376	7 122	7 905	8 909	9 956	11 039	12 324	13 631
Fixed Assets-Plant in Service-year end balance	19 705	29 614	30 747	30 336	33 056	34 740	35 660	35 956	43 542	43 212
Net fixed assets-plant in service (average for year)	19 767	24 660	30 181	30 542	31 696	33 898	35 200	35 805	39 749	43 377
Working Capital (average for year) ^{3/}	373	456	603	641	657	714	740	766	842	915
Total Net Utility Investment (average for year)	20 140	25 146	30 784	31 183	32 353	34 612	35 940	36 574	40 591	44 292
Operating Income (from Appendix B-3)	757	1 247	1 210	1 357	1 291	1 294	1 734	1 833	1 991	2 338
Rate of Return on Net Utility Investment (%)	3.76	4.96	3.93	4.35	4.00	3.74	4.82	5.03	4.91	5.28
Operating Ratio (%)	46.00	38.00	48.00	46.00	49.00	47.4	43.8	43.3	41.8	40.6
Debt Service Covered by Internal Cash	1.8	2.7	1.6	1.2	1.3	1.4	1.6	1.6	1.6	2.1

^{1/} Fixed assets and accumulated depreciation are given in US dollars based on converting the December 31, 1950 Colombian peso amounts at the average exchange rate of that year and adding thereafter the annual net additions at the corresponding years average exchange rate.

^{2/} In the projections only the net additions to fixed assets related to the Project and other works now programmed were considered.

^{3/} Annual working capital requirements computed as 1/6 corresponding annual billings.

CENTRAL HIDROELECTRICA DE CALDAS, S.A. - CHEC

Financial Statements: Comparative Income Statements
1968-1972 Actual, 1973-1982 Projected
in thousands of US dollars unless otherwise noted)

	A C T U A L						P R O J E C T E D						
	1960	1962	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1981
No. of Consumers (thousands)	49.5	52.2	54.9	57.9	63.3	67.1	71.1	75.4	79.9	84.7	89.8	100.9	106.9
Energy Sales - (millions KWH) - CHED System - ISA and Others	199.3 55.2	225.7 143.9	262.9 222.7	305.3 197.2	334.7 147.4	350.1 103.5	423.0 53.7	463.6 10.1	509.1 9.2	557.0 5.0	610.8 5.0	735.4	807.1
Total Energy Sales	254.5	369.6	485.6	503.0	482.1	483.6	476.7	473.7	517.3	562.0	615.8	735.4	807.1
Average Revenue for KWH Sold (US cents/KWH) - CHED System - ISA and Others - Combined average	0.99 0.49 0.88	0.94 0.54 0.81	0.93 0.53 0.74	0.92 0.52 0.76	0.95 0.52 0.82	0.98 0.54 0.89	1.08 0.54 1.02	1.08 0.54 1.07	1.08 0.54 1.07	1.08 0.54 1.07	1.08 0.54 1.07	1.08	1.08
Operating Revenues - From sale of energy - CHED System - ISA and Others	1 966 270	2 130 760	2 448 1 171	2 926 1 023	3 173 771	3 720 562	4 560 302	5 000 54	5 480 49	6 300 27	6 596 27	7 320	8 700
Subtotal from Sale of Energy	2 236	2 910	3 619	3 849	3 944	4 282	4 862	5 054	5 529	6 327	6 617	7 320	8 700
- Other Operating Revenue	68	90	76	78	125	86	91	96	102	100	114	121	136
Total Operating Revenue	2 304	3 000	3 697	3 927	4 069	4 368	4 953	5 150	5 631	6 427	6 731	7 441	8 836
Operating Expenses - Generation; Operation and Maintenance - Transmission; Operation and Maintenance - Distribution; Operation and Maintenance - Energy Purchased - Customer Billing and Collecting - Administration and General Expenses - Provision for Depreciation	379 57 257 58 137 158 191	418 60 271 13 175 216 660	656 65 325 53 197 469 721	703 105 302 55 199 460 746	747 150 348 13 251 456 763	770 170 360 - 293 486 1 004	800 180 380 - 310 500 1 049	855 190 410 - 340 550 1 081	905 190 410 - 340 550 1 205	936 200 430 10 350 572 1 307	980 215 455 308 370 600 1 307	970 230 480 950 1 020 660 1 307	930 240 510 1 350 650 1 307
Total Operating Expenses	1 947	1 723	2 487	2 570	2 778	3 074	3 219	3 311	3 640	3 747	4 172	4 545	5 437
Operating Income	757	1 247	1 210	1 357	1 291	1 294	1 734	1 839	1 991	2 338	2 559	2 746	3 399
Other Income	(4)	(73)	24	141	51	-	-	-	-	-	-	25	25
Depreciation Building	260	250	569	758	732	596	574	564	546	370	774	552	473
Financial Charges	492	924	665	740	583	698	1 160	1 275	1 445	1 968	1 760	2 424	2 901
Net Profit	16.25	17.50	18.66	20.20	22.13	-	-	-	-	-	-	-	-

Average Exchange Rate Used: US\$1=Col.Pesos

Average Exchange Rate Used: US\$1=Col.Pesos

CENTRAL HIDROELECTRICA DE CALDAS S.A. - CHEC

Financial Highlights and Ratios, Years ending 1968-1972
(in millions of US dollars unless otherwise noted)

<u>Financial Highlights</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
Net Fixed Assets	29.9	32.6	35.6	36.2	36.1
- Index (1968=100)	100.0	109.0	119.0	121.0	121.0
- As % of Total Assets	92.6	91.8	91.8	92.3	92.1
Provision for Depreciation	0.5	0.6	0.7	0.7	0.8
- As % of Fixed Assets - Plant in Service	2.0	2.0	2.0	2.0	2.0
Net Working Capital	(1.5)	(1.6)	(0.8)	(1.3)	(1.9)
Capitalization (Long-Term Debt plus Equity)	29.2	32.0	35.5	35.8	35.3
- As % of Net Fixed Assets	98.0	98.0	100.0	99.0	98.0
Long-Term Debt	8.0	8.5	9.7	9.0	8.1
- As % of Capitalization	27.0	27.0	27.0	25.0	23.0
Equity	21.2	23.4	25.8	26.8	27.2
- As % of Capitalization	73.0	73.0	73.0	75.0	77.0
Net Utility Investment (Average for Year)	20.1	25.1	30.8	31.2	32.3
Operating Revenues	2.3	3.0	3.7	3.9	4.1
Operating Expenses	1.6	1.8	2.5	2.6	2.8
- As % of Operating Revenues	67.0	58.0	67.0	66.0	68.0
Operating Income	0.7	1.2	1.2	1.3	1.3
- As % of Operating Revenues	33.0	42.0	33.0	34.0	32.0
- As % of Net Utility Investment	3.8	5.0	3.9	4.4	4.0
<u>Financial Ratios</u>					
Current Ratio ^{1/}	0.39	0.41	0.65	0.48	0.44
Acid Test ^{2/}	0.17	0.26	0.41	0.35	0.33
Net Fixed Assets/Long-Term Debt	3.74	3.83	3.67	4.02	4.46
Debt Service Coverage ^{3/}	1.8	2.7	1.6	1.2	1.3
Total Debt/Total Assets	0.34	0.34	0.33	0.31	0.31
Total Debt/Equity	0.52	0.51	0.49	0.45	0.44
Long Term Debt/Equity	0.38	0.36	0.37	0.34	0.30
Operating Ratio ^{4/}	46%	38%	48%	46%	49%

^{1/} Current Assets/Current Liabilities

^{2/} Liquid Assets/Current Liabilities

^{3/} Operating income plus depreciation divided by debt service

^{4/} "Operating Ratio" is the % relationship of operating expenses before depreciation to operating revenue.

CENTRAL HIDROELECTRICA DE CALDAS S.A. - CHEC -
FINANCIAL STATEMENTS: PROJECTIONS OF SOURCES AND APPLICATIONS OF FUNDS - 1972, 1973-1982
(In Thousands of US Dollars)

	Actual 1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
SOURCES											
Internal Sources											
Net Operating Income	1,291	1,294	1,734	1,839	1,991	2,336	2,559	2,776	3,352	3,779	3,768
Depreciation	763	1,009	1,049	1,081	1,285	1,307	1,307	1,307	1,337	1,357	1,307
Total Internal Sources	2,074	2,303	2,783	2,920	3,276	3,643	3,866	4,103	4,689	5,136	5,035
External Sources											
Capital Increase		115	55								
Comité Caldas		339	339								
Comité Caldas de Caldas		8	137								
Beneficiarios		33									
Subtotal Capital Increase		156	531								
Borrowings											
Local Borrowings											
Comité Cafetero Risaralda		33									
ICEL		33									
Comité Cafeteros Caldas		33									
Comité Cafeteros Risaralda		209	209	209	206						
Comité Cafeteros Caldas		209	209	209	206						
External Borrowings											
IDB - OC		404	1,413	1,617	797	452					
IDB - FOC		541	714	506	406	247					
IDB - FOC											
Subtotal Borrowings		1,469	2,545	2,541	1,615	701					
Total External Sources		1,618	3,076	2,541	1,615	701					
Total SOURCES	2,074	3,921	5,859	5,461	4,891	4,344	3,866	4,810	6,328	6,493	6,342
APPLICATIONS											
Construction Costs (Incl. Interest)											
General, Transmission and Distribution		2,186	3,957	4,032	2,347	666					
Other Projects	620	200	200	200	200	200					
Total Construction Cost	620	2,386	4,157	4,232	2,547	866					
Debt Service											
Interest		682	682	682	682	682	682	682	682	682	682
IDB Loan 12%/OC		300	312	336	355	377	396	406	424	442	460
IDB Loan 21%/OC		21									
MAN A.G. Loan											
IDB - OC - Project											
IDB - FOC - Project											
Fed. Nat. de Cafeteros		34	31	26	25	22	21	19	17	15	14
ICEL			8	8	8	8	8	8	8	8	8
Comité Cafeteros Caldas			4	4	4	4	4	4	4	4	4
Comité Cafeteros Risaralda			4	4	4	4	4	4	4	4	4
Comité Cafeteros Quindío											
Subtotal Amortization	987	1,037	1,043	1,070	1,086	1,244	1,610	1,510	1,624	1,651	1,672
Interest											
IDB Loan 12%/OC		376	376	376	376	376	376	376	376	376	376
IDB Loan 21%/OC		128	110	92	72	51	29	17	10	6	4
MAN A.G. Loan											
IDB - OC - Project		7	52	215	306	366	396	406	424	442	460
IDB - FOC - Project		2	13	30	41	46	48	49	50	51	52
Fed. Nat. de Cafeteros		24	20	16	12	9	7	6	5	4	3
ICEL			4	3	2	1	1	1	1	1	1
Comité Cafeteros Caldas			2	2	2	2	2	2	2	2	2
Comité Cafeteros Risaralda			29	78	102	117	80	62	47	31	15
Comité Cafeteros Quindío			27	72	100	142	80	62	47	31	15
Subtotal Interests	537	606	670	802	897	1,057	774	659	561	471	391
Total Debt Service	1,524	1,643	1,717	1,872	1,983	2,299	2,384	2,171	2,185	2,122	2,063
Less Interest during Construction		(10)	(100)	(245)	(349)	(377)					
Total Debt Service Net	1,524	1,633	1,617	1,627	1,634	1,922	2,384	2,171	2,185	2,122	2,063
Increase in Working Capital Requirements		100	100	100	100	100	100	100	100	100	100
TOTAL APPLICATIONS	2,144	4,112	2,817	2,956	4,072	2,450	2,484	2,272	2,285	2,222	2,163
Increase (decrease) in Cash	(70)	(304)	(12)	(505)	612	1,894	1,382	1,538	4,043	4,271	4,179
Accumulated Cash Balance		(304)	(316)	(721)	(111)	1,589	2,971	4,509	8,552	12,823	17,002

EVALUATION OF LOAN 117/O.S.-00 (CHEC)

A. Summary

On December 18, 1965, the Board of Directors of the Bank approved Loan 117/O.S.-00 to Central Hidroeléctrica de Caldas, S.A. (CHEC) in the amount of US\$8,100,000, to finance 48% of the total cost of the San Francisco Hydroelectric Plant Project, which amounted to US\$16,390,000. The remaining was financed by CHEC (US\$5,200,000) and Electraguas, now called ICEL (US\$3,500,000).

The Project, having an estimated time of construction of four years, consisted mainly of: construction of the San Francisco generating plant; the San Francisco Dam with intake and outlet works; transmission system at 115Kv; subtransmission system at 33 and 13.2Kv; the expansion of the primary and secondary distribution system in Manizales; and small complimentary works.

Also included in the Project was the equivalent of US\$80,000 for the services of an expert under a program of Technical Assistance to guide CHEC in the improvement of its financial and administrative organization. Attached to this evaluation are details of the cost of the San Francisco Hydroelectric Plant Project and its execution.

B. Comments

1.- The results of project execution are considered above average and highly satisfactory to the Bank. CHEC demonstrated adequate capacity as Executing Agency ^{1/} and its organization worked effectively and harmoniously with its consultant Syndibel, during the period of the Project construction.

2.- The recommendations made by the expert providing the Technical Assistance services are in the final stage of implementation.

3.- The local financing of the Project presented some problem, as a result of delays in the allocation of funds by Electraguas (ICEL). The Electraguas contributions were made after some delay and were reflected with an extension in the period of execution of the Project (one year extension of the disbursement period).

4.- The main change in the Project scope was the increase of the generating capacity by 50% (addition of a third unit of 45,000 Kw) brought about by the lower price on the international market of the generating equipment than had been estimated originally, that made it possible for CHEC to acquire the three units for less than that which had been allocated for the two initial units. This change was approved by the Bank and was highly beneficial to CHEC.

5.- As a result of the low prices that existed at that specific time, (the producers of electrical equipment were working at under capacity and the Japanese producers were trying to get into this specific market), CHEC reviewed the Project plans, and with the Bank's acknowledgement increased the Project in all areas with the exception of the distribution and the technical assistance.

6.- All contractors completed their work in accordance with CHEC specifications and the general supervision of the Project was done jointly by CHEC and Syndibel in a satisfactory manner.

7.- CHEC provided the Bank with progress reports requested in the loan contract that contained all the necessary information and details about the Project execution. As a result of the extension and details (in excess of the requirements) of the Reports, some-

^{1/} CHEC's own labor forces constructed the San Francisco Dam and supervised the civil works with the intervention of Syndibel on specific problems.

times CHEC was late in its transmittals.

8.- The first disbursement should have been made on August 18, 1966 as specified in the loan contract, but as a result of some delay by CHEC to satisfy several of the conditions precedents, a postponement to December 22, 1966 was necessary. The last disbursement planned for February 18, 1970, for the reasons mentioned was postponed to February 18, 1971. (For the reasons mentioned in item 4).

9.- The bidding procedures used by CHEC during the execution of the Project were in conformance with the Bank's requirement and the Colombian law.

10.- An additional investment of 10% of the Project's estimated cost resulted in a proportionally greater increase in the rated capacity of the total project.

11.- The loan contract contained a tariff clause which would now correspond approximately to the standard clause alternative 2, that is: "The borrower shall take the necessary steps to the satisfaction of the Bank, in order that the tariffs from the project financed with the resources of the loan generate sufficient income to cover the ordinary costs of operation of the system, including administrative costs, interest, maintenance and depreciation and if the resources generated are not sufficient to attend the service of all financial obligations of the Borrower, such additional income as shall be required for this purpose. As previously mentioned, CHEC has not only been complying with this clause, but is also generating a return on its net utility investment of approximately 3.7%.

C. Conclusions

The Project was 98% completed in June 1973. The principal works were satisfactorily terminated and in operation since 1969. Only small non urgent distribution work remains to be done in some areas outside Manizales to fully complete the Project. It was clearly demonstrated that CHEC is technically capable to carry out this kind of Project and that Syndifael as the consultant for the Project did a satisfactory job during the execution period.

The changes made during the Project execution did not change the original objectives. They resulted in additional benefits to the Project enhancing the cost-benefit relation. In addition to helping meet its own system requirements, the Project helped in resolving the energy shortage in the Departments of Tolima, Cundinamarca and Valle.

The technical assistance provided to CHEC has greatly helped the Company to modernize and streamline its organization; the most important change being the creation of the Administrative Department (before CHEC only had a Technical Department). The work of implementing the recommendations presented by the expert was not finished in June 1973, and specific suggestions were made by the bank mission for its acceleration.

It has been difficult for CHEC to maintain the "current ratio" specified in the loan contract, mainly as a result of the investments an electric utility company has to make. Specific measures to improve the low current ratio situation were recommended by the Bank Missions.

Finally, the execution of the Loan 125/O.C. - CO is considered satisfactory. The objectives of the Project financed by this loan are being fulfilled and the problems presented during the execution of the Project have been well studied and measures are being taken to resolve them. It can be anticipated that no insurmountable problem will arise in the proposed loan to CHEC.

LOAN 125/0.C. CO
CENTRAL HIDROELECTRICA DE CALDAS, S.A.
COMPARATIVE COSTS OF THE PROJECT
(In Thousands of US\$)

Work Description	Budget according to loan document		Project Cost as of December 31/72		COST DIFFERENTIAL		Totals	
	IDB	Borrower	IDB	Borrower	TDR	Borrower	F.ex.	Loc. curr.
San Francisco Generating Plant	5.809	6.459	3.756.1	7.277.9	(2.052.9)	818.9	(2.052.9)	818.9 (1.234.2)
Transmission and Distribution	1.522	2.000	3,086.7	143.5	1.830.6	1.564.7	(169.4)	1.564.7 (169.4) 1.395
Technical-Administrative Assis.	80	---	43.2	---	(36.8)	---	(36.8)	---
IDB Inspection and Supervision	20	---	20.0	---	---	---	---	---
Commitment Fees	132	132	---	238.3	---	106.3	---	106.3
Interests (Construction Period)	---	---	680.5	---	---	---	---	---
Engineering and Administration	699	198	513.5	84.0	832.1	525.0 (114.0)	832.1	411.0 832.1 1.243.1
Contingencies	---	---	---	---	---	---	---	---
	8.100	330	8.591	8.100	465.8	9.940.6	---	(7.7) 1.481.6 (7.7) 1.481.6 1.473.9
	8.100	8.921.	8.100	10.404.4	---	1.473.9	---	1.473.9

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CHEN: GENERATION, TRANSMISSION AND DISTRIBUTION PROJECT

Schedule of Investments and Disbursements
(in thousands of US dollars)

Divisions of Investment	Total Investments			ANNUAL INVESTMENTS											
	Initial Investments ^{1/}			4th. Quarter		1973		1974		1975		1976		F.	F.
	F. Ex.	Loc. Curr.	Total	F. Ex.	Loc. Curr.	F. Ex.	Loc. Curr.	F. Ex.	Loc. Curr.	F. Ex.	Loc. Curr.	F. Ex.	Loc. Curr.		
ADMINISTRATION															
and Supervision of Construction	343	714	1 057	-	26	112	94	60	246	87	166	84	112		
on and General Expenses	-	470	470	-	13	-	80	-	132	-	146	-	59		
ry 1	343	1 184	1 527	-	39	112	174	60	376	87	332	84	211		
CONSTRUCTION															
	2 385	2 472	4 857	-	-	34	249	874	686	1 120	983	357	550		
	545	173	718	-	3	125	34	306	96	93	30	21	6		
ution - Manizales	422	413	835	-	26	100	100	222	187	100	100	-	-		
ution - Outside Manizales	1 398	1 394	2 792	-	154	377	332	308	273	308	273	308	273		
1 2.3 Distribution	1 820	1 807	3 627	-	180	477	435	530	460	408	373	308	273		
allations	180	27	207	-	-	108	16	72	11	-	-	-	-		
ry 2	4 230	4 473	8 703	-	183	744	738	1 782	1 253	1 621	1 366	686	633		
DURING CONSTRUCTION															
- Ordinary Capital (8%)	698	-	698	-	-	7	-	82	-	215	-	308	-		
- Special Funds (2%)	103	-	103	-	-	3	-	18	-	30	-	41	-		
3.11 IDB Interests	801	-	801	-	-	10	-	100	-	245	-	349	-		
nt Fees	99	-	99	-	-	17	-	49	-	25	-	8	-		
on and Supervision - OC	45	-	45	-	-	6	-	11	-	11	-	11	-		
- FOE	24	-	24	-	-	3	-	6	-	6	-	6	-		
3.13 FIV	69	-	69	-	-	9	-	17	-	17	-	17	-		
loans Financial Charges	969	-	969	-	-	36	-	166	-	267	-	374	-		
	969	-	969	-	-	36	-	166	-	267	-	374	-		
Escalation	487	532	1 019	-	-	70	90	168	150	153	166	67	112		
	200	-	200	-	-	-	-	-	-	-	-	-	-		
	757	532	1 289	-	-	70	90	168	150	153	166	67	112		
	6 999	6 201	13 200	-	222	962	1 002	2 176	1 781	2 148	1 884	1 211	1 136		
nd Disbursements															
	4 500	-	4 500	-	-	404	-	1 413	-	1 617	-	797	-		
	2 400	-	2 400	-	-	541	-	714	-	906	-	406	-		
	6 900	-	6 900	-	-	945	-	2 127	-	2 123	-	1 203	-		
utions	-	2 452	2 452	-	51	-	622	-	949	-	418	-	412		
	22	3 749	3 848	-	171	17	380	49	832	25	1 460	8	72		
bursements	6 999	6 201	13 200	-	222	962	1 002	2 176	1 781	2 148	1 884	1 211	1 136		

to be made before estimated date of Loan Contract signing.

CHEC: Proyecto de Generación, Transmisión y Distribución

Programa de Contratación con Recursos BID
(Montos en miles de US dolares equivalentes)

Item de Categoría de Inversión	Descripción	Fecha estima- da llamada a Licitación	Fecha esti- mada recep- ción ofertas	Fecha esti- mada firma Contrato o Pedido	Moneda Extranjera
1.1 (OC)	Ingeniería y Supervisión de Const. - Contrato de servicios de consultores	-	-	Julio 73	343
2.11 (OC)	Conducción San Francisco - Tubería para sifón (placas y Soldadura)	Ag. 73	Nov. 73	Enero 74	30
	- Compuertas de Presa, Boca- toma y Desarenador	Ag. 73	Nov. 73	Enero 74	222
	- Equipo y materiales para túneles	Ag. 73	Nov. 73	Enero 74	20
	Subtotal 2.11 (OC)				467
2.12 (OC)	Conducción Campoalegre y 3a. Unidad La Insula - Compuertas de Presa, Bocatoma y Desarenador	Ag. 73	Nov. 73	Enero 74	327
	- Tubería Forzada (placas y Soldadura)	Oct. 73	Feb. 74	Marzo 74	130
	- Equipo y materiales para túneles	Ag. 73	Nov. 73	Enero 74	345
	- Turbina y Accesorios, 11800 HP	Oct. 73	Feb. 74	Marzo 74	442
	- Generador y Accesorios, 10000 KVA	Oct. 73	Feb. 74	Marzo 74	524
	- Equipo de Subestación Eleva- dora, 10000 KVA, 416/33 kv	Oct. 73	Feb. 74	Marzo 74	150
	Subtotal 2.12 (OC)				1 916
2.2	Transmisión				
2.21 (FOE)	- Equipos para campos de SE de 115 KV	Ag. 73	Dic. 73	Feb. 74	183
2.22 (FOE)	Líneas y SE de 33 KV Fuera de Manizales - Conductores Terminados	Ag. 73	Dic. 73	Feb. 74	41
	- Materia Prima para Conductores	Ag. 73	Dic. 73	Feb. 74	30
	- Aisladores, herrajes, Puesta a tierra y protecciones	Ag. 73	Dic. 73	Feb. 74	30
	- Transformadores 33/13.2 KV	Ag. 73	Dic. 73	Feb. 74	31
	- Equipos y Materiales para Subestaciones de 33 KV	Ag. 73	Dic. 73	Feb. 74	230
	Subtotal 2.2 (FOE)				545

Item de Categoría de Inversión	Descripción	Fecha estima- da llamada a Licitación	Fecha esti- mada recep- ción ofertas	Fecha esti- mada firma Contrato o Pedido	Monto de Contrato CIF Moneda Extranjera
2.3	Distribución				
2.31 (OC)	Distribución Manizales				
	- Transformadores de Distr. (Terminados)	Oct. 73/74	Enero 74/75	Marzo 74/75	68
	- Componentes de Transforma- dores	Oct. 73/74	Enero 74/75	Marzo 74/75	34
	- Conductores Terminados	Oct. 73/74	Enero 74/75	Marzo 74/75	120
	- Materia Prima para Conductores	Oct. 73/74	Enero 74/75	Marzo 74/75	50
	- Aisladores, Herrajes, Puesta a Tierra y Protecciones	Oct. 73/74	Enero 74/75	Marzo 74/75	40
	- Contadores	Oct. 73/74	Enero 74/75	Marzo 74/75	110
	Subtotal 2.31 (OC)				422
2.32 (SF)	Distribución Fuera de Manizales				
	- Transformadores de Distribu- ción Terminados	Ag. 73/74	Oct. 73/74	Dic. 73/74	164
	- Componentes para Transforma- dores	Ag. 73/74	Oct. 73/74	Dic. 73/74	13
	- Conductores Terminados	Ag. 73/74	Oct. 73/74	Dic. 73/74	479
	- Materia Prima para Conductores	Ag. 73/74	Oct. 73/74	Dic. 73/74	292
	- Aisladores, Herrajes, Puesta a Tierra y Protecciones	Ag. 73/74	Oct. 73/74	Dic. 73/74	280
	- Contadores	Ag. 73/74	Oct. 73/74	Dic. 73/74	100
	Subtotal 2.32 (SF)				1 398
2.4 (OC)	Instalaciones Generales				
2.41 (OC)	- Equipo de Carrier y Radio- teléfonos	Dic. 73	Marzo 74	Marzo 74	81
2.42 (OC)	- Vehículos de Mant. y Constr.	Ag. 73	Nov. 73	Enero 74	79
2.43 (OC)	- Puente Grúa Taller Mecánico	Ag. 73	Oct. 73	Dic. 74	20
	Subtotal 2.4 (OC)				180

CHEC: Proyecto de Generación, Transmisión y Distribución

Categorías de Inversiones del Préstamo BID (OC)
(en miles de US dólares)

<u>Categorías y Subcategorías de Inversión</u>	<u>Monto CIF</u>
1. <u>INGENIERIA Y ADMINISTRACION</u>	
1.1 Servicios de Firma Consultora	<u>343</u>
2. <u>COSTO DIRECTO DE CONSTRUCCION</u>	
2.1 <u>Generación</u>	
2.11-a) Tubería y compuertas Conducción San Francisco	258
b) Equipos y materiales para la construcción de túneles	209
2.12-a) Tubería y compuertas Conducción Campoalegre	457
b) Equipos y materiales para la construcción de túneles	345
c) Turbina y Generador con accesorios, 10000 KVA, 3a. Unidad La Insula)	966
d) Equipo de Subestación Elevadora, 10000 KVA, 4.16/	<u>150</u>
Subtotal 2.1 Generación	2 389
2.3 <u>Distribución</u>	
2.31 <u>Distribución Manizales</u>	
a) Transformadores de Distribución Terminados, 7.5 MVA	68
b) Materia Prima para Transformadores de Distribución, 7.5 MVA	34
c) Conductores Terminados	120
d) Materia Prima para Conductores	50
e) Aisladores, Herrajes, Puesta a Tierra y Protecciones	40
f) Contadores, 11000	<u>110</u>
Subtotal 2.31 Distribución Manizales	422
2.4 <u>Instalaciones Generales</u>	
2.41 Equipo de Carrier y Radio Teléfono	81
2.42 Vehículos de mantenimiento y construcción	79
2.43 Puente Grúa Taller Mecánico	<u>20</u>
Subtotal 2.4 Instalaciones Generales	180
Total Categoría 2	<u>2 987</u>

<u>Categorías y Subcategorías de Inversión</u>	<u>Monto CIF</u>
3. <u>GASTOS FINANCIEROS DURANTE CONSTRUCCION</u>	
3.1 Intereses Préstamo BID	698
3.3 Inspección y Vigilancia BID	<u>45</u>
Total Categoría 3	<u>743</u>
5. <u>GASTOS SIN ASIGNACION</u>	
5.1 Imprevistos	267
5.2 Provisión para Escalamiento	<u>160</u>
Total Categoría 5	<u>427</u>
TOTAL PRESTAMO BID OC	<u><u>4 500</u></u>

CHEC: Proyecto de Generación, Transmisión y Distribución

Categorías de Inversión del Préstamo BID (FOE)
(en miles de US dólares)

<u>Categorías y Subcategorías de Inversión</u>		<u>Monto CIF</u>
2.	<u>COSTO DIRECTO DE CONSTRUCCION</u>	
2.2	<u>Transmisión</u>	
2.21	Equipos (Interruptores, Switches, Protección, Control y Medida) para 4 Campos; 2 en Regivit, 1 en La Dorada y 1 de reserva) 115 KV	183
2.22	Líneas de Subtransmisión Fuera de Manizales	
a)	Conductores Terminados	41
b)	Materia Prima para Conductores	30
c)	Aisladores, Herrajes, Puesta a Tierra, Protecciones	30
	Subtotal 2.22 Líneas de Subtransmisión Fuera de Manizales	101
2.23	SE de 33 KV de Subtransmisión Fuera de Manizales	
a)	Transformadores 33/13.2 KV, Capacidad Total 2.4 MVA	31
b)	Equipos (Interruptores, Switches, Protección, Control y Medida)	230
	Subtotal 2.23 SE de Subtransmisión fuera de Manizales	261
	Subtotal 2.2 Transmisión	545
2.3	<u>Distribución</u>	
2.32	Distribución Fuera de Manizales	
a)	Transformadores de Distribución Terminadas 4.2 MVA	164
b)	Materia Prima Para Transformadores de 4.2 MVA	83
c)	Conductores Terminados	479
d)	Materia Prima para Conductores	292
e)	Aisladores, Herrajes, Puesta a Tierra, Protecciones	280
f)	Contadores, 10000	100
	Subtotal 2.32 Distribución Fuera de Manizales	1 398
	Total Categoría 2	1 943
3.	<u>GASTOS FINANCIEROS DURANTE CONSTRUCCION</u>	
3.1	Intereses Préstamo BID	103
3.3	Inspección y Vigilancia BID	24
	Total Categoría 3	127

Categorías y Subcategorías de Inversión

Monto CIF

5. GASTOS SIN ASIGNACION

5.1 Imprevistos

200

5.2 Provisión por Escalonamiento

130

Total Categoría 5

330

TOTAL PRESTAMO BID (FOE)

2 500

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 13,6 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 comparó 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 continuaban 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 dividas 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>1978</u>	<u>1980</u>	<u>1985</u>
Servicio (US\$ millones)	170,8	185,8	184,9	188,3	152,2	116,7
Porcentaje de las Exportaciones de 1972 a/	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.