NORTH-SOUTH ELECTRIC POWER INTERCONNECTION PROJECT

(BR-0275)

EXECUTIVE SUMMARY

BORROWER:	Eletrobrás – Centrais Elétricas Brasileiras, S.A.	
GUARANTOR:	The Federative Republic of Brazil	
EXECUTING AGENCY:	Eletrobrás, through its subsidiaries Furnas and Eletronorte	
AMOUNT AND SOURCE:	IDB:	US$307 million (OC)
	Cofinancing, Export-Import Bank of Japan:	US$300 million
	Local contribution:	US$329 million
	Total:	US$936 million
FINANCIAL TERMS AND CONDITIONS:	Amortization period:	20 years
	Disbursement period:	3 ½ years
	Interest rate:	variable
	Inspection and supervision:	1%
	Credit fee:	0.75%
	Currency:	United States dollars

OBJECTIVES: The project will link the two major electric power systems in the country, which are not interconnected at present. This will optimize the two systems and thereby meet the demand for public electric energy services at the lowest possible economic cost. The project will also support the restructuring of the electric power sector by providing institutional strengthening activities for establishment of the Agência Nacional de Energia Elétrica (National Electric Energy Agency – ANEEL), the development of indicative planning in the new context of competition, and the strengthening of environmental management in the electric power sector.

DESCRIPTION: The project's investment component, at a direct cost of US$720.2 million, consists of (i) the 1,030-km North-South Interconnection line, which will link the Imperatriz substation in the state of Maranhão with the Serra da Mesa substation in the state of Goiás, plus the 249-km long Serra da Mesa-Samambaia section, both of these being single-phase 500-kV lines with a natural power of 1,300 MW; and (ii) construction of three new substations in the municipalities of Gurupi, Miracema and Colinas, in the state of

Tocantins, and expansion of the substations of Samambaia (Federal District), Serra da Mesa (Goiás), Imperatriz and Presidente Dutra (Maranhão), and Marabá (Pará).

The project's institutional strengthening component, which will cost US$3.85 million, has three subcomponents: (i) Support for the establishment of ANEEL, consisting in the organizational structuring of that agency, regulation of open access to transmission and distribution systems, and technical assistance to improve the capability for economic regulation of the sector; (ii) Updating of the inventory of hydroelectric projects, which comprises studies to update the inventory of hydropower projects, plus specific activities to fit the long-range planning models for expansion of generation and transmission into the new sectoral context; and (iii) Strengthening of environmental management of the sector, which will include improvement of the aspects of organization, development of instruments, and personnel training.

ENVIRONMENTAL REVIEW: The environmental report was approved by the Committee on Environment and Social Impact (CESI) at its meeting on September 19, 1997, and sent to the Public Information Center on September 22, 1997. The CESI recommendations are addressed in paragraphs 3.11, 3.13, and 3.17 of the loan proposal.

BENEFITS: The project's high priority stems from the special situation of the electric power sector in Brazil at a time when demand has increased beyond expected levels, investments in the sector have been lagging in recent years, and difficulties are being encountered in adding generation works in the short run. In this situation the government decided to advance the execution of the North-South Interconnection to late 1998. The line will yield an estimated average 600 MW energy gain consisting in the differences of the two electric power systems to be interconnected, which will make it possible to optimize the operation of their reservoirs and make shortages more unlikely especially in the Southeast and West-Central regions, where the population and economic activity are most heavily concentrated. Advancing the schedule for erection of this line is amply competitive, for it will result in the generation of energy at a cost of US$15/MWh, which is substantially below the marginal cost of the expansion of generating capacity, estimated at US$35/MWh.

In addition, the project will contribute directly to the success of the sector reform, which is directed at the establishment of a setting of competition, the inclusion of private operators, and separation of the government's policy-making, regulatory and business operation roles. This will be accomplished by strengthening key aspects of the reform, particularly the regulation and oversight of activities in the sector and indicative planning.

RISKS:

The project poses no special or significant problems in its technical, environmental, financial or legal aspects. Since it will be executed and started up at the time when the new organization of the sector is being implemented, the main risk is associated with the operational and financial viability of the new transmission companies to be set up on the basis of the existing subsidiaries of Eletrobrás – Centrais Elétricas Brasileiras, S.A. (Eletrobrás) to operate that service in the future. This risk was duly considered when the operation was being prepared, and specific contractual clauses are proposed to cover it. It must be pointed out, however, that the economic benefits of the project would be realized in any case, for its completion ties in with centralized economic load dispatch, in place today and to be continued in the new organization of the industry.

Moreover, it is reasonable to expect that the main components of the strategy being pursued by the government in the energy sector will be continued, as emerges from the measures already implemented and those now in progress. In addition, the project will contribute directly to the success of the strategy adopted by supporting the implementation of key aspects of the reform.

THE BANK'S COUNTRY AND SECTOR STRATEGY:

The Federal Government of Brazil has established as principal aims of its macroeconomic policy the development of a market economy in the country, redefinition of the role of the State, reform of the public sector, reduction of inflation and reactivation of socioeconomic development. In keeping with those aims, a new approach has been adopted for the energy sector that defines the field of action and responsibilities of the different levels of the federal and state administrations, and encourages private enterprise to participate more actively in the expansion, administration and maintenance of the energy infrastructure. In this way the government aims to improve the reliability and quality of services and reduce the so-called "Brazil Cost" by reducing energy costs and preserving the environment.

With the present operation the Bank would once again contribute to the financing of the largest electric power sector in the region through a project of very high priority in the new context, and support the ongoing restructuring process. The Bank's participation in the present stage of reorganization of the power sector would facilitate future operations in it by establishing an appropriate setting both for support to private projects at the different stages of electric power service and for new investments in areas that remain in the orbit of the public sector. In light of these considerations the present project is perfectly in line with the Bank's new policy on public utility services, which seeks to establish open, competitive and self-sustaining markets and autonomous regulation based on efficiency criteria.

EXCEPTIONS TO BANK POLICY: No exceptions to the Bank's policies are envisaged.

PROCUREMENT OF WORKS, GOODS AND CONSULTING SERVICES: The project will be subject to the Bank's current policy on the procurement of goods and contracting for works and consulting services to be financed with project funds. When resources of the Bank's financing are used, the thresholds for procurement under this project by international competitive bidding shall be US$350,000 for goods, US$5 million for works, and US$200,000 for consulting services (paragraph 3.20). Procurement below those thresholds will be subject to the procurement requirements in Brazilian law, which are essentially compatible with the Bank's rules (paragraph 3.23).

RECOGNITION OF EARLIER EXPENDITURES: Expenditures incurred as from February 26, 1997, will be recognized as previous expenditures from the local counterpart contribution; they are estimated at US$38.1 million, broken down as follows: (i) US$8.9 million in engineering costs, (ii) US$13.7 million for acquisition of reactors and power transformers, (iii) US$5.7 million for construction of civil works and suspension of transmission lines, and (iv) US$9.8 million for acquisition of transmission line structures (paragraph 3.26).

POVERTY-TARGETING AND SOCIAL ASPECTS: The proposed program does not qualify as poverty-targeted in the terms of the Eighth Replenishment document (AB-1704), either geographically or in regard to its beneficiaries, and is not targeted specifically for participation by women.

SPECIAL CONTRACTUAL CONDITIONS:

The conditions precedent to the first disbursement are an agreement on the transfer of resources to the executing agencies (paragraph 4.1), contracting of the consulting firm and the independent environmental auditor to exercise environmental supervision during execution of the project (paragraph 3.13), and availability of the cofinancing resources (paragraph 5.13).

Other special conditions are: transfer of the line and substations to the transmission enterprises to be set up, and their operational and financial viability (paragraphs 1.21 and 4.22), the holding of periodic consultation meetings to monitor changes in sector policy and the general progress of the project (paragraph 3.34), presentation of final terms of reference and of the results of the institutional strengthening activities (paragraphs 3.17 and 3.19), signature of agreements for implementation of the socioeconomic and ecological compensation and mitigation programs (paragraph 3.13), presentation of evidence of the acquisition of lands and of their legal possession by the Avá-Canoeiro indigenous community (paragraph 3.11), and presentation of information on the financial situation of the sector (paragraph 4.21).

I. FRAME OF REFERENCE

A. The electric power sector in Brazil: salient features

1.1 Forty percent of the energy used in Brazil today is electricity, compared with 22% in 1975, an increase that reflects the great development of the country's hydroelectric potential in the last decades. At the close of 1996 Brazil had an installed capacity of 57,232 MW of electric power generation, 52,427 MW (92%) of it in hydroelectric power stations and 4,805 MW (8%) in thermal generation plants. In that year production totaled 273,827 GWh, 96% of it from hydroelectric generation, and an additional 37,552 GWh was received, of which 36,702 GWh came from Itaipú and the remainder from non-utility producers. The transmission system has some 155,000 km of lines and 216,000 MVA in transformer stations, including the interconnected and nonconnected regional subsystems.

1.2 Energy consumption came to 260,908 GWh in 1996 compared with 177,345 GWh in 1986 (a 47% increase, over double the 20% increase in GDP), and grew 4.7% a year from 1993 to 1996. The number of consumers also grew considerably, to 39.8 million in 1996 from 25.7 million in 1986 (a 55% increase). Electric power is now supplied to 92% of existing households, though with marked regional differences. These differences also emerge in the concentration of more than three quarters of installed generating capacity and consumption in the Southeast region (the leading one) and the South and West-Central regions.

1.3 In 1996 annual per capita energy use stood at 1,644 kWh, and 2,035 kWh per residential consumer, with a range between 2,372 kWh in the Southeast and 1,282 kWh in the Northeast. In regard to the sectoral distribution of consumption, industry is the leader with 46%, followed by the residential sector with 27%, commerce with 13%, government with 11%, and rural consumers with 3%.

1.4 Another important feature of the sector is the presence of strong government-owned enterprises that today run not only the bulk of the distribution operations, but also own more than one third of the installed generating capacity in addition to transmission systems of their own.

1.5 Total electricity losses have held over the last three years at somewhat more than 16% of the available energy, compared to about 13% in the 1980s and early 1990s. This 16% is estimated to consist of 11% in losses in distribution and 5% in losses in transmission. More than 80% of the total was technical losses; those of a commercial nature are concentrated in distribution, where they account for about one third of the total. The highest level of losses is seen in the North and Northeast regions, where they were 18.4% and 18.6%, respectively; losses came to 16.2% in the Southeast and West-Central areas and 12.9% in the South region.

B. The restructuring of the electric power sector in Brazil

1.6 The electric power sector in Brazil is in a stage of transition from the organizational arrangement of the last decades, based on public ownership, with federal enterprises (Eletrobrás and its four subsidiaries in the different regions of the country: Furnas – Centrais Elétricas, S.A. [Furnas], Centrais Elétricas do Sul do Brasil, S.A. [Eletrosul], Companhia Hidroelétrica do São Francisco [CHESF], and Centrais Elétricas do Norte do Brasil, S.A. [Eletronorte]), and state concessionaire enterprises, to a more decentralized structure that includes private operators, operates by ground rules of competition, and separates the business-related and regulatory roles of government.

1.7 Since the Eletrobrás system was put together at the beginning of the 1960s, the industry development model based on the federal and state public sectors has allowed the electric power sector to grow remarkably. The installed generating capacity has multiplied with development of the country's huge hydroelectric potential, transmission lines have been integrated into two major systems, and electric utility service has been extended to 95% of urban housing. Since the mid-1980s, however, some problems have been aggravated by the organization of the sector and the rate-setting system, which generated inefficiencies in the allocation of investment resources, the buildup of a heavy indebtedness by the enterprises in the sector and, in general, a feeble financial situation that gave rise to serious difficulties in sustaining the operation of the enterprises and expansion of the system. The sector's investment plans experienced considerable delays that it has not been possible to make up in recent years, in which the demand for electric energy has been steadily rising.

1.8 In the general context of the stabilization, State reform and economic liberalization policies, since 1993 the government has been implementing measures to put the electric power sector back on a solid financial footing. Worth noting are the changes made in rate policy, such as abolition of the nationwide uniform rate, recovery of rate levels in real terms, elimination of intrasectoral subsidies and offsets, and the paying off of liabilities of the enterprises. These measures have placed the sector as a whole in a more balanced financial position, brought tariffs closer to the economic costs of power supply, and laid the basis for a more far-reaching restructuring of the industry.

1.9 Noteworthy among the measures already implemented for reform of the sector are passage of the Laws on Concessions and Public Utilities, which regulate the granting of concessions and authorizations for the different stages of electric power service and the operations of nonutility generators and independent power producers. In addition, the Agência Nacional de Energia Elétrica (ANEEL) has been set up, whose functions center on the regulation and oversight of

the generation, transmission, distribution and marketing operations of the electric power sector.

1.10 The electricity distribution enterprises Serviços de Eletricidade, S.A. (LIGHT) and Centrais Elétricas de Rio de Janeiro, S.A. (CERJ) of the State of Rio de Janeiro, ESCELSA of the State of Espírito Santo, and Centrais Elétricas de Bahia, S.A. (COELBA) of the state of Bahia, have already been privatized. In the case of Companhia Energética de Minas Gerais, S.A. (CEMIG), of the State of Minas Gerais, part of its capital stock was sold, after a call for bids, to an international operator. The State of São Paulo is also moving forward with the privatization of its electric power utilities, and other state distribution enterprises will also be privatized when their finances have been put in order. The generating plants owned by the Eletrobrás subsidiaries are part of the National Privatization Plan being implemented by Banco Nacional de Desenvolvimento Econômico e Social (BNDES), and the privatization of generating plants of Furnas and Eletrosul is scheduled to begin in 1997. In addition, concessions have been granted for the completion of three hydroelectric plants with a combined generating capacity of 2,860 MW, and the first thermal power plants are being tendered out under the independent power producer arrangement. Finally, bidding operations are in progress for the importation of electric energy through new works taken on by private investors.

C. The new organization of the electric power sector

1.11 As an aid to the design of the new organizational model for the sector, in 1996 the government commissioned from an international consulting firm a study financed by the World Bank. The study, with ample involvement of the various entities operating in the electric power sector and other bodies of opinion, concluded in mid-1997 with a set of recommendations, which were adopted by the government. The proposed model generally coincides with the measures already set in motion and draws on the recent experience of other countries that have reformed their electric power sectors by introducing competition on the basis of unbundling of the functions of generation, transmission and distribution, the privatization of enterprises and entry of new private operators, and the separation of the government's regulatory and business roles.

1.12 The sector's new organization will include (i) a regulatory and oversight agency, ANEEL, (ii) a federal holding enterprise, which will retain ownership of the existing transmission networks, the Brazilian part of the Itaipú hydroelectric power station (shared with Paraguay), the nuclear thermal generation plants managed by Nuclebras Engenharia, S.A. (NUCLEN), the research and development work of the Centro de Pesquisas de Energia Elétrica (CEPEL) and the energy conservation and rational use programs, (iii) a sectoral financial agent, (iv) an independent system operator responsible

for the coordination of generation, the financial arrangements associated with energy purchases and sales by the different entities in the wholesale electric power market, and implementation of open access by generators and distributors to the transmission system, and (v) an agency in charge of indicative planning, closely tied to the Ministry of Mines and Energy.

1.13 The new power-industry structure will provide for competition in electricity generation, with prices set freely in the wholesale power market. Electricity transmission pricing would be regulated by ANEEL, along with distribution rate schedules for captive users who will not be buying power on the wholesale market. Though current customer rate schedules generally approximate long-run marginal costs, the new sector structure will make for a more rational tariff structure in the medium and long term, as it more closely approximates economic supply costs. In particular, it is expected that with increased productivity and better resource allocation in a setting of heightened competition and efficient regulation, the present distortions in relative margins between the different phases of electrical service will be removed, and more funding will be available for expanding generating and transmission facilities.

1.14 Until the new industry structure is in place, Eletrobrás will continue to perform the functions of federal holding enterprise and financial agent of the sector. In addition, it will support the government in organizing the wholesale electric energy market, in setting up the independent system operator and in continuing the planning and other functions of the public sector without interruption.

D. The sector's expansion requirements

1.15 In this sectoral setting and with recovery of the economy's annual growth rates, the growth of the demand for electric power is outstripping the projections made in the planning exercises of recent years. The Ten-Year Expansion Plan for 1997-2006 drawn up by Eletrobrás anticipates that the demand for electrical utility service will grow 5.1% a year, which would mean an increase from installed capacity of 57,232 MW and consumption of 260,908 GWh in 1996 to 90,210 MW and 424,800 GWh, respectively, in 2006. Reflecting that trend toward scenarios with a higher future demand, the total year-2006 demand by concessionaires projected in the Ten-Year Expansion Plan for 1996-2005 has been increased by 16,442 GWh (6.4%) in the plan for 1997-2006.

1.16 The greater growth of demand together with the delayed execution of new generation works would create serious problems of electric power supply on the South/Southeast/West-Central market, which is home to the bulk of the country's population and economic activity, with the possibility of power cuts of up to 14% in 1998 (compared with a maximum of 5% as an operating standard), which would raise a

prospect of the need for rationing that could affect, in 1998 and 1999, from 25% to 30% of the market in that region in the event of a repetition of the most critical floods of the past 60 years. This situation has compelled Eletrobrás to devise a package of short-term measures to increase the energy supply. Notable among these measures is advancement of the schedule for the interconnection between the North/Northeast and the South/Southeast/West-Central electric power systems, termed the North-South Interconnection, the subject of the operation describe herein, which ought to be completed by the end of 1998.

1.17 In face of the difficulties of constructing new generation works in the short run, the North-South Interconnection would add an average 600 MW of energy (the differences of the two electric power systems to be interconnected) which would optimize the operation of the reservoirs of the hydroelectric power stations and reduce the probability of shortfalls, especially in the Southeast and West-Central regions. Advancing the interconnection would be fully competitive because it would provide energy at a cost of US$15/MWh compared with a marginal cost of generation expansion, estimated at US$35/MWh.

1.18 It was envisaged that this project could be let on concession in an open call for bids in accordance with the Law on Concessions, to which end the National Water and Electric Power Department (DNAEE) instructed Eletrobrás to draw up the basic designs and perform the environmental impact studies for the project, which are the basic requirements for preparation of the bidding documents. However, from the findings of planning cycles carried out concurrently with these studies, it was decided that the interconnection needed to be moved up. Since the restructuring of the electric power sector is still only in its earliest stages, and in view of the need to have the line in operation as soon as possible, which imposes a demanding timetable on works of this kind, the government concluded that the purpose could not be accomplished within the requisite short time if the concession were granted in a standard tender operation.

1.19 This urgency, and the extensive experience of Eletrobrás's two subsidiaries involved in the project, Furnas and Eletronorte, in similar large-scale works, prompted the government's decision to grant the concession for the works to Eletrobrás directly, in a procedure similar to the one followed for construction of the other federally owned transmission installations. This arrangement for execution of the project in no way changes the future reorganization of the transmission system, as once the new installations are completed, they will become part of the assets of the transmission companies to be set up along with the other lines and substations now owned by the Eletrobrás subsidiaries.

E. Restructuring of the electric power sector and the future organization of the transmission system

1.20 In the framework of implementation of the new organization of the sector, the high-voltage and extra-high-voltage transmission system would be left for the most part in the government sphere at least until the new organization of the sector has been consolidated. It is considered that the government's participation in this activity would ensure the implementation of adequate competition in the generation stage by giving power generators and distributors open access to the transmission system. The transmission system would be operated by a group of federally- and state-owned companies, and eventually by private enterprises operating, as concessionaires, the installations to be constructed and engaging exclusively in the transmission of electricity, under a transmission agreement and subject to the rules and operational coordination of the independent system operator (ISO). The details of the final institutional and business arrangement for electric power transmission are now beginning to be worked out, together with the related regulatory aspects and the organization and operation of the ISO, among other important matters. Regulation of energy transmission will be built around open-access principles and long-run marginal pricing. Tariffs would be adjusted so as to ensure that transmission company revenues would be high enough to earn them reasonable financial returns.

1.21 By linking Brazil's two interconnected transmission systems, the project would improve the operation and enhance the efficiency of the entire electric power system and help advance the reorganization in the transmission area. At the same time, the organization and rules ultimately adopted for the transmission of electric energy would modify the conditions under which analysis of the loan operation is performed. Hence it is recommended that the loan and guarantee contracts call for the transfer, before the project goes into operation, of the assets and liabilities of the line and substations to the transmission enterprises to be created, whose operational and financial viability will have to be demonstrated to the Bank's satisfaction. In the event of delays, the assets would remain in the hands of Eletrobrás until their transfer can be effected.

F. Experience of the Bank and other financing agencies

1.22 The Bank has traditionally been a source of finance for the Brazilian electric power sector, having made the country 43 loans totaling US$2,211.4 million for major hydroelectric, transmission, distribution and rural electrification projects. The World Bank has also been a major participant in the financing of this sector, with 42 loans aggregating US$4,193.9 million for works of the same kind and for energy conservation programs as well. In recent years, however, neither the IDB nor the World Bank has been providing funding for electric power projects, owing to the sec-

tor's financial and institutional problems, though they have monitored developments and the reorganization in progress. The IDB recently began the preparation of operations through a line of credit to the private sector, and is working on major projects, such as the Itá hydroelectric power station and the thermal generation plant in Uruguaiana.

1.23 The IDB and World Bank loans have had an important impact by helping the Brazilian electric power sector to develop and consolidate itself. The works have been completed satisfactorily, though with delays that in some cases were caused by problems in provision of the counterpart contribution, essentially owing to the effects of macroeconomic policies that imposed rate controls and restrictions on the levels of investment by the public sector. Another result of these factors was that the institutional and financial strengthening aims of the operations were attained only in part. The lessons learned, especially in regard to the availability of the local counterpart contribution and institutional strengthening aspects, were taken into account in preparing the present operation.

G. Long-term sustainability of the project and the electric power sector

1.24 The execution and startup of the project will take place as the most important measures for the future organization of the sector are being implemented, which will determine the sustainability of the project and the sector in the long run. The establishment of competition, the advent of private operators and the existence of a regulatory agency with considerable autonomy will make it possible to address the most important problems, which have been repeatedly cited by the IDB and World Bank on the basis of past operations.

1.25 The government has worked out a strategy for reform of the sector and is embarked on the measures to implement it. To follow through on this process in the context of the present operation, the government has presented to the Bank a Plan of Action for reform of the sector that includes the most important measures to be taken together with the timetable for them and the authorities to be in charge of them (see Annex I-1). Progress in execution of this Plan of Action will be reviewed in periodic meetings between the government authorities and the Bank, and the measures that most directly bear on the viability of the project are the subjects of special contractual conditions.

1.26 While all aspects of the Plan of Action will be examined in monitoring the sectoral restructuring process, the matters regarded as of greatest importance for accomplishment of the purposes of the Bank's participation at the sectoral level are:

a. Compatibility of the sector policies with the Bank's policy for the energy sector, with a view to the establishment of open,

competitive and self-sustaining markets and autonomous regulation based on economic efficiency criteria.

b. The characteristics and organization of the sectoral regulation activities and the startup and operation of ANEEL.

c. The organization and functions of the institution that is to be the independent system operator.

d. The future organization of the transmission system, the impact and role of the North-South interconnection line in the new system, and adoption of economic criteria for regulation of electric energy transmission and distribution.

e. The general financial situation of the sector and the continuity of the present policies aimed at maintaining financing and indebtedness at acceptable levels.

f. Continuity in the performance of vital sectoral functions, especially in such activities as project financing, indicative planning, efficient energy use, and control of environmental impacts, and their adaptation to the new sectoral model.

1.27 In addition, the activities under the project's institutional strengthening component are designed to support implementation of the reforms and, since they would extend beyond completion of the physical works of the project, would facilitate continuity in the monitoring of the Plan of Action after conclusion of the disbursements associated with the physical investments of the project.

H. The Bank's strategy and rationale for its participation

1.28 The Federal Government of Brazil has set as the main objectives of its macroeconomic policy the development of a market economy in the country, redefinition of the role of the State, reform of the public sector, the reduction of inflation and reactivation of socioeconomic development. In keeping with those objectives, a new approach has been established for the energy sector that defines the spheres of action and responsibilities of the different levels of the federal and state administrations and seeks to encourage private enterprise to participate in the expansion, administration and maintenance of the energy infrastructure. In this way the government seeks to improve the reliability and quality of the services and lower the so-called "Brazil Cost" by reducing energy costs, and preserving the environment.

1.29 Thus the Government of Brazil is implementing reforms that will increase the participation of private enterprise in the energy sector. While this participation is developing and consolidating, the Bank seeks to provide needed support, including financing, to facilitate this process, a purpose to which this project would

contribute, as it would accord well with the new approach of the government's energy policy.

1.30 The strategy behind the Bank's loans to Brazil in the 1996-98 programming cycle, described in the country paper of February 1996, is consistent with the objectives of the Eighth Replenishment, with the government's priority of systematically eliminating the causes of chronic inflation, and with the need to promote modernization of the economy.

1.31 The principal elements in the Bank's lending strategy are intended to provide support in the following areas:

a. **Modernization of the State**, with priority to the improvement of planning and management capabilities, reform of the operations of the public sector, and fiscal reform. The proposed project contributes to this objective by strengthening the functions of regulation, oversight and indicative planning that fall to the State under the new model for organization of the electric power sector.

b. **Production infrastructure**. Support to opening up the economy, regional integration and the initiative of reducing the "Brazil Cost" by including priority investments in the transportation and energy sectors. The project would interconnect the two major electric power systems in Brazil, which would optimize both systems and so yield great economic benefits.

c. **Social, basic sanitation and environmental sectors**. The aspects of the project that bear on this strategy focus are reduction of the risk of outages and rationing of electricity in the most heavily populated and economically most important region in the country, which would inflict losses of production and income in the areas they affected. Besides, by facilitating optimal utilization of the existing installed hydropower capacity, the line would permit the utilization of hydroelectric resources that today are unused and, marginally, the replacement of thermal generation, thereby helping to alleviate air pollution.

1.32 The project also fits under the national priorities down to 1998, which the federal government confirmed in 1996 in a Plan of Targets and in its agreements with the Bank. The project's priority was ratified during the latest programming mission, in July 1997.

1.33 With the present operation the Bank would once again participate in financing the Brazilian electric power sector through a project of very high priority, though in a new context and supporting a restructuring of the largest electric power sector in the region. This is fully concordant with the new policy on public utilities approved in 1996. The Bank's participation in the present stage of

reorganization of this sector would facilitate future power-sector operations of the Bank by establishing a sound framework for support both to private projects in the different stages of electricity service and to new investments in areas that continue in the sphere of the public sector (expansion of transmission, extension of electric power service, and delivery of electricity to remote localities).

II. THE PROJECT

A. Purpose

2.1 The purpose of the project is to meet the demand for electric energy from electric utilities at the lowest possible economic cost, with optimization of the two major electric power systems in the country, which are not interconnected at present. In addition, the project will support implementation of the sector's restructuring through activities planned in the institutional strengthening component, directed particularly to the establishment of ANEEL, the development of indicative planning, and the strengthening of environmental planning in the electric power sector.

B. Description

2.2 The investment components consist of lines and substations that comprise a single project from a technical and economic standpoint. A summary description follows.

a. The 500-kV single-phase North-South Interconnection line, 1,030 km long, with a natural power (SIL) of 1,300 MW, will connect the Imperatriz substation in the state of Maranhão with the Serra da Mesa substation in the state of Goiás, consisting of the following sections: Imperatriz-Darcinópolis (166 km), Darcinópolis-Colinas (177 km), Colinas-Miracema (174 km), Miracema-Gurupi (255 km), and Gurupi-Serra da Mesa (258 km). The project further provides for construction of a 249-km section from Serra da Mesa to Samambaia, of the same characteristics as the main interconnection line, to strengthen the Furnas transmission system. The project comprises the construction of 1,279 km of lines altogether.

b. Three new substations will be built, one each in the municipalities of Gurupi, Miracema and Colinas in the state of Tocantins, and the substations of Samambaia (Federal District), Serra da Mesa (Goiás), Imperatriz and Presidente Dutra (Maranhão), and Marabá (Pará), will be enlarged.

2.3 The institution-strengthening component has three subcomponents: (i) support to the establishment of ANEEL, (ii) an update of the inventory of hydroelectric projects, and (iii) strengthening of the sector's environmental management.

C. Targets

2.4 Execution of the project will make available, as from 1999, an interconnection capability of 1,000 MW that will afford an energy gain of about 600 average-MW a year. This will yield savings on

the order of US$15 million a year from a lower variable cost of thermal generation (see Annex II-3, Logical Framework).

D. Results

2.5 The principal results of the project are expected by the beginning of 1999 as follows:

a. The 500-kV Imperatriz-Serra da Mesa-Samambaia line, spanning 1,279 km, and built of freestanding structures in galvanized steel, with four 954 MCM 45/7 Rail code bundled conductors per phase, OPGW (fiber optic) ground wires and a natural power (SIL) of 1,300 MW.

b. The three new substations of Colinas, Miracema and Gurupi will be in operation with their control, metering, safety and communications equipment. These substations will house a total of eight banks of 136-megavar (MVAr) line reactors and five 161-MVAr fixed series capacitor banks.

c. The addition to the Imperatriz substation with its metering, control, safety and communications equipment will be in operation. This addition will comprise a 108-MVAr thyristor-controllable series capacitator (TCSC) bank, two 136-MVAr line reactor banks and three fixed series capacitor banks of 161, 390 and 451 MVAr for a total of 1,002 MVAr installed in fixed series capacitors.

d. The addition to the Serra da Mesa substation will be in operation with its metering, control, safety and communications equipment. This addition will contain a 108-MVAr controllable series compensation (TCSC) bank and two 136-MVAr line reactor banks.

e. The Samambaia addition, with its metering, control, safety and communications equipment, will be in operation. This addition will contain a 136-MVAr line reactor bank, three single-phase 350-MVA autotransformers for a total increment of 1,050 MVA in the transformation of 500/345/13.8 kV and a 345-kV, 150-MVAr fixed-series capacitor bank.

f. The additions at the Marabá and Presidente Dutra substations, with their metering, control, safety and communications equipment, will be in operation. Each of these additions will contain two fixed series capacitor banks, as follows: at Marabá one of 348 MVAr and another of 283 MVAr, and at Presidente Dutra one of 390 MVAr and another of 451 MVAr.

g. The activities in support of the establishment of ANEEL will be completed in December 1999. The studies on expansion of the transmission system and identification of new projects will be completed not later than April 1999, and the update of the

inventory of hydroelectric projects in June 2000. The activities for the strengthening of environmental management will be completed in June 1999.

E. Cost and financing

2.6 For the preparation and administration of the project the following costs have been estimated:

1. Engineering and administration (US$48,600,000)

a. Engineering (US$21,000,000)

2.7 The engineering work will be for development of the detail engineering of the line and substations. This heading includes the precommissioning electrical studies, detailed analyses for specifications for the installation of the compensation equipment, and specialized detail engineering investigations to complete the designs of the substations, adjust the parameters of the system, and define the electrical limits between subsystems for recalibration of shielding.

b. Technical supervision (US$21,000,000)

2.8 This heading covers supervision and inspection of the manufacture of the principal equipment and site supervision and inspection of the works. It also includes coordinating the work between the offices in charge of procurement and preparation of working designs with the site construction offices, in addition to supervision of the requisite studies.

c. Environmental supervision (US$2,600,000)

2.9 This item covers supervision of the execution of the environmental mitigation and compensation programs.

d. Administration (US$4,000,000)

2.10 This item covers the costs of additional administrative personnel and other expenditures of the project executing unit set up by Eletrobrás to administer financing granted to it by international lending agencies, in additional to the related incremental costs of Furnas and Eletronorte to provide administrative, accounting and legal support for the project.

2. Investment component (US$720,196,000)

2.11 The project comprises the following specific components:

a. Transmission lines (US$321,677,000)

2.12 Consisting of the following 500-kV sections: (i) Imperatriz-Colinas (US$88,809,000), (ii) Colinas-Miracema (US$45,052,000), (iii) Miracema-Gurupi (US$62,844,000), (iv) Gurupi-Serra da Mesa (US$63,594,000), and (v) Serra da Mesa-Samambaia (US$61,378,000).

b. Construction of substations (US$175,781,000)

2.13 Consisting of three new substations: (i) Colinas (US$60,560,000), (ii) Miracema (US$49,670,000), and (iii) Gurupi (US$65,551,000).

c. Additions to substations (US$200,558,000)

2.14 Consisting of additions to the following substations: (i) Marabá (US$25,788,000), (ii) Presidente Dutra (US$35,500,000), (iii) Imperatriz (US$70,950,000), (iv) Serra da Mesa (US$23,522,000), and (v) Samambaia (US$44,798,000).

d. Controllable series capacitors (US$22,180,000)

2.15 Consisting of the installation of two controllable series compensator banks, one in the Imperatriz substation and the other in the Serra de Mesa substation, at US$11,090,000 each.

3. Indirect cost (US$24,605,000)

2.16 Comprises the acquisition of rights-of-way (US$12,005,000) and the activities for environmental control, mitigation and protection (US$12,600,000), except for their supervision, which is provided for in the "engineering" and "administration" subcomponents.

4. Associated costs (US$1,700,000)

2.17 Consists of performance of the studies for expansion of transmission and the identification of new projects.

5. Institutional strengthening (US$3,850,000)

2.18 Comprises the activities for the strengthening of ANEEL (US$1,400,000), the update of the inventories of hydroelectric projects (US$1,050,000), and the strengthening of environmental management (US$1,400,000).

6. Other costs (US$137,049,000)

2.19 The contingency estimate (US$35,293,000) is about 5% of the direct, associated and indirect costs of the project. Escalation (US$21,905,000) was calculated from the indexes of domestic and international inflation used by the Bank.

2.20 The financial costs come to US$79,851,000 broken down as follows: (a) interest during construction US$75,468,000; (b) credit fee US$1,013,000; (c) inspection and supervision US$3,370,000. The financial costs were calculated on the basis of the conditions currently applicable to the Bank's loans and a rate estimated at 3% for the financing from the Export-Import Bank of Japan (JEXIM). The costs for inspection and supervision include a fee of 0.1% for administration of the cofinancing resources, to be charged by the Bank to JEXIM, which in turn will pass it on to Eletrobrás.

2.21 The total cost of the project will come to the equivalent of US$936 million, to be financed as follows: (i) US$307 million with ordinary-capital resources of the Bank, to be used as the sole source of financing for acquisition of capacitor banks, switching equipment, control, safety and communications equipment, the precommissioning electrical studies, the work of managing the project included under the heading of technical supervision, the environmental supervision, the institution-strengthening component and the cost of inspection and supervision, plus part of the financing for the acquisition of conductors; (ii) the equivalent of US$300 million in JEXIM resources, as the sole source of financing for the acquisition of optical fiber ground wire (OPGW), current and voltage transformers and lightning arresters, construction of the substations and lines, plus the amount to complement the IDB financing for the acquisition of conductors; and (iii) the balance of US$329 million, from Eletrobrás's own funds, exclusively for the acquisition of reactors and voltage transformers and the purchase of line structures (the equipment to be put out for bids first), the indirect costs, interest during construction, the credit fee, and to complement the financed part of the engineering and administration costs and the costs of the other investment components.

2.22 The components of the project and the sources for the financing of each of them are presented in Table II-1:

TABLE II-1
Costs of the Project
(In US$000)

	ITEM OF EXPENDITURE	TOTAL	IDB	LOCAL COUNTERPART	
				JEXIM	ELETROBRÁS
1.	**ENGINEERING AND ADMINISTRATION**	**48,600**	**3,915**	**0**	**44,685**
1.1	Engineering	21,000	900	0	20,100
1.2	Technical supervision	21,000	415	0	20,585
1.3	Environmental supervision	2,600	2,600	0	0
1.4	Administration	4,000	0	0	4,000
2.	**INVESTMENT COMPONENT**	**720,196**	**281,139**	**279,778**	**159,279**
2.1	Transmission lines	321,677	38,222	212,498	70,957
2.2	Construction of substations	175,781	88,889	37,797	49,095
2.3	Additions to substations	200,558	132,041	29,483	39,034
2.4	Controllable series capacitors	22,180	21,987	0	193
3.	**INDIRECT COSTS**	**24,605**	**0**	**0**	**24,605**
3.1	Rights of way	12,005	0	0	12,005
3.2	Environment	12,600	0	0	12,600
4.	**ASSOCIATED COSTS**	**1,700**	**1,700**	**0**	**0**
5.	**INSTITUTIONAL STRENGTHENING**	**3,850**	**3,850**	**0**	**0**
5.1	Strengthening of ANEEL	1,400	1,400	0	0
5.2	Update of inventory hydro. projects	1,050	1,050	0	0
5.3	Strengthening of environmental management	1,400	1,400	0	0
6.	**CONTINGENCY**	**57,198**	**13,326**	**20,222**	**23,650**
6.1	Contingencies	35,293	2,659	9,231	23,403
6.2	Escalation	21,905	10,667	10,991	247
7.	**SUBTOTALS**	**856,149**	**303,930**	**300,000**	**252,219**
8.	**FINANCIAL COSTS**	**79,851**	**3,070**	**0**	**76,781**
8.1	Interest	75,468	0	0	75,468
8.2	Credit fee	1,013	0	0	1,013
8.3	Inspection and supervision	3,370	3,070	0	300
	GRAND TOTAL	**936,000**	**307,000**	**300,000**	**329,000**
	Percentages (%)	**100.0**	**32.8**	**32.1**	**35.1**

III. EXECUTION OF THE PROJECT

A. The executing agency

3.1 Eletrobrás, a federal public enterprise, will be responsible for execution of the project through two enterprises it controls, Furnas and Eletronorte, which are in charge of all technical aspects, procurement, execution of the works, and supervision.

3.2 The preparation and execution of the project is being coordinated by a project executing unit (PEU) set up in Eletrobrás. The PEU has a Steering Committee reporting to the president of the enterprise, coordinated by the Director of Planning and Engineering of Eletrobrás, and on which sit the Directors of Engineering and Construction of Furnas and Eletronorte. Under the Steering Committee there is an Executive Committee coordinated by Eletrobrás and also consisting of the Construction Supervisors of Furnas and Eletronorte, which is charged with managing and monitoring the execution of the project. Under the PEU there are a Support Office staffed by personnel working full time for the project, and the Technical Management, Financial Management and Environmental Management Units. These units are staffed by personnel of Eletrobrás, Furnas and Eletronorte, and work within the organizational structures of those enterprises and with the support of consultants.

3.3 To supervise the technical aspects of execution of the project the PEU will have the support of a consulting firm to be hired through an international call for proposals. The environmental management elements of the project will be handled through arrangements with the PEU, including (i) the contracting of a consulting firm through an open international call for proposals to exercise environmental supervision of the works and manage implementation of the programs for the mitigation of environmental effects and of ecological and socioeconomic compensation, and (ii) the hiring of an independent environmental auditor to verify periodically that the environmental measures called for in the environmental studies approved by the Bank have been carried out.

B. Engineering designs and construction plans

3.4 The collection of the field data required for final design of the interconnection line has been completed, and the partial and general designs are nearing completion. No delays are anticipated in this regard.

3.5 The basic designs of the substations have been completed as have the specifications of the principal equipment. As usual in projects of this kind, the engineering work remaining to be done is the detail engineering, which must be done after the contracts for

the equipment have been awarded. Similarly, for the definition of some equipment, the alternatives depend on the suppliers, and the engineering analysis of those alternatives will be done by the executing agency as part of the engineering of the project, or eventually with the support of consultants as part of the precommissioning electrical studies.

C. Land and rights-of-way

3.6 The strips of land for the lines have all been defined and rights-of-way must be established for their use, but no land acquisitions are envisaged because of the land-use characteristics. According to Furnas's and Eletronorte's long experience with transmission line construction, no difficulties are expected to arise in the establishment of the required rights-of-way; if, however, any were to arise, there are mechanisms in Brazilian law (Decree of Public Utility) for surmounting them without causing delays of any significance.

3.7 Lots are available for the additions to substations, including the land required for the Imperatriz substation, which has already been acquired. Regarding the lots for the new substations, the one for Gurupi has already been acquired and those for Colinas and Miracema are in the final stage of acquisition.

D. Environmental and social impact

3.8 The evaluation of the project's environmental impact consisted of two different environmental impact studies/reports (EIS/RIMAS): (i) an EIS/RIMA on the section from the Imperatriz substation to the Serra da Mesa hydroelectric power station, under the responsibility of Eletrobrás, and (ii) an EIS/RIMA on the section from Serra da Mesa to Samambaia I and II, under that of Furnas. In both cases the Bank recommended that additional work be done to improve the detail and evaluation of the environmental impacts and for the inclusion or further elaboration of mitigation and compensation programs. These programs were brought together in documents entitled Projetos Básicos Ambientais (Basic Environmental Plans, PBAs), required for the installation license, which authorizes commencement of the project works. Both EIS/RIMAs and PBAs have been completed and have the environmental licenses required by the country's legislation (prior and installation licenses), and have been made public in notices published in the press of the capitals of all the states traversed by the line since August 15, 1997.

3.9 In regard to potential environmental impacts, since the main purpose of this line is to optimize the systems interconnected by it by making use of seasonal surpluses in the North and South regions, the principal impacts are confined to the physical and biotic aspects in the areas adjacent to the service strip, the substations and the complementary and support works (access roads, camps).

Various alternative routings have been considered; the one adopted minimizes interference with areas that are sensitive or contain human settlements. The ecological compensation programs required by federal legislation have been decided upon with the Instituto Brasileiro de Meio Ambiente (Brazilian Environmental Institute, IBAMA), and are being agreed upon with the environmental agencies of the different states. Because the line will traverse sparsely occupied areas, no resettlements will be necessary. Housing expropriations and cases of moving a dwelling elsewhere on the same rural property will be minimal, and they are adequately provided for by a specific program. The new technologies for the building of transmission lines (higher towers, the use of helicopters to string cables, etc.) allow the line to be installed in more sensitive areas, with a minimum of deforestation of the right-of-way strip, which minimizes the environmental impact of such works. Moreover, the contracts for execution of the works will impose on the contractor the obligation to carry out all the environmental measures called for in the environmental studies.

3.10 In the Imperatriz-Serra da Mesa section of the line the environmental studies at the preliminary design stage were done concurrently with the technical design of the project, in coordination with the teams responsible for the engineering aspects. These studies indicate that interference with the environment will not be significant, for indigenous and protected areas will not be touched. Some of the expected impacts can be minimized by construction techniques that minimize interference with the environment and by codes of conduct for workers to minimize conflicts with local communities. The routing of the line was changed to avoid having to expropriate 161 housing units in urban areas belonging to low-income earners in two towns of the state of Maranhão. In this section 13 rural housing units will have to be resited, which will involve only moving the unit to another spot on the same property.

3.11 The Serra da Mesa-Samambaia section traverses the indigenous area of Avá-Canoeiro, and parallels an existing transmission line. The potential impact of the new line was taken into account in the public discussion of the environmental impacts caused by construction of the Serra da Mesa hydroelectric power station and its transmission lines, which resulted in the signing between Furnas and the Fundação Nacional de Proteção ao Indio (National Indian Affairs Foundation, FUNAI) in June 1992 of an agreement in which Furnas assumed full responsibility for the small community of remaining Indians (six persons). In addition, the subject was discussed in detail in the National Congress, which was reflected in a legislative decree authorizing operation of the Serra da Mesa power station and providing that Furnas must donate to the Indians an area equivalent to that flooded by the dam, which is now being done. It is recommended that within 12 months after signature of the loan contract the borrower be required to present evidence that those lands have been acquired and have become the legal property

of the Indian community. Moreover, as part of that agreement the government gave formal recognition in October 1996 to the permanent possession of the 38,000 hectares of the Avá-Canoeiro Indian area and is relocating the 64 families illegally settled in it. In this section a total of 19 homes (eleven rural and eight urban) will be affected by the line. The criteria for indemnification are adequate and agreements have already been formalized with 16 of these families. In addition, the routing of the line was changed to avert interference with a rural resettlement area of the Instituto Nacional de Reforma Agraria (National Agrarian Reform Institute, INCRA) in the municipality of Minacu, Goiás.

3.12 According to the established terms of reference, the consulting firm commissioned to exercise environmental supervision over the works and manage implementation of the compensation and mitigation programs will have to present to the executing agency bimonthly progress reports on its work, which must be audited by the independent environmental auditor. On the basis of these reports and of field trips, the auditor will present to the executing agency and the Bank bimonthly reports on the state of implementation of the environmental measures during execution of the works.

3.13 To ensure proper implementation of the required environmental measures, it is recommended that the loan contract be written to include the following clauses:

a. Before the first disbursement the executing agency shall present to the Bank evidence that (i) the consulting firm has been engaged that will exercise environmental supervision of the works and manage implementation of the mitigation and compensation programs; and (ii) an independent environmental auditor has been engaged.

b. Four months after signature of the loan contract, agreements must have been signed with IBAMA, the State of Maranhão Environment and Water Resources Department (SEMA), Natureza de Tocantins (Naturatins), and Fundação Estadual do Meio Ambiente do Estado de Goiás (FEMAGO), for implementation of the ecological compensation programs.

c. Eighteen months after the signing of the loan contract the executing agency must present evidence that all the socioeconomic and ecological compensation and mitigation programs called for in the PBAs approved by the Bank are being implemented on schedule.

E. Institutional strengthening work

3.14 The project includes activities in support of the restructuring and general development of the electric power sector, in addition to technical assistance to ensure that the project is executed

properly. The institution-strengthening component comprises activities under three heads: (i) support to the establishment of ANEEL, (ii) updating of the inventory of hydroelectric projects, and (iii) strengthening of the environmental management of the sector. Following is a brief description of these three areas.

3.15 ANEEL was created by Law 9,247 of 1996 and is now being institutionally established. It will be the regulatory agency for the electric power sector and have broad functions in regulation, control and inspection, rate-setting, and mediation in controversies and as a court of appeal and source of protection for electricity consumers. Its legal framework will give ANEEL the autonomy it needs to perform its functions properly. The activities included in this component will cover (i) the organizational structuring and development of the agency's internal procedures, (ii) the regulation of open access to transmission and distribution systems, and (iii) external training and assistance in regulatory subjects that are within the competence of ANEEL. Provision is also made for the procurement of information processing equipment and computer programs.

3.16 The changes being implemented in the sector require the preparation of indicative plans for guidance in decisions on the long-term investments of operators in the sector. One of the highest priorities is updating the inventory of hydroelectric projects in order to provide technical and cost data that will both make the indicative plans more reliable and reduce uncertainty for private investors. Similarly, and as part of the project's associated costs, provision is made for a study toward improvement of the planning models for the joint expansion of generation and transmission so as to incorporate the uncertainties generated by the privatization of generation capabilities, enhance the flexibility of solutions and achieve better integration in joint planning for generation and transmission. This activity would also make it possible to identify new priority investments for the transmission system.

3.17 The purpose of the program for the environmental strengthening of Eletrobrás is the training of its Environmental Department (DPA) so that it will be able to perform its functions under the future model of the Brazilian electric power sector, now being formulated by the government, and to meet the environmental management needs of the project. The program comprises (i) the performance of specific studies for the production and systematization of knowledge in environmental issues relating to projects in the sector; (ii) training of DPA staff in techniques for project preparation and analysis, and the environmental supervision and monitoring of projects in the sector; (iii) training and the preparation of guides for the performance of environmental audits of energy generation projects, with special emphasis on determination of the existing environmental and social liabilities of projects slated for privatization, and (iv) strengthening of the technical

staff of the DPA during implementation of the transmission line project. It is recommended that the executing agency be required to present, 18 months after the signing of the contract, evidence that the recommendations made in the studies called for in the Eletrobrás environmental strengthening program have been implemented.

3.18 The remaining activities for institutional support and support to execution of the project are the responsibility of Eletrobrás and comprise the precommissioning electrical studies, which are part of the engineering of the project and are included under the heading of the same title, and the technical supervision work and supervision of the execution and environmental management of the project, which are part of the supervision costs.

3.19 Preliminary terms of reference are on hand for the above activities, and it is recommended that the loan contact require presentation to the Bank of the final terms of reference for each activity at least 30 days before the sending of the respective conditions for calls for proposals or request for authorization to call for offers to the Bank for approval. In addition, to monitor the results of these activities it is recommended that nine months after the signing of the loan contract the executing agency present to the Bank evidence of having commissioned all the studies and services called for under the project, or that the training programs are being implemented, as applicable in each case, and, six months after completion of same, proposed measures based on the findings and recommendations of the planned studies.

F. Execution arrangements and bidding procedures

3.20 As a general rule, acquisitions and contracted services and works to be financed by the Bank and JEXIM are carried out following the procedures of the Bank. International competitive bidding (ICB) will be compulsory for acquisitions of goods to a value in excess of US$350,000, and for construction works to a value of more than US$5 million. International calls for offers will be required for consulting contracts costing more than US$200,000. These threshold limits are justified by the fact that in similar projects in the country, no tenders were received from companies in other countries when lower limits were set.

3.21 All ICBs planned for acquisitions of goods and the contracting of construction works are open and have the Bank's approval. They involve 15 bid processes, 11 of them for the procurement of series and parallel capacitors, circuit breakers and section switches, optical fiber ground wire (OPGW), control, operating and safety equipment, current and voltage transformers and lightning arresters, and the other four for the construction of lines and substations with the supply of miscellaneous equipment under the heading of minor materials. These 15 tender calls provide for international financing from the IDB or JEXIM.

3.22 The international calls for proposals for the acquisition of services will be opened in October 1997 and cover the studies for organizational restructuring and for regulation of access to transmission and distribution, the update of the inventory of hydroelectric projects, the methodology for the economic evaluation of environmental effects of projects in the electric power sector, the precommissioning electrical studies, and the studies for expansion of transmission and the identification of new projects.

3.23 Local competitive biddings will be financed exclusively with resources of the local counterpart contribution and be carried out in accordance with Brazilian law in a manner compatible with the Bank's procurement policies. They cover reactors, voltage transformers and transmission line structures; the awards will be made in September 1997. Their direct investment cost is estimated at US$148.4 million, or 21% of the cost of the project's investment component.

G. Advance tendering for goods and services, and recognition of previous expenditures

3.24 To be able to adhere to the established timetable it was considered necessary to start the acquisition of priority equipment before commencement of the execution of the project. At the request of the executing agency the Bank authorized the opening of the procurement process in March 1997. All international bidding operations have been set in motion and are proceeding in compliance with the Bank's standards; the bidding documents adopted have been reviewed by the Bank, which has found them satisfactory.

3.25 These advance bidding operations are for the purchase of compensation and switching equipment for 500-kV substations, which is relatively complex; requires lead times of about a year for its manufacture, which are beyond the control of the executing agency; and must be available on schedule for installation and testing. Eletrobrás advertised these calls for bids more widely than the Bank's standards require in order to disseminate them more extensively and facilitate participation by interested non-Brazilian enterprises.

3.26 In light of the engineering work already done and the local calls for bids in progress (see paragraph 3.23), the Bank will recognize as previous expenditures those made since February 26, 1997, which are expected to come to US$38.1 million distributed as follows: (i) US$8.9 million for engineering costs, (ii) US$13.7 million for the acquisition of reactors and voltage transformers, (iii) US$5.7 million for the construction of civil works and the erection of transmission lines, and (iv) US$9.8 million for the acquisition of transmission line structures.

H. Periods for execution and disbursement, and investment timetable

3.27 The period for execution of the project will be three years and that for disbursement 3-1/2 years. These terms are compatible with the type and volume of the project works, the lead times for manufacture of the equipment and the construction and erection procedures, the scope of the institutional strengthening planned, and the institutional capacity of the executing agency.

3.28 Annex III-2 contains the tentative plan for the principal acquisitions. Procurement for substations is grouped under the following heads: reactors and voltage transformers; compensation equipment; control, safety and telecommunications equipment; circuit breakers and section switches; and current and voltage transformers and lightning arresters. The acquisitions for the lines comprise structures, conductors, and optic fiber ground wire (OPGW). The construction work comprises civil works, assembly, and the supply of miscellaneous materials for both the lines and the substations. The services to be acquired are the studies for the establishment of ANEEL; the update of the inventory of hydroelectric projects; the studies for the strengthening of environmental management; the precommissioning electrical studies; project management supervision of environmental activites; and studies for the expansion of transmission and the identification of new projects.

3.29 Under the Bank's new policy on advances of funds, it is provided that a revolving fund will be set up of up to 5% of the resources of the Bank's financing.

I. Operation and maintenance

3.30 The transmission installations of the Eletrobrás system are being maintained adequately at present. The institutional and organizational reforms going forward in the electric power sector will determine the future responsibilities for both the electrical operation and the physical maintenance of the installations of the North-South Interconnection.

3.31 The electrical operation of this line would be entrusted to the independent system operator, and for operational purposes would be controlled in sections from the different regional dispatch centers. Operating the North-South Interconnection in the framework of a centralized operating and economic load dispatch system would realize the project's expected benefits.

3.32 In regard to the works of the project, the borrower will have to undertake to maintain the lines and substations adequately in accordance with technically acceptable standards, and before December 1998 will be required to present to the Bank a satisfactory maintenance plan. Before December 31 of each year and for 10 years as from December 1999 Eletrobrás will have to present to

the Bank maintenance reports that will include, among other matters, an evaluation of the results of maintenance in the past year and the plan for the next fiscal year, including its proposed budget for the execution thereof.

3.33 Physical maintenance of the line will be the responsibility of the new transmission companies to be set up on the basis of the existing subsidiaries of Eletrobrás. Upon completion of the works the installations will be transferred to those companies. In the event of delays, the assets will remain the property of Eletrobrás until they can be transferred, and this enterprise must in any case demonstrate that it has the requisite capacity to operate and maintain the installations adequately.

J. Monitoring

3.34 To monitor changes in sectoral policy and the general progress of the project, it is recommended that periodic meetings be held for consultation between the government authorities in the sector, Eletrobrás, and the Bank during the project's execution period, the first of them to be held at the end of the first half of 1998. Three months before each meeting the borrower and the Bank will propose the subjects to be discussed in it and on that basis they will agree on the agenda for the meeting and the work to be done to prepare for it, including the sending of the information required by the Bank before the meeting is held. The subjects to be addressed in these periodic meetings would be, in principle, the progress of reforms in the regulatory and institutional framework and in the reorganization of the electric power sector in the generation, transmission and distribution stages; the state of the regulatory and inspection activities, and of planning in the new sectoral context; the financial situation of the sector and any changes in rate policy; progress in the different components of the institution-strengthening component, discussion of the results of the studies, and plans for the implementation of their recommendations, and any other aspects that the parties may consider of importance for accomplishment of the purposes of the project. The meetings will be, in principle, yearly, but the parties may agree on some other interval at their discretion.

K. Ex post evaluation

3.35 In keeping with its policy and in consultation with the borrower and executing agency, the Bank decided not to include an ex post evaluation among the activities of the project. However, general information on the sector, key economic parameters and the costs and performance of the project will be on hand if it becomes necessary to evaluate its economic impact after its execution.

IV. THE BORROWER AND THE EXECUTING AGENCY

A. The borrower

4.1 The borrower will be Eletrobrás, which will provide the counterpart resources required for execution of the project. Eletrobrás will pass the resources of the loan and local counterpart contribution to the executing entities, and before the first disbursement will present the agreement governing the transfer of the Bank's resources, on the same terms, to those entities. When the new transmission enterprises have been set up, the financial obligations already contracted for construction of the project will be transferred to them and an amending agreement will be concluded for transfer of the resources not yet disbursed.

4.2 Eletrobrás was established in 1962 under the jurisdiction of the Ministry of Mines and Energy (MME) as a holding company for the electric energy sector. Its principal functions are to supervise the operations of the generation and distribution enterprises in which it is the principal stockholder; to make loans to its subsidiaries and other enterprises in the sector, most of which are owned by the states in which they operate; as the agency for planning and coordination, to advise the MME on (i) the policy for long-term expansion in the sector; (ii) obtaining the resources needed to finance that expansion, and (iii) environmental matters. It coordinates the operation of the interconnected system and provides technical and management assistance to the enterprises in the sector. It is responsible for research into and the development of techniques and processes of interest to the sector, and supports CEPEL.

4.3 At the end of 1996 the federal government held 53.6% of Eletrobrás's common stock. The remainder are in the hands of public and private stockholders. The four generating subsidiaries of Eletrobrás sell their energy mainly to state distribution enterprises. In addition to the four generating enterprises, in 1964 Eletrobrás acquired the distributor Espírito Santo Centrais Elétricas, S.A. (ESCELSA), in the state of Espírito Santo, and in 1979 the LIGHT enterprise, of Rio de Janeiro, both of which have since been privatized. In 1989 it became the principal stockholder in NUCLEN, the enterprise that acquired Furnas's nuclear power stations. Another important addition to the system was the startup of Itaipú, in which Eletrobrás holds a 50% interest.

B. Organization of the borrower

4.4 The governing bodies of Eletrobrás are its Stockholders' Meeting and the Board of Directors, which set policy and lay down the guidelines for its operations. The Executive Board, consisting of the President and the directors, and the Office of the President,

are the senior management bodies. An examination of the organizational chart of Eletrobrás reveals a structure and distribution of functions and responsibilities that are considered adequate.

4.5 The administration of Eletrobrás is in the hands of a professional staff of extensive experience in the sector. On December 31, 1996, the enterprise had 1,066 employees, a reduction of about 41% from the workforce on December 31, 1990.

C. External auditing

4.6 The financial statements of Eletrobrás are audited annually by an independent firm of public accountants. It is recommended that, for the life of the contract, the financial statements of Eletrobrás and those of the enterprises that will operate the works of the project be presented to the Bank after having been audited by a firm of independent public accountants acceptable to the Bank. The project financial statements, throughout the life of the project, are to be presented after having been audited by the Federal Audit Office.

D. Eletrobrás and the financial rehabilitation of the electric power sector

4.7 In view of the role of Eletrobrás in the electric power sector, it is considered of importance that its financial situation be assessed in a broader context that includes the general development of the sector.

4.8 Down to 1993, energy rates for both block sales and sales to the final consumer were set on the basis of the average cost to the electric power sector as a whole. All enterprises charged the same rate regardless of the cost of the service to them. The government had to set rates so that they would yield a minimum return of 10% and a maximum of 12% on the investments of the electric power enterprises. When the rates charged yielded a return above or below the 10%-12% range, deficits and surpluses were debited and credited to the federal government on the Profit and Loss Compensation Account (CRC). The enterprises kept those credits and debits to the federal government off-book.

4.9 The concessionaires that showed a return above the national industry average contributed from that surplus to those that earned returns below it, thereby evening out the final returns of all concessionaires. In 1988 the process was modified to compensate concessionaires that did not attain a return of 10%.

4.10 In the 1980s the industry-wide return was below 10%, and transfers to enterprises to compensate for insufficient returns declined, generating high indebtedness between the federal government and the enterprises in the electric power sector and among the distributing

and generating companies. At the end of 1992 the federal government owed the electric power sector about US$26 billion.

4.11 Law 8,631, rescinding the uniform rate and the guaranteed return and abolishing the arrangement of transfers to offset profits and losses, was passed in 1993. At the same time, new provisions were enacted establishing that each concessionaire had to propose to the DNAEE rates based on its cost of providing an adequate service, and a new policy of gradual rate adjustments was launched.

4.12 The current privatization process modifies the approach on rates, especially in the area of generation, in that the price of block energy is to be set by competition among generating enterprises. The rates charged by privatized distribution companies are set in the concession agreement and automatically adjusted when there arise cost changes that cannot be managed for. At the end of an initial period of several years the rates would be adjusted in light of the efficiency gains achieved by the enterprises (price cap).

4.13 Regarding transmission rates, Eletrobrás now has to allow other energy generators to use the transmission system at no charge, though it is allowed to charge a fee for transmission of the energy purchased from Itaipú for resale. The recent Law on Concessions authorizes Eletrobrás to charge rates for energy transmission, and regulations for this purpose are in preparation.

4.14 The authorization to enterprises in the sector to use their CRC credit balances to pay debts meant that in 1993 their liabilities fell by US$19 billion, which allowed them to reverse their arrears and lift the restrictions on obtaining new financing.

4.15 Together with BNDES, Electobras has begun a program for the recovery of the state distribution enterprises, participating in their management. Under this program the requisite measures are being taken to restructure the debts of these enterprises, especially of those incurred with the Eletrobrás system, or to convert them into share capital.

4.16 In December 1995 the enterprises in the sector owed a total of US$22.5 billion, of which US$5.6 billion was owed to Eletrobrás, US$12.5 billion to financial institutions, and US$4.4 billion to other creditors. In addition, Eletrobrás owed about US$7 billion. The indebtedness ratios of Eletrobrás's subsidiaries are holding within acceptable levels, the highest being that of the CHESF, whose obligations amount to 27% of its assets.

4.17 A projected financial analysis shows that the sector would be able to generate resources in amounts sufficient to service its debt and have at the end of four years a balance of US$14 billion to use for expansion of its system.

E. Financial situation of Eletrobrás

4.18 An examination of Eletrobrás's past financial situation shows that (i) the enterprise has performed adequately its function as financial organ of the sector, with a sizable loan portfolio, and as a holding company it maintains a substantial share in the capital of the enterprises in the sector; (ii) regarding its loan portfolio, agreements have been concluded with its delinquent debtors to regularize their situations, and agreements have been entered into for the payment of taxes and benefits. In 1995 and 1996 financing totaling US$1.3 billion was granted each year, the principal sources of these funds being internal cash generation and the resources from the Global Reversion Reserve (RGR), 1/ which in 1996 came to US$555 million; (iii) operating results have been positive, reaching US$832 million in 1995 and US$723 million in 1996; and (iv) the indebtedness is not high and the debt profile keeps debt service within the enterprise's financial capacity.

F. Projected financial situation

4.19 The results of the financial projections indicate that during the projection period Eletrobrás would be in satisfactory financial condition and maintain an increasing capacity to finance the sector. It would be able to meet its commitments for local contributions and debt-service without any difficulty.

4.20 When its subsidiaries are disposed of, Eletrobrás will receive the proceeds of their sale, which will reduce the amount of its investments, and place at its disposal resources with which to pay off liabilities in advance of maturity, as it did when it sold off part of its equity in the LIGHT enterprise.

4.21 Eletrobrás's financial situation is closely tied to the development of the finances of the enterprises in the sector, which makes it important that the strategy for restructuring the sector and the pricing policy for the electric power services provided by the public sector meet the criteria to secure its financial sustainability. To this end it is recommended that the loan contract require the borrower to present to the Bank every year an evaluation of the sector's financial situation examining, among other matters, the financial impact of the measures taken to restructure the sector, rate provisions enacted to ensure the sustainability of public electric utilities in the long run, sales of assets and/or privatizations, status of the indebtedness of publicly-owned electric power enterprises and the financial implications of the plans for expansion of the sector. To this end

---

1 The RGR was set up in 1971 to provide resources for when the rights to a concession revert. These resources are used to finance expansions of electric power service. Eletrobrás administers the RGR and pays interest at 5% p.a.

the Bank is to receive information on the financial history of Eletrobrás and its subsidiaries, and of its main debtor enterprises, describing the financial effects of the measures taken. It is also to be informed of the measures to be taken in the short and medium term and of the expected impact on the financial situation in the sector. These actions will be followed up at the annual consultation meetings (see paragraph 3.34).

4.22 For the purposes stated in paragraph 1.21, the transmission enterprises to which ownership of the project will be transferred will have to demonstrate to the Bank's satisfaction that the resources generated by the service they provide are sufficient to cover their operating and maintenance costs, including depreciation and the service on their debt, and to meet on time the other obligations incurred in the course of their operations.

G. The executing agencies

4.23 Responsibility for execution of the project will lie with the Eletrobrás subsidiaries Furnas and Eletronorte. These two enterprises, like the other two subsidiaries Eletrosul and CHESF, are included in the government's privatization program. The government will sell the generating plants operated by these enterprises and retain the transmission systems around which the new transmission companies would be organized.

4.24 Furnas was established by the federal government in 1957 and transferred to Eletrobrás in 1962. It is the second-ranking producer of block energy in Brazil, supplying 12% of the gross energy generation in the country in 1996 and accounting for 14% of the country's installed capacity. Today Furnas operates seven hydroelectric power stations and four thermal generation plants with an installed capacity of 8,123 MW. It operates a transmission system with 2,597 km of 500 kV lines, 1,783 km of 750 kV lines, and 1,612 km of 600 kV DC lines.

4.25 Eletronorte was established in 1973 to coordinate and develop the electric power system in the Brazilian Northeast. On December 31, 1996, it was operating four hydroelectric power stations and 14 thermal generation plants with an installed generating capacity of 5,503 MW – 10% of the country's total capacity. In 1996 Eletronorte generated 27,213 GWh, or 10% of the energy generated in the country. It operates a transmission network of 2,722 km of 500 kV lines.

V. FEASIBILITY OF THE PROJECT

A. Technical feasibility

5.1 The components of the project were defined by Eletrobrás, Furnas and Eletronorte with the support of consultants and using adequate standards and procedures, an up-to-date data base, and generally accepted analytical models. The characteristics of the transmission line and the substations conform to the most appropriate technical solutions and accord adequately with those of the rest of the electric power system connected with the project.

5.2 The project has the technical studies required for its design; those studies have been reviewed by a consultant of the Bank, who found them satisfactory. The designs and other engineering studies needed for the analysis of bids for goods and construction have been completed. Because of the characteristics of the project, some engineering work has to be done during preparation of the project, and other parts of that work may be carried out with execution of the project. The former include the details of the transmission line and the latter the definitions to be produced by the precommissioning electrical studies.

5.3 The studies done demonstrate an economic advantage from using alternating current instead of direct, and this advantage is qualitatively enhanced by the greater flexibility of the former current and, in the long run, by the possible connection of new hydroelectric power stations located near the main line of the Interconnection.

5.4 The compensation approach used is based on fixed-series capacitors that compensate up to 54%, plus controlled series capacitors (TCSC), which compensate 6% in a state of rest, and in shunt compensation about 100%. Though this is a relatively novel technology, the use of TCSC controlled compensators is, based on the state of the art and successful experience seen in other countries, appropriate for this project.

5.5 As for the routing of the transmission line, collection of the field information needed for its final design has been completed. The final working design will be ready in October 1997. The subsequent engineering work includes approval of the foundations and structures and all other technical determinations that must be taken in the course of construction.

5.6 Regarding the substations, both new and additions, the general designs and the specifications for the principal equipment have been completed. Most of the engineering work remaining to be done is detail engineering, which must be done after the contracts for the equipment have been awarded. For some of the equipment to be defined there are alternatives that depend on the bidders, and the

engineering analysis of which will be done by the executing agency or with the support of consultants as part of the precommissioning electrical studies.

5.7 The energy analyses are conclusive on use of the Interconnection Line in both directions and the important transfers of energy it will make possible, which derive from the hydrological differences among the hydroelectric power stations in the zone of influence of the project and better use of their reservoirs.

B. Institutional feasibility

5.8 As part of the general government reform program, and particularly the restructuring of the electric power sector, Eletrobrás and its subsidiaries have been included in the National Privatization Program. The government is beginning to privatize the generating installations of Furnas, Eletrosul, Eletronorte and CHESF, and the respective transmission systems will be placed in the hands of new companies to be set up for the sole purpose of providing electric power transmission service, while Eletrobrás will continue as the holding enterprise.

5.9 The institutional arrangements proposed in the present operation take account of the special conditions generated by the transition to the new organization of the sector. Eletrobrás's coordination and the establishment of the project executing unit in accordance with requirements and criteria duly agreed upon with the Bank, the recognized capacity and demonstrated technical experience of Furnas and Eletronorte in the execution of projects of this kind, and the provisions adopted for transfer of the project's installations to the transmission companies that would own and operate them, all will assure the project's viability.

C. Financial feasibility

5.10 The project's financial feasibility has been examined in light of Eletrobrás's capacity to put up the counterpart resources needed to execute it and service the debt. The counterpart would consist of US$300 million in cofinancing resources and US$329 million in internal resources of Eletrobrás, which are guaranteed in their entirety by the federal government. Of the latter figure, about US$75 million will go for the payment of interest and finance charges during construction.

5.11 According to the financial projections, Eletrobrás would generate enough resources during execution of the project to cover its counterpart contribution to it; at the same time, its strategy for managing the portfolio of the sector would enable it to maintain a relatively comfortable financial position, and an insufficiency of resources on the part of the enterprises in the sector to meet their obligations to Eletrobrás does not seem likely at present. Nevertheless, the legal documents for the operation would reflect

the recommendations to ensure that both the rate level and the financial policies of the electric power enterprises in the public sector will remain within the parameters agreed upon with the Bank (see paragraphs 4.21 and 4.22). On this assumption the project would be adequately financed, and Eletrobrás would maintain financial standards that were reasonable and in compliance with the Bank's applicable operating policies.

5.12 The measures undertaken by the government for reform of the sector, in combination with the priority assigned to execution of this project and the annual weight of the amounts of local contribution required relative to the total cash flows projected for Eletrobrás indicate that no problems would arise in the availability of the required counterpart contributions. It may also be noted that the local calls for bids to be financed from the local contribution are far advanced, with the requisite resources having been budgeted and committed by Eletrobrás.

5.13 Lastly, since the financing from the Export-Import Bank of Japan would be approved after the Bank's, it is recommended that the loan contract require, as a condition precedent to the first disbursement, that the borrower present to the satisfaction of the Bank evidence that that cofinancing has been committed or that acceptable financing has been obtained from other sources.

D. Economic feasibility

5.14 The economic analysis shows that the project (a) is indeed the least-cost alternative, (b) presents high benefit-cost indicators, (c) is robust, inasmuch as its indicators of economic merit remain high in the face of major changes in the main variables, and (d) is timely, being scheduled to go on line at the earliest possible date, as delays would entrain major net economic losses.

5.15 The demand projections used show an average annual growth rate of 5.1% in the period 1997-2006; the growth rates of the several subsystems are 5.5% in the South, 4.1% in the Southeast, 7.1% in the North, and 5.5% in the Northeast.

5.16 The least-cost analysis included, firstly, identification of the best interconnection alternative to increase the firm capacity of the system and, secondly, selection of the best technical option for construction of the Interconnection. The latter selection was made on the basis of several technical-economic studies done to define the most advisable choice between alternating current and direct current technology, voltage options, the types and numbers of conductors, the kinds of supports to be used, the routing of the line, the number of intermediate substations, the equipment for the end and intermediate substations and the additional transmission plant and equipment at the substations required for the interconnection to the transmission system, in order to handle the major load transfers to be made.

5.17 For the benefit-cost analysis the development described in the Ten-Year Expansion Program 1997-2006 was taken as the "with project" scenario; in the course of the analysis it was found that this scenario was, for purposes of energy simulations, practically the same as another scenario considered in that Plan but without extension of the North-South Interconnection Line and with an additional average 450 MW thermal energy supply in the Northeast region and scheduled to go on line in 2002. On the basis of this similarity, the "without project" scenario was defined as the latter case, but without the North-South Interconnection Line.

5.18 The energy simulations indicate that:

a. The additional energy to be made available by the interconnection would be about an average 600 MW starting in 1999.

b. From the standpoint of reliability of supply, with the line the probability of a shortfall in supply relative to demand starting in the year 2000 would lie within the normal planning range (about 5%) provided the line is complemented by the other required generation and transmission works.

c. With the line the probability of shortages in the South system in the course of 1999 falls from 9.5% to 8.4% and in the Southeast region from 11.7% to 10.4%.

d. In addition, the interconnection will generate savings in the form of a lower variable cost of thermal generation on the order of US$15 million a year starting in 1999.

5.19 The probability associated with the siting and magnitude of the additional energy made possible by the interconnection that does not replace thermal generation leads to its being evaluated on the side of reliability and not as incremental energy because, on the one hand, its effect is actually to avoid supply cuts and, on the other hand, given this probability, the alternative of avoiding power cuts by using rate signals to induce less use of energy is ruled out because rates should be relatively stable and could in no way be associated with hydrological contingencies. The expected cost of the deficit is valued at US$540/MWh.

5.20 The benefit-cost analysis shows a net present value (NPV) of US$1.975 billion of December 1996, stated at market prices without taxes and discounted at 12%. The economic internal rate of return (EIRR) is 49%. Of the gross benefits, 94% is the expected value of the averted shortfall and the remaining 6% the reduction in the variable cost of thermal generation.

5.21 Table V-1 shows the sensitivity of the benefit-cost analysis to major but independent changes in the key variables that determine the economic soundness of the project.

TABLE V-1
Sensitivity of the benefit-cost analysis
NPV in US$ millions of December 1996, discounted at 12%, at market prices without taxes

	NPV	EIRR%
A. Project	**1,975**	**49**
B. The investment cost rises		
15%	1,881	43
30%	1,787	38
45%	1,692	35
C. The cost of the shortfall is valued at		
25% below US$540/MWh	1,484	40
50% below US$540/MWh	1,156	35
75% below US$540/MWh	922	30
At US$100/MWh starting in 2002	514	32
At US$100/MWh starting in 2001	369	26
At US$100/MWh starting in 2000	223	19
D. No benefits assumed as from 2008	1,108	47

5.22 To evaluate the timing of the project and the importance of meeting the timetable for its construction and its startup in December 1998, an analysis was done of the consequences of possible delay. If the entry of the project is rescheduled to one month later, the loss in expected benefits would come to US$58 million; if the delay were three months, the loss would be US$167 million, and if six months, then US$339 million. It must be noted that this analysis represents the consequence of scheduled delays which imply a change starting now in the rules for operation of the reservoirs. Unexpected delays in the startup of the interconnection would produce losses of much higher expected values because they would mean that the reservoirs were being operated uneconomically.

5.23 Since the cost of a delay, even if scheduled, is far higher than the corresponding benefit that would accrue from postponing the investment expenditures and since, at the same time, the project cannot be put into operation at any earlier date, it is concluded that the project is correctly timed.

E. Environmental feasibility

5.24 The environmental impact studies indicate that the project is environmentally feasible and essentially favorable because of the benefits it would bring to the Brazilian electric power system by making it more reliable and integrating the main electric power markets. The latter benefit would optimize exchanges of energy and

make more efficient use of the already installed generation capacity. The negative impacts identified are of low or medium intensity and local, and can be mitigated or compensated by fairly simple and easy-to-implement measures.

5.25 The environmental studies are concordant with the guidelines agreed upon with the Bank and included an analysis of alternative routings, which allowed selection of the alternative with the fewest environmental and social impacts, and were analyzed and approved by the country's environmental authorities and the Bank. The mitigation and compensation plans show a quality and level of detail (detailed design of all measures, execution timetables, detailed budgets, institutional arrangement for implementation, identification of those responsible for costs, etc.) that constitute a significant step forward in the inclusion of environmental issues in projects for power transmission lines and may become a frame of reference for similar studies in future.

5.26 The project's environmental management includes definition of the institutional mechanisms for proper implementation of the compensation programs, the commissioning of a consulting firm to exercise environmental supervision over the works and monitor implementation of the environmental compensation programs, and the hiring of an independent environmental auditor to oversee their proper implementation.

5.27 The construction contracts include specific clauses that obligate the contractors to carry out all the mitigating measures called for in the EISs and set penalties for noncompliance.

F. Risks

5.28 The economic benefits of the project would be attained in any case, for its realization is associated with centralized economic load dispatch, which exists now and would continue in the new sectoral structure. Hence the main risk of the operation is associated with the present uncertainty regarding the actual conditions in which the line would be operated and maintained, and remuneration for the power transmission service, which would determine the income to be received by the companies that will be in charge of this service in the future. These aspects depend on the decisions being taken on organization of the system and ownership of the transmission assets, and on the operational and financial feasibility of the new transmission companies to be set up on the basis of the present subsidiaries of Eletrobrás. Specific clauses would be written into the contract to mitigate the risks arising out of these uncertainties.

5.29 Moreover, it is reasonable to expect that the principal components of the strategy being implemented by the government in the energy sector will continue, considering the decisions taken and the measures already implemented, and the fact that the main aspects of

the future organization of the sector have already been defined and the details of the new sectoral model are already being developed and implemented.

5.30 In addition, the project would contribute directly to the success of the strategy adopted by strengthening key aspects of the reform, such as the regulation and oversight of operations in the sector and indicative planning in the new setting of competition. In this context, and to track implementation of the sectoral and institutional reform measures and the general progress of the project, periodic meetings would be held by the government authorities with responsibilities in the sector, Eletrobrás, and the Bank.

5.31 Lastly, it is concluded from an analysis of the timetable for execution of the project works that there is no float time and that its execution on schedule will indeed pose a challenge to the executing capacity of the enterprises involved. However, based on the organization established for execution of the project, the extensive experience of Furnas and Eletronorte in the construction of similar works, the advanced state of the procurement processes, and the high priority assigned by the government to the project, it is expected that no delays will arise in execution of the interconnection on account of any factor that is within the control of those who will execute it.

NORTH-SOUTH ELECTRIC POWER INTERCONNECTION PROJECT
(BR-0275)

GENERAL STRATEGY FOR THE ELECTRIC POWER SECTOR IN BRAZIL

ACTIVITY	PURPOSES	MEASURES	RESPONSIBLE AGENCY	EXPECTED RESU
		SECTORAL STRUCTURE		
N tion of the wholesale	Competition in generation	1.1 Regulation of the wholesale market, establishment and operation of the Independent System Operator (ISO)	SEnergia/ANEEL	Wholesale market opera 7/99
ng of generation from sion and distribution	Idem	2.1 Division and privatization of Eletrobrás subsidiaries	Eletrobrás/BNDES	Privatization completed
		2.2 Division/segregation of State enterprises	States	Principal enterprises sep 12/2000
n of generation	Conditions for efficient long-term expansion	3.1 Financial agent for long-term financing and guarantees to hydroelectric power stations and interconnections	Eletrobrás	Changes in long-term fi regime developed in 12/
		3.2 Implementation of Indicative Plan (IP)	MME/SEN/Eletrobrás	Indicative generation pla available in 12/98 Implementation in 12/99
ON tion of transmission	To permit competition by making transmission installations accessible to generators and distributors	4.1 Establishment of federal transmission company (or companies)	MME/Eletrobrás	Companies in operation
		4.2 Startup of ISO	SEN/ANEEL	ISO in operation in 7/98
		4.3 Signing of transmission service agreements	ANEEL/ISO	Agreements in force in 1
n of transmission	Idem	5.1 "Open access" regulation	ANEEL/ISO	Regulations approved in
		5.2 Implementation of transmission rates	ANEEL/ISO/SEN	Rates in force in 7/98

NORTH-SOUTH ELECTRIC POWER INTERCONNECTION PROJECT
(BR-0275)

GENERAL STRATEGY FOR THE ELECTRIC POWER SECTOR IN BRAZIL

CTIVITY	PURPOSES	MEASURES	RESPONSIBLE AGENCY	EXPECTED RESU
of transmission	Conditions to make investments in extension of transmission profitable	6.1 Preparation of 5-year Indicative Transmission Plan	ISO/SEN/Eletrobrás	Plan available in 12/98
		6.2 Development of "neutral" scheme for setting and reviewing transmission rates	ANEEL/ISO	Mechanisms implemente
N				
t of distribution ns	To assure conditions for competition in generation, adequate satisfaction of demand, and extension of electric power service	7.1 Privatization of companies owned by Eletrobrás	Eletrobrás/BNDES	Implementation plan in e in 7/98
		7.2 Separation of accounts of State enterprises	ANEEL	Separation of accounts implemented in 7/98
supervision and concessions	Idem	8.1 Distribution regulations and standards	ANEEL	Regulations implemente
		8.2 Development of limits on cross-ownership between generation and distribution, and on concentration ceilings	ANEEL/SEN	Standards implemented
		8.3 Development of a rates policy at the distribution level	ANEEL	Rate system implemente
REGULATORY AND INSTITUTIONAL AREAS				
planning (IP)	Supplement functioning of generation market and guide expansion of generation and transmission	9.1 Implementation of institutional and organizational plan for IP	SEN	New IP implemented in 1
		9.2 Inventory of hydroelectric projects and prefeasibility studies	SEN/Eletrobrás/ANEEL	Studies begun in 7/98 Preliminary inventory ave 12/2000
and control of of the sector	Ensure that markets are functioning in keeping with objectives of the reorganization of the sector	10.1 Regulation and placement in operation of ANEEL	SEN/ANEEL	ANEEL starts becoming operational in 10/97
				In full operation in 10/99

NORTH-SOUTH ELECTRIC POWER INTERCONNECTION PROJECT
(BR-0275)

GENERAL STRATEGY FOR THE ELECTRIC POWER SECTOR IN BRAZIL

ACTIVITY	PURPOSES	MEASURES	RESPONSIBLE AGENCY	EXPECTED RESU
nal strengthening	Provision of institutional and technical capacity for agencies that govern and control the sector	11.1 Strengthening of ANEEL for (i) implementation of new normative framework, (ii) control, supervision and operation of the sector, and (iii) regulation of rates for access to the system of transmission and end use of energy.	ANEEL	Strengthening program execution in 4/98
		11.2 Strengthening of environmental control under new organization of the sector	Eletrobrás	Programs in execution i
		11.3 Training of personnel in electric power sector	Eletrobrás/ANEEL	Training activities begur
		FINANCIAL AREAS		
cy of the sector	Ensure that income of enterprises in sector is sufficient to sustain the services in long run	12.1 Revision of methodology for calculation of transmission rates and regulation of transmission	ANEEL	Revision in 7/98
		12.2 Evaluation of rate levels of public enterprises and regulated concessionaires	ANEEL	Annual verification starti
ness of the sector	Ensure that structure and profile of debt of enterprises in the sector are compatible with long-run sustainability of services	13.1 Evaluate structure and profile of the sector's debt load	Eletrobrás	Annual verification starti
ng the sector's financial	Evaluate financial impact of measures taken	14.1 Present financial projections of Eletrobrás, subsidiaries and principal debtors	Eletrobrás	Annual presentation star 7/98

LOGICAL FRAMEWORK
North-South Electrical Interconnection Project
(BR-0275)

OBJECTIVE	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
			(Aim to supertarget)
te to increasing the coverage of ver service to the population and nent of production sectors by re efficient use of the system's capacity.	1. Coverage of electric power service rises from 33,934 million residential users in 1997 to 47,208 million in 2006. Consumption per residential user rises from 2,035 kWh in 1996 to 2,618 in 2006. Industrial consumption rises from 116,500 GWh in 1996 to 177,800 in 2006.	1. Eletrobrás operations report	1. Government of Brazil maintai application of new operating electric power sector.
			(Purpose to aim)
r electric energy met as needed st economic cost by public ver service, and achieves joint n of the two major electric power the country.	1.1 An interconnection capacity of 1,000 MW will become available in 1/99 and afford a gain in energy of about 600 average-MW a year [see Note 1] and savings of about US$15 million a year from lower variable cost of thermal generation	1.1 Eletrobrás operations report (indicating actual amounts of electricity carried)	1. Implementation of measures t restructure the sector, which e new organization, rules of ope private sector participation, ar provision regarding rates at d stages.
S			**(Component to purpose)**
on line connecting the Serra da Mesa and Samambaia completed and in operation	1. The 1,279-km 500-kV Imperatriz-Serra da Mesa-Samambaia line, built of free-standing galvanized steel structures, with 4 bundled phase conductors of 954 MCM, Rail code 45/7, with OPGW (optical fiber) ground wires and 1,300 MW natural power (SIL), to be operational in 1/99.	1. Works inspection reports	
tions with their transmission ks completed and in operation	2. Three new substations at Colinas, Miracema and Gurupi, with their control, metering, protection and communications equipment, will be in operation in 1/99. These substations will contain a total of 8 banks of 136-MVAr line reactors plus 5 banks of fixed series 161-MVAr capacitors	2. Works inspection reports	

LOGICAL FRAMEWORK
North-South Electrical Interconnection Project
(BR-0275)

OBJECTIVE	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
s to and works to strengthen the ystem completed and in	3. In operation in 1/99 will be: (a) the enlargement of the Imperatriz substation with its metering, control, protection and communications equipment, this enlargement comprising a 108-MVAr controllable series compensation bank (TCSC), two banks of 136-MVAr line reactors, and 3 banks of fixed series capacitors of 161, 390 and 451 MVAr installed in fixed series capacitors; (b) enlargement of Serra da Mesa substation with its metering, control, protection and communications equipment, this enlargement comprising a 108-MVAr controllable series compensation bank (TCSC) and 2 banks of 136-MVAr line reactors; (c) enlargement of the Samambaia substation with its metering, control, protection and communications equipment, this enlargement comprising a bank of 136-MVAr line reactors, three 350-MVA single-phase autotransformers for a total increase of 1,050 MVA for step-down transformation 500/345/13.8 kV, and a bank of fixed 345-kV and 150-kV series capacitors; and (d) enlargement of the Marabá and Presidente Dutra substations with their metering, control, protection and communications equipment, each enlargement comprising 2 banks of fixed series capacitors as follows: at Marabá one of 348 MVAr and another of 283 MVAr, and at Presidente Dutra one of 390 MVAr and another of 451 MVAr.	3. Works inspection reports	
al strengthening program d	4. Activities to support establishment of ANEEL to be completed in 12/99. The studies to adjust the Indicative Planning for the Expansion of Transmission and Identification of New Projects will be completed not later than 4/99, and the Update of the Inventory of Hydroelectric Projects will be completed in 6/00. Activities for the Strengthening of Environmental Management to be completed in 6/99.	4. Reports of the Eletrobrás project executing unit	

LOGICAL FRAMEWORK
North-South Electrical Interconnection Project
(BR-0275)

OBJECTIVE	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
			(Activity to component)
ion line: (i) preparation of bidding s, (ii) call for bids; (iii) study of awards; (iv) execution of works of ns Imperatriz-Colinas, Colinas- , Miracema-Gurupi, Serra da ambaia II, and (v) precom- g tests.	1. See detailed budget for the project.	1. Reports on supervision of works issued by Furnas, Eletronorte and supervising firms.	1.1 Development and implementa Environmental Management P consisting of (i) technical env specifications for construction operation of the transmission (ii) environmental protection p and activities for prevention a mitigation of impacts of the w 1.2 No delays in execution of the interconnection will be cause under the control of the execu agencies (Furnas and Eletron the timetable for execution of works indicates that there is r making up lost time.
ns and transmission control call for bids, (ii) study of bids ds, (iii) study of bids and awards, tion of works at Colinas, , Gurupi substations; and mmissioning tests.			
ents and strengthening works: bids, (ii) study of bids and award, tion of works for enlargement of ns at Marabá, Presidente Dutra, , Serra da Mesa and Samambaia, trolled series capacitor at each of and Serra da Mesa, and mmissioning tests.			

LOGICAL FRAMEWORK
North-South Electrical Interconnection Project
(BR-0275)

OBJECTIVE	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
l strengthening program: terms of reference, (b) invitation ion, (c) contracting of consulting arrying out of studies and/or tivities, (e) presentation of final d (f) implementation of dations.			

the likely characteristics of energy transfers over the line, which will depend on hydrological conditions in the systems to be connected, effective availability of transmissi
s a target.

NORTH-SOUTH ELECTRIC POWER INTERCONNECTION PROJECT
(BR-0275)

TENTATIVE PLAN FOR PROCUREMENT OF PRINCIPAL WORKS AND EQUIPMENT

TABLE A-III-2-1
Call for bids for equipment and works

Description	Bidding		Prequalification Yes/No	Bidding arrangement	Amount (US$ thousands) Dec. 96
	Public.	Closing			
1. SUBSTATIONS					**398,519**
Reactors and power transformers	16/04/97	13/06/97	NO	LPB	79,894
Compensation equipment	16/06/97	25/08/97	NO	ICB	171,273
Circuit breakers and section switches	31/05/97	30/07/97	NO	ICB	44,741
Control, protection and communications equipment	16/06/97	22/09/97	NO	ICB	29,320
Current and power transformers and substation lightning arresters	31/05/97	02/09/97	NO	ICB	17,797
Assembly and supplies	16/07/97	1/	NO	ICB	55,494
2. TRANSMISSION LINES					**321,677**
Metal structures	16/04/97	27/05/97	NO	LPB	68,461
Conductors	31/05/97	29/08/97	NO	ICB	95,863
OPGW ground wire	31/05/97	28/08/97	NO	ICB	30,991
Assembly and supplies	16/07/97	16/09/97	NO	ICB	126,362
GRAND TOTAL					**720,196**

NOTES:

ICB = International competitive bidding with financing from IDB or JEXIM
LPB = Local public bidding with financing from counterpart contribution
1/ = 18/09/97 substations in Furnas area and 09/09/97 in Eletronorte area

TABLE A-III-2-2
Tentative plan of principal service contracts

Description	Bidding		Prequalification	Bidding arrangement	US$ thousands	Notes
	Public.	Closing			December 1996	
SUPPORT TO ESTABLISHMENT OF ANEEL	**01/10/97**	**31/01/98**			**1,400**	
Organizational structuring			YES	ICP	400	(1)
Regulation of access to transmission and distribution			YES	ICP	250	(1)
Training			NO	Several	650	(1)
Equipment			NO	LCP	100	(2)
UPDATE OF INVENTORY OF HYDROELECTRIC PROJECTS	**01/10/97**	**31/01/98**	**YES**	**ICP**	**1,050**	**(1)**
STRENGTHENING OF ENVIRONMENTAL MANAGEMENT	**01/10/97**	**31/01/98**			**1,400**	
Methodology of economic evaluation of environmental effects of electric power sector projects			YES	ICP	403	(1)
Project supervision and monitoring			NO	IC	74	(1)
Methodological and technical studies of project preparation and analysis			NO	IC	37	(1)
Environmental audits			NO	IC	209	(1)
Strengthening of technical staffs			YES	Several	677	(1)
ENGINEERING	**01/10/97**	**31/01/98**			**900**	
Preoperational electrical studies			YES	ICP	900	(1)
SUPERVISION	**01/10/97**	**31/01/98**			**3,015**	
Project execution/management			YES	ICP	415	(1)
Environmental supervision			YES	ICP	2,600	(1)
CONCURRENT COSTS	**01/10/97**	**31/01/98**			**1,700**	
Studies for transmission expansion/identification of new projects			YES	ICP	1,700	(1)

NOTES:

ICP = International call for proposals
LCP = Local call for proposals
IC = Individual consultants
(1) = IDB financing
(2) = Financed entirely from local counterpart contribution

LEG/RG1/BR-1912
Original:Spanish
BR-0275

PROPOSED RESOLUTION

BRAZIL. LOAN /OC-BR TO
CENTRAIS ELETRICAS BRASILEIRAS S.A. - ELETROBRAS
(North-South Electric Transmission Line Project)

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 Centrais Eletricas Brasileiras, S.A - Eletrobrás, as Borrower, and the Federative Republic of Brazil as Guarantor, for the purpose of granting it, the former a financing to cooperate in the execution of a North South Electric Transmission Line Project. Such financing will be for the amount of up to three hundred seven million dollars of the United States of America (US$307,000,000), from the Single Currency Facility of the Ordinary Capital resources of the Bank, and will be subject to the "Special Contractual Conditions" and the "Terms and Financial Conditions" of the Executive Summary of the Loan Proposal.