

BOLIVIA-BRAZIL GAS PIPELINE INTEGRATION PROJECT

(RG-0028)

EXECUTIVE SUMMARY

BORROWER: Transportadora Brasileira Gasoduto Bolivia-Brasil (TBG)

GUARANTOR: The Federative Republic of Brazil

EXECUTING AGENCY: TBG

AMOUNT AND SOURCE:	IDB:	US\$ 240 million (OC)
	World Bank:	US\$ 310 million
	Andean Development Corporation:	US\$ 84 million
	European Investment Bank:	US\$ 60 million
	Partners and export credit agencies:	<u>US\$1,005 million</u>
	Total:	US\$1,699 million

FINANCIAL	Amortization period:	20 years
TERMS AND	Disbursement period:	3 years
CONDITIONS:	Interest rate:	variable
	Inspection and supervision:	1%
	Credit fee:	0.75%
	Currency:	US dollar

OBJECTIVES: The general objective of the project is to contribute to regional energy integration, facilitating expansion of the natural gas industry and market by connecting Bolivian gas fields to the market in central and southern Brazil. In Brazil, the introduction of Bolivian natural gas will accelerate a positive change in the energy matrix through more extensive use of a fuel that is preferable from the environmental standpoint and whose efficiency is more compatible with the country's industrial development. Opening up the Brazilian market on a much larger scale will allow Bolivia to fully develop its natural gas reserves.

The specific objectives are, in Brazil's case, to cover part of the growing demand for energy by consumers in the economic hub of the country. In Bolivia's case, a new export market will be opened up, which will boost gas production and growth in the industry, with a positive impact on the country's economy and trade balance.

DESCRIPTION: A gas pipeline 3,146 km long will be built between the city of Rio Grande in Bolivia to the city of Porto Alegre in Brazil, passing close to the Brazilian cities of Campo Grande, Araraquara, Campinas, Guararema (in the São Paulo area) and Curitiba. Five hundred and fifty-seven kilometers will be built in Bolivia and 2,589 km in Brazil. The diameter of the pipeline will be 32" in the initial section, decreasing to 16" in the final section. Total carrying capacity will eventually be 30 Mm³/day which could be achieved in several stages through the addition of compressor stations.

The present project considers medium-term carrying capacity of 18 Mm³/day and the Bank loan is intended to cover part of the cost of the pipeline in Brazilian territory.

ENVIRONMENTAL REVIEW: At its meeting on January 21, 1997, CESI requested that an environmental report be prepared, which it approved on October 29, 1997. The conclusions and recommendations of that report have been included in this proposal (paragraph 3.14). The environmental impact assessments and environmental management plans were made available to the public in both countries during the week of June 23 to 27, 1997, and were sent to the PIC on July 15, 1997 (paragraph 3.13).

BENEFITS: Construction of the pipeline will lead to a substantial increase in the use of natural gas in Brazil with positive long term impacts on the environment, industrial competitiveness, and Bolivia's trade balance. In both countries the project will contribute to the advance and consolidation of economic and institutional reforms in the energy sector, opening up concrete opportunities for greater private sector participation.

RISKS: The main risk has to do with establishing conditions in Brazil for a competitive fuel market and for self-sustaining development of the natural gas market in the long term. The risk is considerably attenuated by the new Hydrocarbons Act and will be minimized by its enabling regulations, covering the following main areas: (i) deregulation of the fuel market and fuel prices; (ii) open access to gas pipeline capacity; (iii) limitations on cross-ownership by companies in the different stages of the natural gas industry; and (iv) regulation of gas transport prices under appropriate economic, financial, and commercial conditions.

These measures will be implemented through the pipeline operating license granted to the TBG (paragraph 5.47) and the introduction of the principles agreed upon with the government regarding fuel prices and organization of the gas sector contained in the letter of undertaking presented to the Bank (paragraphs 5.30 and 5.31).

**BANK COUNTRY AND
SECTOR STRATEGY:**

The Bank's strategy and operating program for Brazil for 1996-1998, as described in the country paper of February 1996, are fully consistent with the objectives of the Eighth Replenishment, the government's aim to systematically eliminate the causes of poverty (alleviating some of its social consequences), and the need to promote modernization of the economy. The chief elements in the Bank's lending strategy (paragraph 1.39) are to provide support directly and through joint endeavors in the following areas: (i) **modernization of the State**, giving priority to enhanced planning and management capacity, public sector reform, and fiscal reform; (ii) **productive infrastructure** to support a more open economy, regional integration, and a reduction in the Brazil cost by making priority investments in the transportation and energy sectors; and (iii) **social sectors, basic sanitation, and the environment**. The project will contribute to these goals through a solid energy interconnection between Bolivia and Brazil which will help to lower industrial costs and involve the private sector in the construction and operation of facilities. It will improve the quality of life in areas that use gas, since gas is environmentally better than the alternatives and will mitigate critical environmental situations. This fully justifies the Bank's participation in project financing (paragraphs 1.40 to 1.43).

**POVERTY TARGETING
AND SOCIAL
CONSIDERATIONS:**

The proposed program cannot be classified as a poverty-targeted operation either geographically or with respect to beneficiary groups, nor is it targeted specifically to women pursuant to the Eighth Replenishment document (AB-1704) (paragraph 5.32).

**SPECIAL
CONTRACTUAL
CONDITIONS:**

The conditions precedent to the first disbursement include: (i) establishment of a mechanism for environmental supervision of the works and for management of environmental programs (paragraph 3.19) and presentation of the first report of the supervision company and the opinion of the independent environmental auditor (paragraph 3.18); (ii) provision of financing by the TBG's partners (paragraph 4.21); (iii) availability of the other

sources of financing for the pipeline (paragraph 4.2); (iv) presentation of the development plan for indigenous communities for the Brazilian section of the project (paragraph 3.14); (v) transfer to the TBG of contracts and other obligations incurred by Petróleo Brasileiro S.A. (Petrobrás) for the financing and construction of the pipeline (paragraph 3.46); and (vi) establishment of partnership agreements and other contracts relating to the TBG, with the government's share in the company limited to a maximum of 51% (paragraphs 4.4 to 4.6).

Other conditions in the loan contract include: (i) signature of agreements with the Instituto Brasileiro de Meio Ambiente (IBAMA) [Brazilian Environmental Authority] and state agencies to implement ecological compensation programs (paragraph 3.21); (ii) presentation of reports on compliance with environmental measures during the project (paragraph 3.20); (iii) contracting of studies and services for Petrobrás environmental strengthening (paragraph 3.23); (iv) nature of the system under which the pipeline will be operated and maintained (paragraph 5.38); (v) presentation of the TBG's financial projections; (vi) conditions for declaring or paying dividends; (vii) restrictions on contracting new financial obligations (paragraphs 4.18 and 4.21); (viii) presentation of annual maintenance reports (paragraph 3.47); (ix) implementation of the environmental compensation and socioeconomic programs contained in the environmental studies (paragraph 5.43); (x) maintenance of the environmental management structure during the entire project (paragraph 3.19); and (xi) presentation of information on the works performed by Petrobrás along the entire length of the pipeline (paragraph 3.2).

Costs incurred since January 2, 1997, of not more than US\$336.2 million will be recognized from the local contribution. Costs incurred after the same date of not more than US\$30 million will be recognized from the Bank loan (paragraphs 3.42 and 3.43).

The Brazilian government, through the letter of undertaking presented to the Bank, makes the following commitments: (i) it will issue the license for operating the pipeline on the terms agreed upon with the Bank (paragraphs 3.22 and 5.47); (ii) it will limit its shares in the TBG to not more than 51% (paragraph 4.5); (iii) it will present a proposal to regulate the Hydrocarbons Act based on the principles established in the aforesaid letter of undertaking;

and (iv) it will participate in the meetings to monitor the TBG's use of its operating license and implementation of the measures described in its letter of undertaking (paragraph 5.50).

**EXCEPTIONS
TO BANK POLICY:**

None

**PROCUREMENT OF
WORKS, GOODS, AND
ENGINEERING AND
CONSULTING
SERVICES:**

Bank procedures will be followed in procuring goods and contracting works and consulting services to be financed with loan proceeds. International public bidding will be used for consulting services over US\$200,000, goods over US\$350,000, and works over US\$5 million. Local legislation will be followed for procurements below those amounts and for procurements using counterpart funds (paragraph 3.25).

I. FRAME OF REFERENCE

A. General considerations

- 1.1 Energy integration among the countries of the Southern Cone has made considerable headway in recent decades through extensive interconnections between the electric systems of Argentina, Uruguay, Paraguay, and Brazil, bringing many technical and economic benefits. In view of the significant existing potential, this development is strengthened by an increase in thermal power in each country based on natural gas. The most attractive areas for increased energy integration are electricity, through hydroelectric plants and transmission lines, and gas through pipelines.
- 1.2 Proven natural gas reserves in the subregion are 1.1 billion m³, mainly located in sedimentary basins in Argentina and Bolivia, which can be used to supply markets in the other countries through the construction of gas pipelines. Natural gas would partially replace oil and biomass for the generation of electricity and for industrial consumption, for an increasing share in the region's energy matrix. Apart from the gas pipeline between Bolivia and Argentina, which has been operating since 1972, the following initiatives have been identified: (i) gas pipelines between Argentina and Chile, one of which is already in operation; (ii) a gas pipeline from Argentina for thermoelectric generation of 600 MW in Uruguaiana in Brazil to supply power to the state of Rio Grande do Sul; and (iii) gas pipelines between Argentina and Uruguay – one from Buenos Aires to Montevideo and one that would serve cities on both sides of the Uruguay river.
- 1.3 The idea of building a pipeline between Bolivia and Brazil has been raised on various occasions and has finally materialized in the present project, which is in line with the concept of regional integration which is crucial for gas-producing countries such as Bolivia, with neighbors who are heavy consumers, such as Brazil. Bolivia's exports would be on the order of US\$200 million a year for the volumes already contracted and could rise to as much as US\$300 million, making a substantial contribution to its export earnings which are currently on the order of US\$1 billion a year.

B. Brazil's energy matrix and natural gas consumption

- 1.4 Brazil's domestic energy supply is marked by a relatively high percentage of renewable resources. Hydroelectric energy accounts for 37% and biomass for 25%. Fossil fuels represent about 36%. Natural gas makes up just 2.4% of end consumption, which is low compared with other countries (the figure for Argentina is 38%). One of the reasons is that Brazil's proven natural gas reserves are quite small, at less than 2% of the total in the region.

- 1.5 In recent decades Brazil has developed its energy sector intensively, focusing on oil exploration and production and the development of its hydroelectric potential. These investments, which have been made mainly by the public sector, and increased use of biomass as an energy resource developed by the private sector, have permitted the country to largely replace imported fuels through the development of renewable resources.
- 1.6 However, the most economical hydroelectric potential is already being tapped and remaining reserves are more expensive to develop owing to their distance from consumer centers and the associated environmental costs. There is also awareness that the environment in major cities, affected by air pollution caused by the use of fossil fuels, needs to be improved. Last, economic integration of the different countries in the region and greater economic openness in general demand the use of appropriate fuels to boost the competitiveness of the productive sectors. All these reasons have led the government to promote greater use of natural gas – both domestic and imported – to improve the country's energy matrix through greater flexibility and diversification of sources, and to follow the trend in the more developed countries towards greater use of natural gas.

C. Physical installations and natural gas consumption in Brazil

- 1.7 Brazil currently operates 2,730 km of gas pipelines belonging to Petróleo Brasileiro S.A. (Petrobrás), the government-owned company. They are divided into two systems, one in the northeast and one in the central and southern area, where most sales of natural gas are made. The total length of the distribution network is 4,300 km, with 2,170 km operated by the Companhia Estadual de Gás do Estado de Rio de Janeiro (CEG) and 1,608 km by the Companhia de Gás de São Paulo (COMGAS).
- 1.8 Current natural gas consumption is approximately 10 Mm³/day, with the states of Rio de Janeiro, São Paulo and Minas Gerais using almost 7 Mm³/day of that figure. The extension of the Rio de Janeiro-São Paulo pipeline to Belo Horizonte in Minas Gerais, fed from the Campos and Santos fields, was completed in 1996 and gave Petrobrás an additional market of 1 Mm³/day. COMGAS has contracted to buy an additional 1.5 Mm³/day of domestic production from Petrobrás over the next three years, which facilitates the short-term expansion of its market.
- 1.9 Despite its competitiveness with other forms of energy, natural gas has captured only a small portion of its potential market, owing to limitations on the supply of gas from the fields in question for markets in the central and southern parts of the country.

D. Brazil's gas development strategy

- 1.10 The government's energy policy calls for greater use of natural gas (with a target of 12% of primary energy consumption by the year 2010) owing to its environmental and energy efficiency advantages over other fuels such as fuel oil, fuelwood, and coal. Introduction of natural gas will also permit industries to boost their competitiveness, particularly industries such as ceramics and glass manufacturers that make heavy use of wood.
- 1.11 Energy demand is concentrated in the central-south part of the country, while half of Brazil's proven gas reserves are on the coast. The most promising areas for new discoveries are in the Amazon, far away from potential consumers. Therefore the possibility of importing gas from Argentina and Bolivia is a natural alternative for the framers of Brazil's energy policy. Petrobrás began negotiations with companies in those countries, and in February 1993 it signed a contract with Yacimientos Petrolíferos Fiscales Bolivianos (YPFB) [Bolivian State Petroleum Corporation] to import 18 Mm³/day from 2006 to 2018, beginning with 9 Mm³/day in 1999 and rising gradually in subsequent years, with the option to increase its purchases by 6 Mm³/day to a maximum of 24 Mm³/day.
- 1.12 Imports of gas from Bolivia will provide a strong impetus for growth of the natural gas market in Brazil, laying the groundwork for subsequent growth in imports from Argentina and the development of Brazil's own reserves, in the context of growing integration of the region's energy markets.

E. Regulatory and institutional considerations

- 1.13 Recent amendments to the Brazilian constitution have eliminated the Petrobrás mandate for the development, transport, and importation of natural gas. These activities continue to be the responsibility of the federal government, but may now be delegated to private companies by concession or license. Gas distribution is to be provided by public or private companies under concessions granted by the state governments.
- 1.14 The federal government attaches high priority to reforms in the sector, and Congress passed Law 9478, the Hydrocarbons Act, on August 6, 1997 which will permit more competition and private sector participation in the oil and gas sectors. The act clearly separates the government's policy setting, regulatory, and business functions. The act also establishes the Conselho Nacional de Política Energética (CNPE) [National Energy Policy Council] and creates the Agência Nacional de Petróleo (ANP) [National Petroleum Agency] which is responsible for regulating and supervising all activities connected with oil, petroleum products, and natural gas. Apart from administering exploration and operating rights for oil and natural gas, the ANP will carry out other vital functions for the development of the hydrocarbons sector in an efficient and

competitive framework. They include ensuring free access to oil, petroleum-product, and gas transport installations. The ANP will be established as an independent agency, with its own budget and staffing system, under a board of directors named by the president with Senate approval, to ensure its autonomy.

- 1.15 Even prior to passage of the Hydrocarbons Act, a number of steps had been taken to deregulate the oil industry, and considerable headway has been made in liberalizing the distribution and sale of petroleum products by gradually freeing prices and removing subsidies. The act establishes a transition period of up to 36 months for full market deregulation and competitive pricing. After that time, fuel subsidies may only be maintained at the proposal of the CNPE and must be approved by Congress. When current ex-refinery prices are compared with reference prices (international prices plus import costs), the main distortions are the subsidy for liquefied petroleum gas (LPG) and overpricing of gasoline and, to a lesser extent, the diesel oil subsidy. In the case of fuel oil - the main competitor of natural gas - the current subsidy is an estimated 15%. To comply with the provisions of the act, during the transition period the government will apply the criteria established in the letter of undertaking presented to the Bank, which will be monitored by the Bank at contractually-established periodic meetings.
- 1.16 The new regulations will eliminate Petrobrás' monopoly over the exploration, production, refining, and foreign trade in hydrocarbons and will set rules for the development of an open and competitive market. However, until such time as the new regulations accompanying the act are issued, sector activities will continue to be carried out mainly through Petrobrás under existing regulations. Accordingly, until the legal reforms to permit greater private participation in the different phases of the natural gas industry come into effect, the government has decided to permit Petrobrás to associate with private companies to develop the project to import and transport Bolivian natural gas to the main urban centers in the south-southeast of Brazil in order to speed up the process of change in the energy matrix and expand the market for natural gas in that region.
- 1.17 To implement the new principles for organization and operation established in the act, which will affect the different activities in the oil and gas industries, the government will rely on a series of consulting studies to be funded by the World Bank and performed according to terms of reference that the Bank considers appropriate. The recommendations made in those studies will be used by the National Fuels Department of the Ministry of Mines and Energy to organize the ANP and to regulate activities in the natural gas sector.
- 1.18 In Bolivia, the government has promulgated a modern law governing the production, transport, and sale of hydrocarbons. The process

of capitalizing the YPFB was completed in December 1996. The YPFB was divided into two companies, one for exploration and production (E&P) and one for pipeline transport. An Argentinian group took charge of one of the E&P companies and a United States' group of the other, with the obligation of providing the YPFB with the volumes of gas contracted by it with Petrobrás. Under the law, the YPFB will aggregate gas production and will continue to answer to Petrobrás for delivery of the volumes contracted. It will also be the government agency responsible for managing the reserves and awarding operating concessions. The existing pipelines will be operated by Transportes de Hidrocarburos S.A. (TRANSREDES), which is owned by Enron and Shell, with participation by Bolivian pension funds, as is also the case with the E&Ps. The payments from the contracts will be kept in an escrow account to be invested by the companies themselves. The funds will be sufficient to: (i) develop and produce the natural gas required under the contract between the YPFB and Petrobrás; and (ii) upgrade the system as necessary to deliver gas to the pipeline at the Rio Grande intake.

F. Business organization for the project

- 1.19 The pipeline to carry gas from Bolivian wells to the main markets in Brazil will be built and operated by two ad hoc companies, one in Bolivia and one in Brazil. Petrobrás, through its subsidiary Petrobrás Fertilizantes S.A. (PETROFERTIL), has established the company Transportadora Brasileira Gasoduto Bolívia-Brasil (TBG). The company will include private minority shareholders from PETROFERTIL, British Gas (BG) of the United Kingdom, Tenneco Gas International (El Paso), and The Broken Hill Proprietary Company Ltd (BHP) of Australia, which have formed the consortium known as BG, BHP and El Paso (BTB). Private Brazilian companies and possibly the group behind the transport company in Bolivia will also be shareholders. The final plan calls for PETROFERTIL to hold 51% of the shares in the TBG, which allows it to arrange for loans from multilateral banks guaranteed by the Brazilian government.
- 1.20 On the Bolivian side, the company Gas Transboliviana S.A. (GTB) with majority private capital (98%) composed of Enron Development Corporation of the United States (Enron), Shell of the United Kingdom and the Netherlands, and TRANSREDES will build and operate the pipeline. The TBG will also participate. The general principle is that the partners in the transport company on the Brazilian side will hold minority shares in the Bolivian company, and vice versa.
- 1.21 To carry out this project on the Brazilian side, Petrobrás is establishing a new business model with its future partners, which incorporates the institutional reforms being implemented and is strongly based on private capital participation. This will be the first commercial venture with the private sector in activities under the gas monopoly in Brazil.

G. Current execution status

- 1.22 The contract between Petrobrás and the YPFB covers a 20-year supply of virtually dry gas, since the liquids will be extracted at natural gas processing units in the Santa Cruz area prior to delivery to the pipeline (see paragraph 1.11).
- 1.23 To back the contract, Petrobrás has already signed contracts with state distribution companies starting with 4 Mm³/day in 1999 and rising to 14.25 Mm³/day in 2007. These amounts include allocations for gas-fired thermal electric power stations. The supply contract with CONGAS and the transport contract with the GTB include heavy fines to be paid by Petrobrás if the pipeline is not operational by December 1998.
- 1.24 To enable the pipeline to Campinas to begin operating on the agreed date, all the pipes and compressors have already been purchased and preliminary construction from Rio Grande in Bolivia to Guararema in Brazil began in the dry season in 1997 (April to September). This was necessary since the pipeline crosses several rivers and areas that are very wet during the rainy season, such as the swampland in Mato Grosso do Sul and the access roads to the pipeline construction sites on the Bolivian side. Productivity would have been lost if the works had not begun at that time, since the pace of work drops off sharply during the rainy season from October to March.
- 1.25 For these reasons, the bid process began in early 1997 when the general procurement notices were published for construction and assembly of the pipeline in the Bolivian section and in the Brazilian section between Corumbá and Guararema were published.
- 1.26 A call for prequalification of companies for the southern section was also announced in *Development Business* and, with the approval of the World Bank, the bids were opened in December 1997, with the contract award expected by March 1998.
- 1.27 With respect to financing, loans have already been granted for the pipes and compressors for the two countries by export credit agencies. Petrobrás is financing all construction on the Bolivian side. The Banco Nacional de Desenvolvimento Econômico e Social (BNDES) [National Economic and Social Development Bank] of Brazil and the Andean Development Corporation (for Brazil and Bolivia) also approved loans. Only the loans from the IDB, the European Investment Bank (EIB), and the World Bank need to be concluded to complete the financial picture. Therefore about 28% of the funding needed to build the entire pipeline remains to be finalized, precisely the amount these banks will finance. The EIB plans to approve its loan in December 1997 and the World Bank by January 1998 at the latest.

H. Bolivian gas reserves

- 1.28 Bolivian gas reserves at the start of 1996, recently confirmed by an independent international auditor, were some 181,500 Mm³, divided into 52% proven reserves, 28% probable reserves, and 20% possible reserves. The proven reserves are sufficient to provide enough natural gas to make the pipeline economically feasible and to enable the YPFB to meet its sales commitments to Petrobrás so that the latter can honor the contracts it has already signed with distribution companies.

I. Cost of transport and supply

- 1.29 The purchase price of gas under the Brazilian agreement with Bolivia is based on a nominal value of US\$0.95/MBTU which will vary over the life of the contract up to US\$1.06/MBTU. The base price is adjustable by applying indexes for price variations in a basket of three types of fuel oil.
- 1.30 The cost of transport for the pipeline companies on the Brazilian and Bolivian sides will include a charge for initial capacity of US\$1.53/MBTU (adjustable annually) and a charge for variable operating costs.
- 1.31 To establish an initial market for gas, the government decided that the price of natural gas for distribution concession holders for volumes up to 18 Mm³/day will be the same at any city gate. This price, which is about US\$2.70/MBTU, is competitive with alternative fuels and will cover the cost of the gas and the transport charges that Petrobrás must pay to the TBG, while guaranteeing an adequate return for the shareholders.

J. Experience of the Bank and other multilateral institutions

- 1.32 In the past, Bank financing for the energy sector in Brazil has focused on electricity, including projects for hydroelectric stations, transmission lines, distribution works, and rural electrification.
- 1.33 The World Bank has made loans to the electricity and oil and gas sectors and is currently financing expansion of the COMGAS system. It has also extended a loan to Petrobrás for a hydrocarbons transport project for US\$260 million. The World Bank will also finance part of the gas pipeline and the two Banks are cooperating closely in preparing the operation.
- 1.34 The Andean Development Corporation (CAF) has not worked with the energy sector in Brazil, although it is currently arranging a loan for electric interconnection with Venezuela. With the recent entry of Brazil as a member of the Corporation, it can be expected that the CAF will finance a growing number of projects. CAF approved its loan for the present operation on July 22, 1997.

- 1.35 The EIB will also be making its first loan to the Brazilian gas sector.

K. Government program and rationale for Bank participation

- 1.36 The main objectives of the Brazilian government's macroeconomic policy are to expand the market economy, redefine the role of the State, reform the public administration, bring down inflation, and reactivate socioeconomic development. Consistent with these objectives, it has established a new approach for the energy sector, which defines the field of action and responsibilities for the different levels of federal and state governments and seeks more active private sector participation in the expansion, management, and maintenance of energy infrastructure. The government's intention is to improve the reliability and quality of services and reduce the so-called Brazil cost by lowering the cost of supplying fuel, while protecting the environment.
- 1.37 The Brazilian government is introducing reforms to increase private participation in the energy sector. As this participation is developing and consolidating, the Bank should provide the necessary support, including financing, to facilitate the process. This project is one example, since it fits in with the government's new energy policy for eliminating monopolies and opening up the sector to private investors and operators. Development of the natural gas market, which will begin with this project, will also provide concrete opportunities for greater participation by private capital in new investment projects and in sector operation, as well as in other activities such as distribution and services.
- 1.38 The Bank's lending strategy for Brazil for 1996-1998, as described in the country paper of February 1996, is fully consistent with the objectives of the Eighth Replenishment, the government's aim to systematically eliminate the causes of chronic inflation, and the need to promote modernization of the economy.
- 1.39 The chief elements in the Bank's lending strategy call for providing support directly and through joint endeavors in the following areas:
- a. Modernization of the State. Priority is given to enhanced planning and management capacity, public sector reform, and fiscal reform. The proposed project contributes to this objective by including the private sector in the construction, operation, and maintenance of infrastructure that will lead to a dramatic change in Brazil's energy matrix.
 - b. Productive infrastructure. Support is provided for opening up the economy, regional integration, and a reduction in the Brazil cost by making priority investments in the transportation and energy sectors. The project contributes significantly to gas integration between the countries of the

Southern Cone, and more than just an initiative for Brazil, it is regional in scope since it allows for intensive use of Bolivia's main energy resource and provides a new solution for that country's trade balance problems with Brazil. It is also a concrete step toward opening up a large export market for Argentina over the medium term for its surplus gas reserves. The project also helps to reduce the Brazil cost by supplying a fuel that will boost efficiency and reduce industrial costs in the cities involved, which are the country's main production centers.

- c. Social sectors, basic sanitation, and the environment. The pertinent aspects of the project will be a reduction in air pollution through the use of a cleaner fuel, which will mitigate critical environmental problems in areas such as the city of São Paulo.
- 1.40 The project is also consistent with national priorities to the year 1998, as confirmed in August 1996 by the federal government in a target plan and in agreements with the Bank.
 - 1.41 In general, the Bank's presence in the project allows it to:
 - (i) act as a catalyst in making a complex transnational project bankable even for other financial institutions, under a timetable that is compatible with the termination of Bolivian exports of natural gas to Argentina;
 - (ii) support Bolivia's export sector by spurring gas exploration and production through the creation of a market in Brazil;
 - (iii) support the short-term development of a gas market in the south, southeast and central-east of Brazil, providing the energy sector with a new alternative source to meet growing energy demand;
 - (iv) support the development of trade between the two countries through energy integration, creating a longer-term subregional market for gas;
 - (v) improve environmental conditions in Brazil by replacing dirtier fuels in urban areas and avoiding the use of biomass in some industries, thus easing pressure on forests;
 - and (vi) bring about regional environmental benefits which the Bank and the countries can achieve through this project.
 - 1.42 In addition to the Bank's presence in this project, the Brazilian government will also be involved. The request for a loan backed by the government's guarantee, through the Bank's traditional window, will permit interaction between the Bank and the government to add an essential component to the project (in addition to the six points mentioned above) which would undoubtedly not be present if the project were exclusively private, i.e. the cooperation that the IDB and the World Bank can provide for consolidating energy sector reform in the country. In this context, the Bank's presence will ensure that the basic conditions of its public utilities policy are met.

- 1.43 Last, because of its nature, the project requires long-term financing that will optimize debt service, offering levels of coverage that are compatible with projected income. The catalytic presence of the IDB and the World Bank as lenders of part of the project amount will have an impact on achieving the effect in question.

II. THE PROJECT

A. Objectives

- 2.1 The general objective of the project is to contribute to regional energy integration, facilitating expansion of the natural gas industry and market by connecting Bolivian gas reserves with the market in central and southern Brazil. In Brazil, the introduction of Bolivian natural gas will accelerate a positive change in the energy matrix through more extensive use of a fuel that is preferable from the environmental standpoint and whose efficiency is more compatible with the country's industrial development. Opening up the Brazilian market on a much larger scale will allow Bolivia to fully develop its natural gas reserves.
- 2.2 The specific objectives are, in Brazil's case, to cover part of the growing demand for energy by offering consumers in some cities in the economic hub of the country the option of using natural gas. In Bolivia's case, a new export market will be opened up for increased gas production and growth in the industry, with a positive impact on the country's economy and trade balance. In both countries, the project will make a positive contribution to progress on and consolidation of economic and institutional reforms in the energy sector, which will provide concrete opportunities for greater private participation.

B. Goals

- 2.3 The project will make it possible to increase natural gas consumption in Brazil, raising its share in the primary energy market from 2% in 1995 to 12% in 2010. Total sulfur oxides and particle emissions will be reduced by 20% and 40%, respectively, in the metropolitan region of São Paulo by 2006 (see logical framework, Annex II-1).
- 2.4 The goals presented below will be achieved as the different project components come on stream:
 - a. The pipeline will carry 9 Mm³/day in 1999, rising to 18 Mm³/day in 2006.
 - b. Exports of Bolivian gas will rise from 6 Mm³/day in 1996 to at least 18 Mm³/day in 2006.

C. Project description

- 2.5 Although the Bank will be involved only in financing construction of the Brazilian section of the pipeline, this work, in technical, economic, and socioenvironmental terms, should be approached as an integrated project that includes production in Bolivia, the

pipeline, and delivery of gas to city gates in Brazilian cities, from where it will be distributed to end users.

- 2.6 The pipeline, which will be 32" in diameter in the initial section, decreasing to 16" in the final section, will be built from the city of Rio Grande in Bolivia to the city of Porto Alegre in Rio Grande do Sul, passing close to the Brazilian cities of Corumbá, Campo Grande, Araraquara, Campinas, Curitiba, Florianópolis, and Porto Alegre. Between Campinas and Guararima the new pipeline will interconnect with the existing pipeline that links Rio de Janeiro, Belo Horizonte, and São Paulo. The total length of the pipeline is about 3,146 km, with 557 km in Bolivia and 2,589 in Brazil. The Brazilian part is divided into the northern section between Corumbá and Campinas (1,256 km) to be financed by the IDB/CAF, and the southern section between Campinas and Porto Alegre (1,180 km) financed by the WB/EIB, plus the interconnection (153 km) financed by CAF. It will supply gas to a total of 37 city gates in Brazil (12 in the northern section, 23 in the south, and 2 in the interconnection).
- 2.7 The pipeline has been designed for a final carrying capacity of 30 million m³/day, which can be achieved in various stages by adding compressor stations. However, the basic budget refers only to maximum capacity between 18 and 24 million m³/day in terms of pumping stations, since these are the most likely capacities to be required over the medium term.

D. Costs

- 2.8 The total cost of the pipeline is an estimated US\$2,149.5 million, with the Bolivian section costing US\$450 million and the Brazilian section US\$1,699.5 million, for which financing has been requested from the IDB, CAF, the EIB, and the WB.
- 2.9 The Bolivian section will be financed with direct loans of US\$130 million from Petrobrás for works; export credit agencies (ECAs) such as Eximbank of Japan and the Marubeni Corporation of Japan will provide US\$160 million for pipes and pumping stations; US\$80 million will be financed by CAF to enable Petrobrás to purchase transport capacity options; and the partners will put up share capital of US\$80 million.

1. Cost of the Brazilian section

- 2.10 The cost of the Brazilian section, broken down by investment category and source of financing in the following table, is an estimated US\$1,060,440,000 equivalent for the northern section (Corumbá-Campinas), US\$573,240,000 for the southern section (Campinas-Porto Alegre) and US\$65,850,000 for the interconnection, for a total of US\$1,699,540,000.

Table II-1 PROJECT COST (US\$ thousands)							
Description	IDB	Counterpart				Total	%
		Partners	ECAs	WB	CAF/EIB		
1. SUPERVISION AND ENGINEERING	0	25,760	0	29,820	1,360	56,940	3.4
1.1 Construction supervision	0	23,000	0	27,000	1,360	51,360	3.0
1.2 Environmental supervision	0	2,520	0	0	0	2,520	0.2
1.3 Design and studies	0	240	0	2,820	0	3,060	0.2
2. DIRECT COSTS	237,600	342,970	332,010	193,050	136,920	1,242,550	73.1
2.1 Pipes	0	223,570	261,670	0	0	485,240	28.6
2.2 Compressors/meters	0	57,290	47,950	39,050	3,030	147,320	8.7
2.3 SCADA system	4,580	850	0	0	0	5,430	0.3
2.4 Construction/assembly (Section 3)	0	10,000	0	0	73,530	83,530	4.9
2.5 Construction/assembly (Sections 4-7)	218,020	17,260	0	10,000	0	245,280	14.4
2.6 Construction/assembly (Sections 9-13)	0	30,000	0	130,000	60,000	220,000	12.9
2.7 Valves/storage/river crossings	15,000	4,000	22,390	14,000	360	55,750	3.3
3. CONCURRENT COSTS	0	32,220	0	23,000	0	55,220	3.3
3.1 Rights-of-way	0	30,000	0	0	0	30,000	1.8
3.2 Environment	0	2,220	0	23,000	0	25,220	1.5
4. CONTINGENT COSTS	0	116,340	0	0	0	116,340	6.8
4.1 Contingencies	0	86,270	0	0	0	86,270	5.1
4.2 Escalation	0	30,070	0	0	0	30,070	1.8
5. FINANCIAL COSTS	2,400	151,570	4,440	64,130	5,950	228,490	13.4
5.1 Interest	0	136,160	4,400	0	5,310	145,870	8.6
5.2 Credit fee	0	15,410	40	0	640	16,090	1.0
5.3 Other financial costs	0	0	0	64,130	0	64,130	3.8
5.4 Inspection and supervision	2,400	0	0	0	0	2,400	0.1
6. GRAND TOTAL	240,000	668,860	336,450	310,000	144,230	1,699,540	100.0
7. Percentages	14	39	20	18	8	100	

2. Cost components

a. Supervision and engineering (US\$56,940,000)

- 2.11 The subcategory construction supervision (US\$51,360,000) includes the funds required for supervision and technical control of the project works, which will be performed essentially by Petrobrás, with occasional support from specialized consultants for field services. This category also includes administrative costs relating to Petrobrás/PETROFERTIL personnel, as agreed upon by the TBG partners, for project execution during the construction stage. This cost represents 4.1% of the direct construction costs and is considered adequate.
- 2.12 The subcategory environmental supervision (US\$2,520,000) includes contracting specialized consulting services for field supervision of the environmental works, which will also be monitored by Petrobrás and El Paso Energy.
- 2.13 The subcategory design and studies (US\$3,060,000) includes the cost of completing the basic and execution designs for all the project works and some minor studies yet to be performed.

b. Direct costs (US\$1,242,550,000)

- 2.14 This category covers the direct cost of purchasing pipes, pumping, communications and metering equipment, civil construction, and assembly of the works. It has been calculated on the basis of the quantities of work provided for in the engineering designs, applying international unit prices adapted to the Brazilian situation, estimated on the basis of the experiences of the partners in the pipeline and the results of bidding processes already held. Of that sum, US\$781,220,000 will be invested in the northern section (Corumbá-Campinas), US\$412,430,000 in the southern section (Campinas-Porto Alegre), and US\$48,900,000 in the interconnection.

c. Concurrent costs (US\$55,220,000)

(i) Rights-of-way (US\$30,000,000)

- 2.15 To cover these costs, US\$12,710,000 will be spent on the northern section and US\$17,290,000 on the southern section. The interconnection will be made on land already belonging to Petrobrás and therefore no rights-of-way need be acquired in that section.

(ii) Environment (US\$25,220,000)

- 2.16 This sum will cover the costs of implementing environmental protection measures (mitigation and compensation), as agreed with the environmental agencies, including: (i) media communications (US\$400,000); (ii) interference with mining activities (US\$120,000); (iii) conservation of the archeological heritage (US\$860,000);

(iv) environmental measures in the works (US\$2,440,000); (v) restoring plant cover (US\$2,830,000); (vi) health and safety measures for the works (US\$3,220,000); (vii) socioeconomic compensation for municipalities (US\$1,000,000); (viii) community support (US\$2,000,000); (ix) ecological compensation (US\$7,500,000); (x) inspection of environmental measures (US\$1,680,000); (xi) indigenous community development (US\$1,000,000); (xii) training (US\$300,000); and (xiii) environmental risk management during construction (US\$1,870,000). These amounts do not include some of the costs of mitigation measures which form part of the direct cost of the civil works or the costs of environmental supervision which are included in the items discussed in paragraphs 2.11 and 2.12. Of this total, US\$16,470,000 will go for the northern section and US\$8,750,000 for the southern section. There will be no costs of this kind for the interconnection, which will be built alongside an existing pipeline.

d. Contingent costs (US\$116,340,000)

- 2.17 These costs, divided into US\$70,370,000 for the northern section, US\$40,770,000 for the southern section, and US\$5,200,00 for the interconnection, include: (i) price escalation during construction from the date on which the basic budgets were prepared to completion of the works (US\$30,070,000); and (ii) contingencies in the designs of the works and in the equipment manufacturing and construction markets (US\$86,270,000).
- 2.18 External and internal inflation indicators and the exchange rates projected by the Bank for the coming years have been used in calculating price escalation. Contingencies have been calculated as 10% of the sum of supervision and engineering costs, direct costs (except those already contracted) and estimated concurrent costs for the works, plus 5% of the direct costs already contracted.

e. Financial costs (US\$228,490,000)

- 2.19 This category, with US\$138,550,000 for the northern section, US\$79,550,000 for the southern section, and US\$10,390,000 for the interconnection, includes: (i) interest during construction on the Bank loan (US\$22,830,000); (ii) the credit fee (US\$2,720,000); (iii) Bank inspection and supervision (US\$2,400,000); (iv) US\$123,040,000 interest on loans from the other financial entities involved in the project; (v) US\$13,370,000 for the credit fees for those entities (includes prepayment on the financing amount charged by the multilateral lending agencies and the ECAs and interest on unused loan balances); and (vi) US\$64,130,000 in miscellaneous financial costs incurred by the credit institutions (legal and financial consulting services, business costs, certification of reserves, etc., and the reserve for future debt service).

E. Financing

1. Bank funds

- 2.20 The TBG asked the Bank and CAF to finance the civil works and assembly in the northern section and the interconnection, and the World Bank and the EIB to finance the same work in the southern section. The Bank will contribute US\$240 million in foreign exchange from the ordinary capital, or approximately 14.1% of the total project cost.
- 2.21 Bank funds will cover 88.9% of the direct construction costs of the four lots between Miranda and Campinas, 84.3% of the costs of supervisory control and data acquisition system (SCADA), the full cost of the works at river crossings in the northern section, and the cost of inspection and supervision.

2. Counterpart funding

- 2.22 The counterpart funds of US\$1,459,540,000 equivalent represents 85.9% of the total project cost and will be covered by: (i) a World Bank loan for US\$130 million, equivalent to 8.9% of the counterpart, to finance in part direct construction and assembly costs in the southern section; (ii) partial guarantees by the World Bank for a bond issue of US\$180 million corresponding to 12.3% of the local contribution to finance part of supervision of the works, design and studies, procurement and assembly of compressors, works on the northern and southern sections, environmental activities and financial costs; (iii) a CAF loan of US\$84,230,000 for 5.8% of the local contribution to finance in part civil works and assembly in the northern section and the interconnection, construction supervision, procurement of compressors, valves, and metering stations, interest, and credit fees; (iv) European Investment Bank financing of US\$60 million to cover in part works in the southern section; (v) US\$336,450,000 in onlending by Petrobrás/PETROFERTIL from the BNDES, Eximbank and Marubeni of Japan to purchase pipes, valves, and compressors; (vi) capital resources (US\$309,570,000) including junior debt; (vii) advance purchase of transport capacity option by Petrobrás (US\$302 million); and (viii) funds generated by the TBG during operation of the pipeline (US\$57,290,000).
- 2.23 This counterpart contribution will finance 15.7% of the SCADA system, 11.1% of works on the northern section, and all of the remaining supervision and engineering, as well as direct, concurrent, contingent, and financial costs of the project.

III. PROJECT EXECUTION

A. Executing agency

- 3.1 The proprietor of the Brazilian section of the pipeline and project executing agency will be the TBG. The TBG has delegated Petrobrás to take charge of project management, procurement, and construction. It is contracting private companies for the supply and transport of pipes and equipment and hiring contractors for assembly and civil works. Petrobrás will also be responsible for supervising the contractors and the consulting firm hired to perform environmental supervision. A coordination committee composed of representatives of all the TBG's partners will be in charge of project management.
- 3.2 Petrobrás has also been delegated responsibility by the YPFB to take charge of construction of the Bolivian section of the pipeline, which will be built at the same time as the Brazilian section between Corumbá and Guararema. A turnkey contract has been signed containing heavy penalties for Petrobrás for delays in meeting the operating deadline. This will ensure the coordination that is indispensable for works of this kind and minimizes the risks of delays and increases in costs. Petrobrás is contracting private companies to perform the works, while retaining supervisory and management responsibilities. In view of the Bank's role in the project, Petrobrás has undertaken to provide it with bimonthly information on progress in the works and environmental measures on the Bolivian side through the TBG, which will be reflected in the loan contract.

B. Engineering designs and construction plans

- 3.3 The project is well advanced, since all the conceptual and basic designs are ready for the entire pipeline for use in preparing the bid documents.
- 3.4 The design for executing the civil works and assembly (soldering, logistics, etc.) forms part of the proposals to be submitted by bidders, and Petrobrás has formulated very precise terms of reference for those works which have been examined by the Bank and found to be satisfactory. Petrobrás and the partners in the TBG prefer this solution, since it places responsibility for execution in the hands of the contractor.
- 3.5 The environmental studies already conducted have made it possible to establish the measures to be adopted directly by the executing agency during construction, guide contractors on how to proceed, and the proprietor on how to operate the installations in future.

- 3.6 All the documents needed to execute the project are ready including technical studies, conceptual engineering designs, construction plans for the pipeline, environmental specifications, and general and specific construction techniques. Topographical, hydrological, geological, geotechnical, environmental, and other studies were conducted in order to prepare the documents.

C. Rights-of-way

- 3.7 Although the pipeline will be completely underground, its layout was determined on the basis of both technical conditions and environmental protection requirements. Rights-of-way through private property will be obtained for most of the area rather than purchasing land. In Brazil the system for acquiring land and obtaining rights-of-way for public works permits the agency in charge to take immediate possession of the land, even if arrangements for expropriation or the negotiation of rights have not been completed.
- 3.8 Preference will be given to negotiating rights-of-way with owners, although an expropriation decree can be used to gain access to the strip of land required for construction. The land for pumping stations and city gates will be purchased rather than expropriated whenever possible.
- 3.9 Petrobrás already owns rights-of-way for the interconnection between the Bolivia-Brazil pipeline and the existing pipeline between São Paulo, Rio de Janeiro, and Belo Horizonte. The company concluded negotiating rights-of-way in the northern section at the end of July 1997. It will complete the process for the southern section by the end of March 1998. All the rights-of-way and land purchases are being registered with the pertinent government agencies.
- 3.10 The project does not require the resettlement of families, since the occupants of the land to be expropriated are its legal owners and will be compensated under the legislation governing expropriation for public purposes. Petrobrás' purchase conditions comply with the requisites of the Bank's policy on involuntary resettlement.

D. Environmental and social impact

- 3.11 Although the Bank is only financing part of the construction in Brazil, the environmental evaluation was performed for the project as a whole, without taking national borders into account. The process included preparation of environmental impact assessments (EIA/RIMA) and the respective basic environmental projects, setting forth compensation and mitigation programs. An indigenous peoples development plan was drawn up for the Bolivian section of the project, and one is being prepared for the Brazilian section, in order to deal with issues affecting these communities.

- 3.12 Lastly, a strategic environmental evaluation was performed of the project as a whole, which looked at high priority issues that are beyond the scope of a simple EIA, such as: (i) synergy of the gas pipeline with other large projects in the region (Paraguay/Paraná waterway, reconstruction and paving of the Pailón-San José highway, etc.); (ii) the potential impact on air quality resulting from construction of new thermoelectric plants; and (iii) the environmental impact of exploring for new gas fields in Bolivia to attain the pipeline's full capacity. This evaluation was the first of its kind for energy projects in Bolivia and Brazil. The evaluation recommended that an environmental management plan be prepared for new gas developments. The total cost of preparing the plan is US\$400,000 which, since it does not form part of the project cost, will be financed with funds from Bank loans to Bolivia currently in execution.
- 3.13 The studies were presented to the competent authorities in the two countries and to the general public at public hearings held at different sites along the route of the pipeline. Announcements were placed in leading newspapers in both countries during the week of June 23 to 27, 1997, informing that the environmental studies were available. Since August 1, 1997, they have been accessible on the Internet and were available for public consultation at the Bank's Country Offices in Brasília and La Paz. The Banks also sponsored a public seminar in Campo Grande (Brazil) and Santa Cruz de la Sierra (Bolivia) and some 80 NGOs from around the world were invited to attend. To facilitate participation by local NGOs, the executing agencies paid the travel and accommodation costs of representatives from 10 NGOs in each country, selected by civil society.
- 3.14 Construction of the works will not have a direct impact on indigenous communities or require population resettlement, since all the communities lie at a considerable distance from the route. However an indigenous peoples development plan (IPDP) (social compensation plan) has been prepared. In Bolivia the IPDP includes funds for indigenous land titling, water supply systems, electric power generators, mobile health posts with physicians and vehicles, training for youths, assistance in establishing small companies, and infrastructure services. The largest is the land titling program with a total cost of US\$1.5 million. In Brazil, the IPDP includes support for infrastructure that is being negotiated with indigenous communities. Completion of the IPDP on the Brazilian side in accordance with the terms of reference agreed upon with the Bank is a condition precedent to the first disbursement of the loan.
- 3.15 The environmental impact studies call for a series of 23 mitigation and socioeconomic compensation programs at a cost of some US\$35.8 million for the two countries, with US\$27.7 million to be spent on the Brazilian side. The Bank's environmental report was presented to the CESI and approved on October 29, 1997, and the

committee's recommendations have been included in this loan proposal. The executing agencies have already obtained the environmental permits necessary to construct the entire Bolivian section of the project and the part in Brazil to be financed by the Bank.

- 3.16 The environmental measures for the Bolivian section of the pipeline include: (i) support for indigenous development (IPDP for US\$3,716,000) which incorporates management of the Gran Chaco park; (ii) environmental supervision of the works (US\$911,000); (iii) environmental management of the works (health and construction risk management for US\$1,730,000); (iv) support for non-indigenous communities (US\$890,000); (v) ecotourism study fund (US\$96,000); (vi) restoring plant cover along the line (US\$276,000); (vii) a biodiversity study (US\$110,000); (viii) an archeological restoration program (US\$32,000); (ix) a communications and public education program (US\$95,000); and (x) the environmental manager and independent auditor (US\$204,000). These costs (US\$8,060,000) are not included in the amounts presented in paragraph 2.16.
- 3.17 During construction, the contractors will be responsible for implementing and maintaining measures to prevent accidents and releases of hazardous products, and for preparing a preliminary risk analysis (PRA), risk management plans (RMPs), and emergency action plans (EAPs) to deal with potential accidents. Start of construction on each section will be authorized by Petrobrás only after the PRA, RMPs, and EAPs have been presented by the contractor.
- 3.18 Petrobrás will be responsible, with the consent of the TBG and the YPFB, for implementing all the environmental measures during construction (paragraphs 2.16 and 3.16) and a commitment from the TBG that Petrobrás will implement the measures in both countries will be a contractual condition. The Petrobrás commitment was set forth in the letter of undertaking presented to the Bank by that company during loan negotiations.
- 3.19 To ensure adequate implementation of the mitigation and compensatory measures in both countries, an environmental management structure has been designed for the project, with the following components: (i) contracting a specialized consulting firm to supervise the environmental aspects of the works and ensure that all the socioeconomic and ecological compensation programs are implemented, which will report to the TBG on progress in the work at least once every two months; (ii) contracting a full-time independent environmental auditor, who will audit the supervision reports and report, directly to the Banks. This operating structure is to be maintained throughout the project as a contractual condition. The consulting company has already been contracted with counterpart funds and has begun its field work. The environmental auditor will be hired at the end of 1997, and

presentation of his first report demonstrating to the Bank's satisfaction that the environmental management structure has been established and that the work is being performed adequately in Bolivia and Brazil will be a condition precedent to the first disbursement of the loan.

- 3.20 Every two months during the project, the TBG will present an environmental report to the Bank on progress in the works, indicating the status of compliance with environmental measures and programs in Bolivia and Brazil, including the report prepared by the environmental supervision consulting firm, duly reviewed by the independent environmental auditor (see paragraph 3.19).
- 3.21 Within six months after the loan contract is signed, the TBG (or Petrobrás if necessary) will reach formal agreements with the Brazilian Environmental Authority (IBAMA) and the state environment departments to implement the ecological compensation programs (paragraph 2.16) as per Resolution 02/96 of the National Environment Committee (CONAMA).
- 3.22 The government will include in the license to operate and maintain the pipeline, and the Bank will include in the loan contract, the obligation of the TBG to implement the environmental control measures agreed upon to obtain the environmental permits (paragraph 2.16) either directly or through the operating company.
- 3.23 Petrobrás, which has been delegated by the TBG to build this project through its Engineering Service (SEGEN), will contract a training program in environmental management, environmental impact assessments of oil projects, project preparation and analysis, and environmental supervision and auditing. Petrobrás is completing arrangements to obtain certification under ISO series 14000 standards. Since this is a large company, with dozens of subsidiaries and related companies, certification is being carried out in stages. Certification of SEGEN, which apart from the pipeline is also responsible for the planning and implementation of new projects, began in 1996 and is to be completed by the end of 1999; a specialized company has been contracted for this purpose. An environmental manual and procedures for the environmental management system have already been prepared. A computerized environmental management system has already been established and audited by an independent agency under ISO 14001 standards. Petrobrás has promised, in a letter of undertaking presented to the Bank, to demonstrate six months after the contract is signed that the Petrobrás training program has been contracted, and to report on progress on the ISO series 1400 certification.
- 3.24 The risk analysis study for the operating stage indicated (based on data for similar projects) that international standards have been applied in all project stages. The individual risk was calculated as 10^{-7} fatalities a year, which is very low. The final

contingency plan for the operating stage should be completed prior to the start of the pre-operating tests.

E. Execution procedures

- 3.25 Bidding for all services, equipment, civil works, and assembly for the pipeline will be carried out in accordance with procedures agreed upon with the IDB, applying the stipulations of annexes B and C of the loan contract for items financed by the Bank. International public bidding is compulsory for consulting services over US\$200,000, goods and services over US\$350,000, and works over US\$5 million, since foreign companies have not bid on lesser amounts in similar projects. Local legislation will be followed for procurements using Bank funds below those amounts. Procurements using counterpart funds will be based on local legislation or the procedures of the pertinent lending agency.
- 3.26 Bidding is taking place for supplies of pipes and the SCADA system for the entire pipeline. The project has divided the pipeline into three sections for bids and contracts for civil works and assembly. The first is in Bolivia and is not financed by the Bank; the second is between Corumbá and Guararema for 1,419 km in six lots; and the third is in five lots for 1,180 km between Campinas and Porto Alegre. The latter will be financed by the World Bank. Bids for compressors, metering stations, valves, and storage will be called as necessary. Annex III-1 gives a list and estimated cost of these bids.
- 3.27 All these procurements will be put to international tender with no restrictions on participation by companies from the Bank's member countries. Bids have already been called for the northern section in accordance with Bank procedures. The Bank approved the bid documents. In this particular case, the documents allowed firms to bid on one or more lots, and the bidders are required to furnish bid bonds and performance bonds for each of the lots.
- 3.28 To speed up construction and increase the number of bidders, the bid documents permitted construction companies to bid on up to three lots simultaneously. The contracts were awarded to the lowest responsive bidder for the series of lots. The procedure also made it possible for large and medium-sized local and foreign companies to compete. To obtain two or more lots, companies were required to prove (with evidence and performance bonds for the lots) that they had sufficient personnel, equipment, and funds to construct the sections simultaneously and on schedule.
- 3.29 Bidders on civil works and assembly in the northern section were prequalified based on their technical proposals and other documents demonstrating their economic, financial, and business suitability. Bidders submitted this information in envelopes opened on the day they were delivered. A second envelope containing prices was opened for bids that met the preselection criteria.

- 3.30 The bidding for the SCADA system took place without prequalification, with a two-stage bid process, the first referring to price. The technical proposal with the lowest price will be evaluated and selected if acceptable. The bids were submitted for the entire pipeline, but will be awarded in two contracts, one for each country.
- 3.31 It should be kept in mind that member countries of the IDB who are also members of the World Bank can bid on civil works and assembly in the southern section being financed by the World Bank, which include services similar to those in the northern section.
- 3.32 The terms of reference for supervision of the project's environmental works were discussed and agreed upon with Petrobrás, PETROFERTIL, and their future partners and were considered adequate by the Bank. The environmental supervision company was contracted under international bidding and began work on site at the same time as the contractors.

F. Execution schedule

- 3.33 Construction of the Bolivian section, the northern section in Brazil, and the interconnection will take about 17 months, even under a tight schedule (two months to complete mobilization of the contractor and 15 months for works). To operate the pipeline to Campinas by December 1998, construction on these sections was begun in the dry season in 1997.
- 3.34 The bidding process for construction of the pipeline in Bolivia and the Brazilian section between Corumbá and Guararema began in early 1997. The technical proposals were opened on April 30, 1997 and the price proposals on June 3. The winning bidders were announced in the following month and the contracts were signed at the end of July, to enable the contractors to mobilize in early August. Bidding has also begun for the southern section and the contracts are expected to be signed in March 1998.
- 3.35 The bid process for the other procurements (compressors, metering stations, etc.) and the contracts for the northern section will be completed in 1997. Annex III-1 presents the bid program for all the components in the different sections, including both north and south.
- 3.36 The main execution period will require 36 months counting from the beginning of 1997. The northern section and the interconnection to Guararema, close to São Paulo, will be ready by the end of 1998 and the southern section to Porto Alegre by December 1999. However, additional compressors will be installed, even after the year 2000, when the pipeline is already in operation. The target dates are compatible with the types and volumes of project works, the construction procedures to be used, the institutional capacity of

the executing agency, and the ability of the different partners to make their respective financial contributions.

G. Advance bidding and contracting of works and services

- 3.37 The timetable for bids and contracts takes account of the different operating modalities and interests of the lending agencies and the project executing agency, as well as the restrictions imposed by physical construction conditions and the time required to manufacture equipment and carry out the works. The timetable is compatible with the contractual conditions agreed upon by Petrobrás with the YPFB, the transporters on the Bolivian and Brazilian sides, and the gas distribution companies, and with the timetables of the lending institutions for processing the loans.
- 3.38 Thus far, contracts for supplying all piping for Brazil and Bolivia have been awarded. The winning bidder was a consortium of Japanese, Argentine, United States, Italian, German, Austrian and Brazilian (CONFAB and EBSE) steel and pipe manufacturers. The costs of these contracts will be recognized from the counterpart contribution, since they were made in accordance with Bank rules and within the allowable 18-month period.
- 3.39 Petrobrás has also contracted all the lots for the section to be partly financed by the Bank to enable it to keep to the schedule and avoid financial losses to itself and to the YPFB. The winning bidders were two consortiums, one of Brazilian and United States companies that will build three lots, and one involving Brazilian, Argentine, and Italian companies that will build two lots. The lot for the interconnection was contracted with a Brazilian company.
- 3.40 The above-mentioned contracts comply with Bank requirements for retroactive financing, since they followed Bank procedures and were concluded within the allowable 12-month period.

H. Investment schedule

- 3.41 The following investment schedule is based on Annex III-1 and the physical timetable for the works:

Table III-1 Investment schedule (US\$ millions)										
Source	1997		1998		1999		After 1999		Total	
IDB	30.0	8.2	203.2	23.6	6.8	1.6	0.0	0.0	240.0	14.1
Partners	185.9	50.8	250.8	29.2	188.0	43.7	44.2	100.0	668.9	39.4
World Bank	0.0	0.0	176.0	20.5	134.0	31.2	0.0	0.0	310.0	18.2
ECAs	139.8	38.2	137.5	16.0	59.1	13.7	0.0	0.0	336.4	19.8
EIB	0.0	0.0	18.0	2.1	42.0	9.8	0.0	0.0	60.0	3.5
CAF	10.5	2.9	73.7	8.6	0.0	0.0	0.0	0.0	84.2	5.0
Total	366.2	21.5	859.2	50.6	429.9	25.3	44.2	2.6	1,669.5	100.0

I. Recognition of prior expenses

- 3.42 To keep the works on schedule, it will be necessary to invest about 21% of the total cost during 1997. Since the loan will be presented to the Board of Executive Directors at the end of the year, the costs incurred prior to approval will be recognized. Costs recognized from the local contribution will be a maximum of US\$336.2 million, including those incurred since January 2, 1997, for project engineering, environmental measures that cannot be postponed until after the loan is approved, purchase of land, mobilization of contractors and performance of initial works, and payments for equipment and pipes (paragraphs 3.38 and 3.39).
- 3.43 The first payments to mobilize the contractors for the lots financed by the Bank (paragraph 3.40) will be recognized from the loan. They will not amount to more than 12.5% of the loan amount since the costs incurred for these items since January 2, 1997, are not expected to be over US\$30 million.

J. Licenses to build and operate the pipeline

- 3.44 The Hydrocarbons Act requires companies to obtain licenses from the ANP to build installations and transport oil, petroleum products, and natural gas, for internal consumption, import, and export. However, the standards that the ANP will apply with respect to safety and environmental protection in licensing interested parties and the conditions under which it will grant concessions have not yet been established.
- 3.45 In the project under consideration, the National Fuel Department (DNC) issued a resolution on July 2, 1997, authorizing the TBG to build the pipeline in Brazilian territory, making it clear that another specific resolution will be required for its operation after construction has been completed and the specifications have been met. The principles that will guide operation and maintenance of the pipeline are discussed in paragraphs 3.22 and 5.47.
- 3.46 For the Bank it is essential that the rights and responsibilities regarding the pipeline assumed by the government and Petrobrás with respect to financing, construction, and operation of the project be transferred to the TBG. The TBG will therefore be required to present the documents governing the transfers of rights and obligations stemming from contracts and other commitments entered into by Petrobrás with other entities for the financing and construction of the pipeline, as a condition precedent to the first disbursement.

K. Maintenance

- 3.47 The borrower will undertake to maintain the installations and equipment in the northern section in accordance with acceptable technical standards and to present to the Bank before August 31 of

each year for 10 years after the loan contract becomes effective, maintenance reports that will include an evaluation of maintenance performed in the preceding year and the maintenance plan for the following year.

- 3.48 Maintenance in Bolivia is indirectly guaranteed by the agreements between Petrobrás, the TBG, and the GTB, which ensure the supply of gas in predetermined amounts and on given dates, with stiff penalties for noncompliance.

L. Monitoring

- 3.49 It has been agreed that periodic meetings will be held with the authorities of the Ministry of Mines and Energy and other government agencies with sector responsibilities to monitor implementation of the new sector policy and general headway in the project. The first meeting will be held in June 1998. Two months prior to each meeting the ministry will propose the topics to be discussed to the Bank. An agenda and preparatory steps will be agreed upon, including submission of the information required by the Bank prior to the meeting.
- 3.50 The topics to be discussed at the periodic meetings will include, in principle: progress in the reforms in the fuel and natural gas sector under the new Hydrocarbons Act and transport permits for the pipeline; developments in policies on fuel pricing and charges for natural gas transport and distribution; regulatory and supervisory activities by the ANP; progress on studies to regulate the act; discussion of results and plans to implement recommendations; and other relevant considerations. At the meetings, the Bank and the TBG will follow up on project activities and progress made on environmental programs.

IV. THE BORROWER AND EXECUTING AGENCY

A. The borrower and executing agency

- 4.1 The borrower will be Transportadora Brasileira Gasoduto Bolívia-Brasil S.A. (TBG). The main purpose of the company, which was incorporated for an indefinite period in April 1997 under Brazilian legislation, is to construct and operate a pipeline in Brazil to carry gas from Bolivia. The company was established with PETROFERTIL as the sole partner, but private shareholders will join in future, as described in paragraphs 1.19 and 1.21.

B. Agreements among partners

- 4.2 To be eligible for potential loans from the Banks, the partners in the TBG must sign a funding agreement. Since the project's financing structure requires broad participation by multilateral lending agencies, it will be necessary to demonstrate that the loans from those agencies have been approved or that funds are available from other sources, before the IDB loan can be disbursed.
- 4.3 The TBG implementation plan presented to the Banks calls for the private partners to make the initial financial contributions at the time of the dry financial closure. This will occur immediately after the loans have been approved by the multilateral banks. These financial contributions will be made by the partners as bridge loans. Their final form in terms of capital contributions and junior debt will be determined after the dry financial closure, once the loans from the multilateral banks become eligible for disbursement.
- 4.4 An agreement in principle has already been reached by PETROFERTIL and BTB but does not yet include provision for participation by Enron/Shell on the Brazilian side. Their participation would be desirable to foster permanent cross-participation, which would be positive for project sustainability since it would facilitate dispute settlement.
- 4.5 Although participation by private partners such as Enron/Shell in the TBG is viewed as essential for attaining the project's objectives, the Banks that are financing the operation are aware that the goals could also be achieved if different international companies were to participate. It is recommended that the loan contract include a condition precedent to disbursement requiring not less than 49% private participation in the TBG's capital. In the event of majority participation such that private partners come to have control of the TBG, the government's sovereign guarantee would be confined to the financial obligations undertaken by the borrower. Performance of the remaining obligations included in the loan contract would then be secured by the commitments assumed by

the project's sponsors in the capital contribution agreements, as well as other agreements as mentioned earlier. The letter of undertaking also stipulates that in the event that a private shareholder decides to sell all or part of its shares in the TBG, the Brazilian government will not increase its share in the company above 51%.

- 4.6 Thus, if agreement cannot be reached with all the potential partners, this will not be an impediment for proceeding with the operation, since the establishment of a coordination committee in the TBG with participation by most of the potential private partners to supervise construction, and Petrobrás' commitment to build the sections in Bolivia and Brazil, will constitute a good guarantee that any problems that arise during construction will be solved (paragraphs 3.1 and 3.2). Further, the agreements mentioned in paragraph 4.4 ensure adequate transport of the gas on the Bolivian side and delivery to the TBG at the Brazilian border. It is recommended that the prospective loan contract include as a condition precedent to the first disbursement, the requirement that the borrower present satisfactory evidence to the Bank that the commitments made in the agreement in principle with the TBG's shareholders are in effect.

C. Organization of the TBG

- 4.7 The company will be headed by a 10-member board of directors (five from PETROFERTIL, three from BTB, and two from the other private groups). They will be elected for two years by the TBG's meeting of shareholders. The shareholders will appoint the chairman of the board, who will cast the deciding vote in the event of ties. Reporting to the board, the TBG will have a coordination committee composed of five members (three from PETROFERTIL, one from BTB and one representing other partners) which will supervise the construction management carried out by SEGEN and make recommendations to the TBG's administrators regarding construction decisions.
- 4.8 The partners have already agreed on how the TBG is to be organized. It will be based on a structure to cover three geographical areas (western, eastern, and southern divisions) to allow for efficient company management. Each division will have a technical support area and an administrative and financial support area. The company's operating plan provides for contracting operating and maintenance services with third parties. The institutional arrangements agreed upon by the project's partners are considered suitable.

D. External control

- 4.9 It is recommended that the borrower's financial statements during the contract life and the project's financial statements during execution be presented to the Bank, certified by a firm of

independent public accountants (as provided for in the Brazilian Corporations Act) acceptable to the Bank, in accordance with generally-accepted standards.

E. TBG financial structure

- 4.10 The TBG financial plan for the project, which was described in chapter II, provides for four different sources of funds for construction: (i) financing from multilateral banks (IDB, WB, EIB, and CAF) for a total of US\$694.2 million; (ii) the transport capacity option purchased by Petrobrás for US\$302 million; (iii) Petrobrás financing for the pipes (made available to Petrobrás by the BNDES and Eximbank and Marubeni of Japan) for US\$336.5 million; and (iv) capital contributions from the partners, including junior debt, for a total of US\$309.6 million. After the pipeline begins operating, the TBG will provide a further US\$57.3 million in self-generated funds to install additional compressors.
- 4.11 The capital, including junior debt, will have the following composition: PETROFERTIL US\$157.9 million; BHP, El Paso, and British Gas US\$25.8 million each; private Brazilian investors US\$12.4 million; and other private investors who will be partners in the GTB, US\$61.9 million. The partners' contributions to the capital and the transport capacity option will be prorated to overall disbursements of the loans from multilateral banks.

F. TBG financial capacity

- 4.12 To evaluate the financial capacity of the TBG, the company's financial projections were analyzed for the pipeline construction period (1997-1999) and extended to 2019.
- 4.13 The following basic assumptions were used in preparing the projections: (1) project cost (Brazilian side) US\$1,642.3 million, excluding the additional costs for compressors, and US\$1,699.5 million total; (2) financing of US\$240 million from the IDB, US\$310 million from the WB, and US\$144.2 million from CAF/EIB; (3) other sources as described in paragraphs 4.10 and 4.11; (4) maximum volume of gas transported of 18 Mm³/day starting in 2007; and (5) initial base tariff of US\$1.22/MBTU and average base tariff of US\$1.30/MBTU.
- 4.14 Income projections for the sale of transport services during the period analyzed are sufficient to cover the fixed and variable operating costs of the pipeline, interest, and other financial costs stemming from the financing plan. The company will be in position to cover depreciation costs and earn profits starting in 2003. For tax purposes, the company will use an accelerated depreciation mechanism (10 years). This offers it tax advantages such that profits subject to gains tax will only be generated starting in 2006.

- 4.15 The company's internally generated resources during the entire period will allow it to cover total debt service, repay the transport capacity option in 20 years, and make additional investments to operate the pipeline. The balances will allow it to pay dividends to the partners beginning in 2005, once taxable profits are generated, and starting in 2002 it will have financial surpluses that the partners may take as loans to be repaid preferentially when the company begins to generate profits.
- 4.16 The projected flows of funds will permit the company to generate financial returns starting in 2006. They will grow annually to a maximum of 18.5% by the year 2018. The project is being carried out with a high level of financial leverage, which will generate high debt service levels. It is therefore important to note that the funds earned from operating the pipeline will permit average coverage of debt service with the multilateral banks of approximately 2.39 times, with the figure never falling below 1.29 times in any year. These figures are considered appropriate to guarantee timely payment of contractual obligations. The projections of volumes sold do not include operation of the pipeline at maximum capacity of 30 Mm³/day, but rather at just 18 Mm³/day plus the transport capacity option purchased by Petrobrás.
- 4.17 In addition, the TBG plans to establish a three-month reserve to cover debt service with the multilateral banks.
- 4.18 To prevent the TBG's debt to equity ratio from rising above acceptable levels, it is proposed that the prospective loan contract include a condition whereby the borrower agrees to take steps as necessary to prevent the ratio of long-term debt (excluding unpaid balances of the transport capacity option and junior debt) to equity plus total liabilities from rising above 67%.
- 4.19 Lastly, to evaluate the impact of participation by the multilateral banks on the project's financing plan, a sensitivity analysis was performed under alternative financing arrangements. The effect of replacing the loans from the multilateral banks with loans from commercial banks causes a considerable reduction in the economic internal rate of return, which would be a maximum of 13% after 20 years. Also the IRR would only turn positive in 2009, in other words three years later than in the base case. To make the IRR equal to the original values considered in the base case (with financing from multilateral banks) it would be necessary to increase the transport charges by 20.5% in real terms.
- 4.20 Chapter V presents the conclusions on the financial feasibility of the operation and proposes other financial contractual conditions considered reasonable to ensure that the project attains its objectives.

4.21 Notwithstanding, and to ensure that the hypotheses used in evaluating the operation materialize, it is proposed that the loan contract include the following conditions:

- a. Prior to the first disbursement of the loan, the borrower undertakes to present evidence satisfactory to the Bank that the partners in the TBG have provided funds in accordance with the financing plan (paragraph 4.2).
- b. During the contract, the borrower undertakes to do the following: (i) Present updated financial projections for the TBG demonstrating that the company will have the funds necessary to cover its debt service obligations. (ii) For the TBG to declare or pay dividends, except in the form of its own shares, it must comply with the following requirements: (1) be up to date in fulfilling all obligations under the project; (2) have demonstrated that sufficient funds will be available to cover obligations falling due in the following 12 months; and (3) demonstrate that it has sufficient liquid retained earnings to pay them. (iii) The TBG may not assume new financial obligations with maturities over one year, other than those included in the project's financing plan as a result of which the ratio of internally generated funds to debt service is less than 1.5 times.

G. Financial capacity of the partners

- 4.22 The private partners in the BTB group are companies with solid international reputations and demonstrated financial capacity to provide the funds for project execution on time. The following paragraphs outline highlights of the financial position of those companies, briefly illustrating their financial soundness.
- 4.23 The Broken Hill Proprietary Company is one of the largest companies in Australia in terms of market value, and has operations in over 20 countries. In 1994-1995, the BHP contributed approximately 1.4% of Australia's GDP and 8% of the country's total exports. It engages in hydrocarbons exploration and production, mineral exploration and production, copper mining and refining, and steel milling. Its total assets as of December 31, 1996 were approximately US\$28 billion. Sales in that year were US\$15.6 billion and annual operating profits were US\$826 million.
- 4.24 Tenneco/El Paso is one of the largest companies in the United States in the field of natural gas processing, transport, and sales. The company has a pipeline about 38,000 miles long that carries 30% of the country's natural gas. The combined assets of Tenneco and El Paso are US\$8 billion, with sales income of US\$3 billion, and operating profits of US\$550 million.
- 4.25 British Gas Americas is a subsidiary of British Gas, which is the largest natural gas company in the Western world. In 1995 its

total assets were some US\$27 billion, with sales income of US\$13.5 billion, and operating profits of US\$1.6 billion.

- 4.26 Petrobrás is Brazil's national oil company. The federal government owns 51% of company shares. In 1995 it had assets of US\$31.8 billion, sales income of US\$24.1 billion, and profits of US\$639 million.

V. PROJECT FEASIBILITY

A. Technical feasibility

1. Bolivian gas reserves

- 5.1 Reserves can be classified as proven, probable, or possible, based on the amount of information available. Proven reserves are the volumes of gas that can be produced from wells already drilled and tested. Probable reserves are the volume that can be recovered from the same fields, while possible reserves are the volumes that could be produced from fields for which seismic studies and correlations with nearby fields already studied in greater detail are available. Proven reserves in Bolivia are 93,600 Mm³, probable reserves are 51,000 Mm³ and possible reserves are 36,900 Mm³, for total reserves of 181,500 Mm³.
- 5.2 Proven reserves in Bolivia are sufficient to enable the YPFB to cover its sales commitments to Petrobrás under the contracts already signed by the latter with Brazilian distributors, for a volume of 14.25 Mm³/day. Gas reserves of 120,000 Mm³ will be necessary to guarantee that the total volume contracted by Petrobrás with the YPFB of 18 Mm³/day beginning in 2006 can be supplied.
- 5.3 One criterion that is generally accepted in similar operations is to adopt 100% of proven reserves, 50% of probable reserves, and 10% of possible reserves as a yardstick for establishing whether reserves will be sufficient to justify a gas pipeline project. Based on that criterion, which is customarily used by the World Bank, existing reserves would allow for constant production of 19 Mm³/day for 20 years after 2006, to be carried by the pipeline. These volumes are higher than the volumes required for project feasibility.
- 5.4 To deliver 24 Mm³/day starting in 2006, which would also cover the existing transport capacity option held by Petrobrás (i.e. an additional 5 Mm³/day), in addition to proven reserves it will also be necessary for 100% of probable reserves and 53% of possible reserves to materialize. To achieve maximum transport capacity compatible with the pipeline diameter of 30 Mm³/day, 100% of total reserves would be required.
- 5.5 As a result of capitalization of the YPFB and the prospects for exports to the Brazilian market, the likelihood of growth in total Bolivian reserves has increased considerably. Thus far, only 15% of potential areas have been studied, and there are expectations that reasonable volumes of gas exist in identified reserves and others that have not yet been explored. The YPFB expects that by around the year 2000, total reserves will be 80% higher than at

present, which will exceed the carrying capacity of the pipeline. In 1995 alone, total reserves increased by 40,000 Mm³.

- 5.6 The pipeline that carries gas today from the same production area to Argentina could be reversed to carry 6 Mm³/day under current conditions (and up to 9 Mm³/day with higher compression) which, when added to the 19 Mm³/day mentioned in paragraph 5.3, would increase the volume of transportable gas to 28 Mm³/day. Existing reserves in northwestern Argentina could amply cover these requirements, since Petrobrás has demonstrated that reserves in that area are 79,000 Mm³ which could sustain production of 9 Mm³/day over 24 years if the gas is not used for other purposes, with additional potential reserves of 184,000 Mm³ in fields being explored.

2. The pipeline

- 5.7 The pipeline has the technical features required to deliver Bolivian natural gas to various cities in the center and south of Brazil to help meet growing local energy demands.
- 5.8 It does not involve any special technical difficulties in execution, and engineering designs have been prepared for the works with adequate solutions and reasonable construction costs. Although the works do not require any special or advanced technologies and no problems are expected with physical execution, they will be guaranteed by insurance. Reserves have also been set aside to cover concurrent and contingent costs and escalation in construction prices.
- 5.9 Petrobrás and its future partners have extensive background in building pipelines of this kind, and their current practices and working experience in this field are adequate to maintain and operate the installations, including safety aspects.
- 5.10 In preparing the operation, the Banks have had access to relevant information from both Brazil and Bolivia and the opportunity to visit Bolivia to supervise environmental works and projects involving indigenous communities. The coordination plan and the fact that Petrobrás is responsible for construction in both countries provides assurances that the entire project will be implemented properly and on schedule.

B. Economic feasibility

1. The gas market in the center and south of Brazil

- 5.11 The pipeline will link markets in seven Brazilian states: Mato Grosso do Sul, São Paulo, Minas Gerais, Rio de Janeiro, Paraná, Santa Catarina, and Rio Grande do Sul, where 57% of the population lives and 75% of GDP is produced. The potential market for the pipeline's gas will grow from an estimated 22 Mm³/day in 1999 (year

one of operation) to 38 Mm³/day in 2015. For the economic evaluation base case, only the transport contract quantities of 18 Mm³/day were considered to 2006. These values include supplies for gas-fueled thermoelectric plants with a total installed capacity of 900 MW.

- 5.12 It was assumed that 85% of the imported gas will be used by the industrial sector and the remaining 15% to generate electricity. In industry, natural gas competes with a variety of fuels. In heavy industry, fuel oil is the main competitor, while liquefied petroleum gas (LPG) and diesel oil are the main competitors in medium and light industry, apart from electric power for specific uses.
- 5.13 Sufficient evidence exists, however, to suggest that there will be additional consumption based on thermoelectricity, since a protocol has been signed by the Banco Nacional de Desenvolvimento Econômico (BNDES), Petrobrás, and Centrais Elétricas Brasileiras S.A.(Eletrobrás) for the installation of new generating capacity of up to 1,350 MW using natural gas, which will require 6 Mm³/day, which is the capacity contracted under the transport capacity option. The studies prepared by Eletrobrás on the feasibility of using natural gas for thermal generation in south and southeastern Brazil indicate that the addition of new thermal capacity would be economically feasible if integrated into the existing electric system, which is mainly hydroelectric.
- 5.14 Since the potential market for natural gas in the center-south-southeast is considerably larger than the figures used to analyze the feasibility of the Bolivia-Brazil pipeline, there are other projects in different stages of preparation for the same region. Apart from the Argentinian gas pipeline that will supply natural gas for the 600 MW plant to be built in Rio Grande do Sul mentioned in paragraph 1.2, COMPAGAS, a distributor in the state of Paraná, has signed a protocol with a private group to bring gas from northern Argentina into the western part of the state, about 700 km from Curitiba.
- 5.15 These cases do not compete for the same market as the gas from Bolivia, since they are very far away from the pipeline, but there are ideas for other projects for pipelines from Argentina that could eventually reach the same consumer centers served by the Bolivia-Brazil pipeline. These new projects could compete with the pipeline for volumes above 20 Mm³/day, and more probably above 24 Mm³/day, up to the full capacity of the line of 30 Mm³/day, and therefore they would not affect the feasibility of the line.
- 5.16 On the contrary, the project under consideration is expected to give a strong thrust to the natural gas market in this part of Brazil, favoring new pipelines to carry subregional gas reserves in the medium and long terms, which in addition to Bolivian gas, would

include the sedimentary basins in northern and western Argentina and Brazil's own domestic reserves.

2. Alternatives, costs, and prices considered in the cost-benefit analysis

- 5.17 To define the current configuration of the pipeline, Petrobrás studied the alternatives of importing gas by pipeline from Argentina and importing liquefied gas. Two alternatives for imports from Bolivia were also considered: a northern route from Rio Grande to Campinas and then to Curitiba via Mato Grosso do Sul, and a southern route from Yacuiba to Curitiba and Campinas via Paraguay. The northern route was chosen as the least-cost alternative. The analysis included extending the pipeline to the states of Santa Catarina and Rio Grande do Sul and linkups with the existing pipelines from Rio de Janeiro to São Paulo and Belo Horizonte to carry both imported and domestic gas.
- 5.18 The economic internal rate of return (EIRR) calculated for the project includes the cost of gas at the pipe head (excluding taxes, customs duties, and financial costs), the cost of capital for the pipeline, and operating costs from Santa Cruz to Porto Alegre in addition to the incremental distribution costs and the conversion costs for users of other fuels. The benefits are based on the opportunity cost (netback value) of natural gas at each city gate, understood as the net benefit of using natural gas based on the prices of alternative fuels that are displaced, adjusted by efficiency factors and other costs.
- 5.19 For end users, the final cost of the gas was defined as the maximum price that industrial clients are willing to pay, taking into account the benefits of efficiency, savings in capital and operating costs, and the environmental advantages of natural gas. The estimates included an environmental premium of US\$0.50 MBTU where natural gas replaces high sulfur fuel oil, to internalize the benefits from the lower sulfur content in atmospheric emissions. The bonus assumes that the cost of natural gas is similar to that of low sulfur fuel oil having environmental combustion properties comparable to natural gas. In the case of electric power generation, the price of gas reflects its economic cost, taking into account long-term expansion of the electric system and its implications for calculating the long-term marginal cost of electric power generation.
- 5.20 The base case for calculating the EIRR uses the assumption that the opportunity cost of natural gas at the city gate is US\$3.20 MBTU and that the price at the head of the pipeline in Santa Cruz is US\$1.10 MBTU, the latter based on the contracts already signed under the project. The price variations in these contracts are linked to variations in the international price of fuel oil, and the base case considered a price of US\$18 per barrel, equivalent to around US\$3.20 MBTU.

3. Main results and sensitivity analysis

- 5.21 The estimated EIRR for the base case is 17% and the project is robust, since even when the volume is similar to the gas sales already contracted by Petrobrás with the distributing companies of 13 Mm³/day, the EIRR is 12%.
- 5.22 An analysis of the sensitivity of the EIRR to changes in relevant variables shows that it falls to 16% with a rise of 10% in investment and operating costs.
- 5.23 The EIRR would rise to 21% if a larger volume of gas (an extra 6 Mm³/day) were carried as a result of implementation of the transport capacity option. In this case it was assumed that the price of gas at Santa Cruz would be higher (US\$1.40 MBTU) than the price agreed upon for transport contract quantities.
- 5.24 A separate analysis was also performed of returns from the two main sections of the pipeline - the northern section or main pipeline from Santa Cruz to Campinas, and the southern section from Campinas to Porto Alegre. The estimated EIRR for the main section is 14% and for the southern section it is 24%. In this calculation, the incremental capacity and operating costs in the northern section to provide gas for the southern section were added to the investment and operating costs of the southern section (discounting those for the northern section). The incremental costs were estimated as 10% of the total costs of the main pipeline, and derive mainly from increasing the diameter of the line from 26" to 32". The different EIRRs between the main line and the southern section can largely be explained by the difference in the density of final sales per km of pipeline in each section and by a higher opportunity cost in the southern section where gas would replace a larger percentage of more expensive fuels.

4. Competition with alternative fuels

- 5.25 Natural gas must be competitive with other fuels, particularly high sulfur fuel oil (HSFO), if the project is to be feasible. The main factors that influence demand for gas over fuel oil are: (i) the balance between supply and demand for fuel oil; (ii) the assumptions regarding international prices of crude oil and the differentials between crude and petroleum products which determine the projected prices for gas and fuel oil in Brazil; and (iii) replacement of HSFO by low sulfur equivalents.
- 5.26 With regard to the balance between the supply and demand for fuel oil, Petrobrás refining operations are largely determined by growing demand for diesel oil and light products. The expansion of refinery production will normally lead to additional production of vacuum distillates, which are the basic material of fuel oil. However Petrobrás plans to use the vacuum distillates as raw material for refining high-value light products and lower quality

diesel. Since it is highly likely that Petrobrás will continue with that program, which will tend to reduce additional production of fuel oil, the economic analysis assumed parity between the import prices of fuel oil with high and low sulfur content, LPG, diesel oil, and kerosene.

- 5.27 The government is implementing a program to liberalize fuel prices, under which cross-subsidies between products and subsidies for transport are being gradually removed. Liberalization will be completed over a three-year transition period after passage of the Hydrocarbons Act. The act eliminates the Petrobrás monopoly over the import, production, and refining of oil and petroleum products. These changes have a major impact on the prices of fuels that compete with natural gas, which have traditionally been set by the government so that the prices for petroleum products were virtually the same anywhere in the country. In August 2000, when all the prices will be freed, the pipeline will still be in the early operating stages, with about one half of the total volume envisaged in the transport contract quantities. It was therefore considered reasonable to adopt an assumption linking fuel prices in Brazil to projected international prices for the economic analysis. The prices of petroleum products were estimated based on reference markets (Gulf of Mexico prices in the USA) adjusted by shipping, import duties, port charges, and the costs of handling, storage, and transport to end users.
- 5.28 Based on recent demand studies, the potential market in Brazil for Bolivian gas will be as a replacement for fuels used in industry that cost the same or more than HSFO and as fuel for the new gas-operated thermal plants already included in Eletrobrás expansion plan. The demand for gas tends to fall when the price is over US\$2.70 MBTU at the city gate, in which case it would only replace expensive fuels such as LPG and fuelwood, but demand rises sharply below that level, since gas begins to replace HSFO.
- 5.29 The gas distribution companies cannot limit themselves to the high end market segment, since HSFO prevails in some states. They will probably need to capture both high and low market segments to ensure the financial viability of their investments in distribution. It is particularly important to capture the HSFO market owing to its dominant position, the ease with which users of fuel oil can convert to natural gas, and the advantages of replacing a dirty fuel. The contracts for gas supplies between Petrobrás and the distribution companies specify that for the first five years, the city gate price will be linked to the price of HSFO, which will protect them to some extent against swings in the prices of that fuel.
- 5.30 For appropriate and sustainable development of the hydrocarbons sector based on price signals that reflect the economic cost of the different fuels, thereby promoting efficient economic development of the gas industry, it is necessary to continue with the program

to rationalize fuel prices. The government has presented a letter of undertaking to the Bank stating that it will implement the following measures, which are consistent with the price and administrative system to be introduced under the new Hydrocarbons Act for fuels in general, within the transition period allowed in the act:

- a. Setting ex-refinery prices for petroleum products at par with import prices through automatic adjustment formulas.
- b. Linking the ex-refinery prices of LPG to international prices through automatic adjustment formulas that will allow for the phased removal of subsidies.
- c. Allowing for geographic differentiation of the prices of fuel oil by freeing freight spreads from refineries to distribution centers.
- d. Reforming the current price system that administers subsidies for alcohol and other fuels through the FUP.
- e. Allowing the price of domestic crude in the cost structure of Petrobrás refineries to reflect its opportunity cost on the international market.

5.31 In the specific case of gas regulation, the letter of undertaking establishes the guidelines for regulating the act. Based on the studies to be conducted, these will define:

- a. The criteria and methodologies for implementing the pricing policy for natural gas and developing the instruments to be used in cases in which the ANP is required to act. The most important areas to be studied include: the treatment of import prices; economically efficient tariff systems for the transport of natural gas and consideration of financial aspects; proposals for direct regulation or regulation through taxation to reflect the costs implicit in the use of highly polluting fuels such as HSFO in the prices of alternative fuels; proposals for distribution rates that are economically efficient and financially feasible, to be presented to the state authorities responsible for regulating distribution services for consideration.
- b. The form in which open access to pipeline capacity will be provided for different agents on a nondiscriminatory basis. Access to gas pipeline capacity will be regulated by the ANP which will set the forms of payment and adequate remuneration for the service.
- c. How restrictions on cross-ownership between companies will be established to reduce the risk of market domination or collusion among market agents in order to prevent both public

and private companies from simultaneously controlling import, exploration, production, transport, and distribution of natural gas. Implementation of this principle, which will also be applied in the Brazilian electric power sector, will be monitored by the ANP.

- d. The criteria and methods that will be applied by the ANP in setting and adjusting transport rates, based on economic, financial, and commercial principles to ensure full and efficient use of transport capacity, adequate returns on investments, and sufficient incentives for expansion of the natural gas market. These criteria will include modes of supply, volumes purchased, distances, seasonal consumption, and the possibility of interruptions in supply, so that all consumers with the same consumption characteristics will pay equal prices. Contracts for the sale of gas to distribution companies and large consumers will break down the sales price of gas into product costs and charges for capacity.

5. Poverty impact

- 5.32 The proposed program cannot be classified as a poverty-targeted operation either geographically or with respect to beneficiary groups, and is not targeted specifically to women pursuant to the Eighth Replenishment document (AB-1704).

C. Financial feasibility

1. Availability of financial resources

- 5.33 Building the pipeline works and achieving the development objectives hinges on the timely availability of the financial resources required by the TBG and the GTB. The partners in the project in both countries have designed a financing plan that is compatible with project requirements. Processing of the loan operations with the multilateral lending agencies (WB, CAF, EIB, and IDB) has been carefully coordinated and no difficulties are anticipated in meeting the schedules.
- 5.34 The project is also receiving financing from suppliers and export agencies (Eximbank/Marubeni of Japan) and development agencies (BNDES) to procure the pipes. Part of this financing will be transferred by PETROFERTIL as a capital contribution to the project. Purchase by Petrobrás of the transport capacity option will be fully financed by the BNDES. Last, no difficulties are anticipated with timely contributions by the private partners of PETROFERTIL in the form of direct capital and junior debt.
- 5.35 The TBG's financial projections indicate that if the assumptions on which they were based are maintained, the project will generate the funds needed to cover all debt service, expansion of the pipeline, taxes, and dividends.

2. Financial benefits of the project

- 5.36 One of the reasons why the multilateral banks are participating in this operation is to ensure that the price of transport will result in natural gas prices for end consumers that are competitive with alternative fuels, while maintaining the financial feasibility of the pipeline. As mentioned in paragraph 4.19, if private loans were used, the cost of transporting 18 Mm³/day would be 20.5% higher, which would result in an increase of about 16% in the city gate price and a significant reduction in demand for natural gas (paragraph 5.28).
- 5.37 However, conditions could change in the future in the context of unregulated prices and additional volumes of gas. Benefits would be generated that should be transferred to the producers or consumers of natural gas and not translate into extraordinary profits for the project's sponsors beyond those estimated as returns on capital investments. Therefore, the operating license will establish that the transport prices to be negotiated by the TBG and arbitrated in future by the ANP may not generate capital returns for the partners that are substantially higher than the projected rate of return.

D. Institutional capacity

- 5.38 Petrobrás' subsidiary PETROFERTIL, which is a partner in the pipeline, has taken all the initial actions for project implementation, negotiating the establishment of the TBG. Petrobrás' Engineering Services Department is providing administrative, supervisory, and coordination services to proceed with construction and begin operating the pipeline. The TBG will present, within six months after signing of the loan contract, a proposal for operation and maintenance of the gas pipeline.
- 5.39 The TBG's partners in building and operating the pipeline are companies with international reputations and ample experience in projects of this kind.
- 5.40 The organizational and operating arrangements made by Petrobrás and the TBG for carrying out the project and the measures to be adopted later to ensure that the new company will operate the pipeline satisfactorily have been studied by the Bank and are considered adequate for complying with the goals in a timely fashion.

E. Environmental feasibility

- 5.41 The environmental impact studies and the strategic environmental evaluation indicate that the project is environmentally feasible in both the production area and along the entire length of the pipeline. The project is of great significance for Bolivia and Brazil since it will bring benefits for Brazil's energy matrix, for the environment in the large cities in the south of Brazil, and for

the Bolivian economy. Most of the potential negative impacts can be satisfactorily mitigated, and sustained economic growth and environmental conservation will be compatible. The main environmental benefit is the expected reduction in air pollution levels in large Brazilian cities through the replacement of fuel oil (in industries) and diesel (in fleets of urban buses) by natural gas.

5.42 The environmental studies were done in accordance with guidelines agreed upon by the Bank and the authorities of the two countries, and have been approved. The mitigation and compensation plans have been brought up to the standards of the Banks and demonstrate levels of quality and detail that represent significant progress in including environmental aspects in oil and gas projects in South America, and can be used as a frame of reference for future studies. The first ever strategic environmental evaluation of the oil and gas sectors in Brazil and Bolivia was performed during the preparation of this project. The mitigation and compensation plans give a detailed description of the measures to be carried out, the execution schedule, the budget, institutional arrangements, and definition of who will defray the costs.

5.43 Most of the negative impacts are localized and are small or medium in magnitude. They can be mitigated or compensated for with simple measures that are easy to implement. They are mainly limited to physical and biotic aspects in the areas adjacent to the pipeline and to disturbing daily life in the communities through which it will pass. Mitigation and compensation plans have been proposed for the most relevant impacts which are tailored to their extent and complexity. A specialized consulting firm will be contracted to supervise implementation of all the programs which will be monitored by an independent environmental auditor who may only be removed with the express agreement of the Banks. The environmental specifications for the works were included in the construction contracts to ensure that the work will be performed according to the specifications. The loan contract will stipulate that, 24 months after its signing, the TBG is to present evidence to the Bank that all the measures mentioned in paragraph 2.16 were implemented during construction (paragraph 3.18) and operation (paragraph 3.22).

F. Regulatory aspects and development of the natural gas market

5.44 One of the main reasons why the government and the multilateral banks are supporting this project, and the main justification for granting favorable financial conditions to its sponsors, is that it will set the stage for an open and competitive energy market in Brazil. The legal framework to attain this objective is being established with the amendment already made to article 177 of the constitution and passage of the new Hydrocarbons Act. Successful implementation of the principles established in the act, particularly through the measures envisaged in the letter of

undertaking mentioned in paragraph 5.30, will help to shape a competitive market. Such a market would make it possible to build new pipelines financed under normal conditions by commercial banks and supply natural gas at prices that are competitive with alternative fuels which are generally more harmful to the environment.

- 5.45 The new Hydrocarbons Act defines the conditions for developing an open and competitive natural gas market, with adequate regulation in the stages that constitute natural monopolies. To effectively enforce the act, it will be necessary to ensure that the ANP functions efficiently, that suitable concessions and licenses are granted, and that other aspects relating to market operating conditions are established. The act allows a term of six months for setting up the ANP, and the results of the studies financed by the World Bank will be needed to regulate the act. Therefore the new regulatory framework for the Brazilian energy sector will be implemented simultaneously with construction of the pipeline.
- 5.46 The license to operate the pipeline (paragraph 3.45) will have to be issued by the government even before the new regulatory framework has become consolidated, and therefore the license is an important document since the principles and criteria it contains will send out major signals for the construction of new gas pipelines and for development of the natural gas market in general.
- 5.47 The letter of undertaking by the government stipulates that the operating license to be granted will: (i) ensure access by third parties to the unused capacity of the pipeline under the terms of the new act; (ii) permit geographical differentiation of the charges for transporting volumes in excess of the transport contract quantities on the basis of distance, volume, and additional operating and maintenance costs; (iii) establish that the TBG may not sell gas or participate in gas production or distribution activities; and (iv) establish that the transport price should generate returns for the TBG that are not higher than values which are compatible with projects of this kind, such as those initially projected (paragraph 5.37).

G. Risks

- 5.48 The main risk has to do with establishing conditions in Brazil for a competitive fuel market and for self-sustaining development of the natural gas market in the long term. The risk is considerably attenuated by the new Hydrocarbons Act and will be minimized in its enabling regulations, where both Banks will have the opportunity to collaborate.
- 5.49 In addition to deregulation of the fuel market and prices, which has already begun, the letter of undertaking mentioned in paragraphs 5.30 and 5.31 also covers the introduction of a new regulation system and contains the basic principles that will be

used to regulate the new act. These principles are suitable for establishing over the long term, an efficient gas industry and an open and competitive market, and for adequately protecting the interests of users, investors, and the State.

- 5.50 Fulfillment of the letter of undertaking will be verified during the project. A proposal for regulating the act in the gas sector will be presented before the end of 1998, based on the principles contained in the letter. Review meetings will be held periodically. The meetings will also examine implementation of the measures set forth in the pipeline operating license and the environmental and physical aspects of the project works, as described in paragraph 3.50.

H. Ex post evaluation

- 5.51 The TBG did not express interest in an ex post evaluation of the project, although it will provide information on the pipeline for an evaluation if required. The government normally has general information on the sector which would supplement the TBG's information if it is decided to perform an evaluation of the project's economic impact once the target of transporting 18 Mm³/day of natural gas from Bolivia has been achieved.

LOGICAL FRAMEWORK
Bolivia-Brazil gas pipeline integration project
(RG-0028)

Objectives	Indicators	Means of verification	Assumptions
<p>te to regional energy integration, expansion of the natural gas d market by connecting Bolivian o the market in central and Brazil, which will lead to a positive Brazil's energy matrix through the se of a fuel that is preferred from mental and efficiency , in a manner that is compatible untry's industrial development.</p>	<p>1.1 Natural gas consumption (10 Mm³/day) in 1997 accounted for 2% of Brazil's final energy demand (576 Mm³/day). Natural gas consumption in Brazil will grow to 12% of the country's primary energy consumption by 2010.</p> <p>1.2 Total emissions of sulfur oxides and particles will be reduced by 20% and 40% respectively by 2006 in comparison with 1996 values in the metropolitan region of São Paulo.</p>	<p>1.1 Energy balance prepared by the Ministry of Mines and Energy</p> <p>1.2 Periodic reports by the State of São Paulo Environmental Sanitation Company (CETESB)</p>	
<p>art of the demand for energy in in the economic hub of Brazil in and southern parts of the country g natural gas from Bolivia via a which the private sector will hold t interest.</p>	<p>1.1 The pipeline will carry 9 Mm³/day in 1999 rising to a minimum of 18 Mm³/day in 2006.</p> <p>1.2 Gas exports from Bolivia will increase from 6 Mm³/day in 1996 to at least 18 Mm³/day in 2006.</p>	<p>1.1 Annual statistical reports from natural gas distributors</p> <p>1.2 TBG management reports</p> <p>1.3 Annual statistical reports by the YPFB</p>	<p>1. The provisions of the new lega for the hydrocarbons sector in implemented.</p>

LOGICAL FRAMEWORK
Bolivia-Brazil gas pipeline integration project
(RG-0028)

Objectives	Indicators	Means of verification	Assumptions
transporting natural gas from Brazil in operation. It will be some 32" in diameter between Rio de Janeiro and Campinas with a smaller diameter between Campinas and Porto Alegre. The initial carrying capacity will be 1.5 million m ³ per day and could rise to a maximum of 2.5 million m ³ per day with additional compression.	1. Pipeline from Río Grande to Puerto Suárez in Bolivia and from Puerto Suárez to Porto Alegre in Brazil, crossing the Brazilian cities of Corumbá, Campo Grande, Araraquara, São Paulo, and Curitiba. The section between Campinas and São Paulo will be operational in December 1998 and between Porto Alegre and Canoas in December 1999. The installations will be designed, built and operated in accordance with the highest ANSI B31.8 standards for gas pipeline transmission and distribution systems or with Bolivian and Brazilian codes and regulations. The installations will be designed for a maximum permissible operating pressure of 1,420 psig.	1. Progress and work completion reports by the project executing unit	1. Bolivia's natural gas reserves are sufficient to cover expected demand and sufficient Argentinian gas reserves are available to top up the carrying capacity of the pipeline.
stations at five points on the pipeline	2. The five stations will be located as follows: one on each side of the border between Bolivia and Brazil (close to Corumbá in Brazil), one close to Campinas/Paulina at the point of delivery to the Petrobrás' system running to Guararema, and another close to Campinas/Paulina at the connection with the pipeline to Porto Alegre/Canoas. All the stations should be in operation by October 1998.	2. Progress and work completion reports by the project executing unit	2. A new legal framework for the hydrocarbons sector is approved and implemented, establishing mechanisms for sector regulation and assuring access by different agents to the pipeline.
communications system in operation	3. The system will permit sound and data transmission. It will use a VHF radio and sound communications system, telephone and satellite circuits, and radio bands. Where possible, the system will be designed to use the services provided by local telecommunications companies. The systems for lots 1 to 8 should be completed and in operation by October 1998 and those for lots 9 to 13 by October 1999.	3. Progress and work completion reports by the project executing unit	

LOGICAL FRAMEWORK
Bolivia-Brazil gas pipeline integration project
(RG-0028)

Objectives	Indicators	Means of verification	Assumptions
Compressor stations in operation	4. The compressor stations will be installed at: (a) Penápolis in December 2000, one unit and one backup, and in December 2005 one additional unit, each with a capacity of 7,000 hp; (b) in Florianópolis in December 2000, one unit and one backup, each with a capacity of 700 hp and in December 2007, one additional 1,200 hp unit; (c) in Campo Grande in December 2001, one unit and one backup with 7,000 hp each and in December 2005, one additional 7,000 hp unit; (d) in Curitiba in December 2003 one unit and one backup with 1,200 hp each and in December 2004, one additional 1,200 hp unit; and (e) in Rio Verde in December 2007, three 7,000 hp units. Additional stations will be added when capacity of over 18 Mm ³ /day is required.	4. Progress and work completion reports by the project executing unit	
Control and management system	5. Each compressor and metering station and the valves and isolated installations will have electronic communications equipment for data processing and control and monitoring through the telecommunications system. The SCADA system for sections 1 to 8 will be in operation by October 1998 and for sections 9 to 13 by October 1999.	5. Progress and work completion reports by the project executing unit	
Costs for piping for the entire pipeline	Detailed project budget	1.1-5.3 Project accounting records kept by the executing agency	1. Capital contributions, transport option, and third-party financing available on schedule.
Costs for civil works for the sections Corumbá and Campinas and Campinas and Porto Alegre			
Costs for procurement and award of contracts for the works			
Costs for metering stations			
Costs for procurement and award of contracts for the metering stations			

LOGICAL FRAMEWORK Bolivia-Brazil gas pipeline integration project (RG-0028)			
Objectives	Indicators	Means of verification	Assumptions
s for the telecommunications oids and award of contracts of the telecommunications s for the supply and installation sor stations oids and award of contracts of the compressor stations s for the SCADA system oids and award of contracts of the SCADA system			

BID TIMETABLE

BOLIVIA-BRAZIL GAS PIPELINE INTEGRATION PROJECT
(RG-0028)

A. International public bidding for works in Brazil

Section	Km	Prequalification (yes/no)*	Direct cost (US\$000)	Financed by	Date of publication
1. Construction and assembly	2,589		563,810		
1.1 Lots 3 to 7 (Corumbá-Campinas)	1,256	No	305,280	IDB/CAF	Jan/97
1.2 River crossings	0	No	15,000	IDB	Jan/97
1.3 Lot 8 (Campinas-Guararema)	153	No	23,530	CAF	Jan/97
1.4 Lots 9 to 13 (Campinas-Puerto Alegre)	1,180	Yes	220,000	WB	Jul/97
2. Piping	2,589	No	485,240	ECAs	Sep/96
3. Compressors, metering stations, other	n/a	No	147,320	Diverse	Jul/97
4. SCADA system	n/a	No	5,430	IDB	Jul/97
5. Valves/storage	n/a	No	40,750	Diverse	Nov/96 Nov/97
6. Total	2,589		1,242,550		

* Technical and price proposals analyzed separately in cases with no prequalification.

B. Bidding by consulting and engineering companies*

Item	Type of bid**	Prequalification (yes/no)	Date of publication	Cost (US\$000)
1. Environmental supervision (Brazil)				4,200
1.2 Supervision	IPB	No	3rd quarter 1997	2,520
1.3 Management and auditing	IPB	No	4th quarter 1997	1,680
2. Environmental supervision (Bolivia)				910
2.1 Supervision	IPB	No	3rd quarter 1997	800
2.2 Management and auditing	IPB	No	4th quarter 1997	110
3. Total				5,110

* There will be a single contract for supervision in Bolivia and Brazil and a single auditing contract for the two countries.

** IPB = international public bidding without Bank financing.

PROPOSED RESOLUTION

**REGIONAL. LOAN /OC-BR
TO TRANSPORTADORA BRASILEIRA GASODUTO
BOLÍVIA - BRASIL S.A. - TBG
(Bolivia - Brazil Integration Gas Pipeline 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 Transportadora Brasileira Gasoduto Bolivia - Brazil S.A. - TBG, 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 the Bolivia - Brazil Integration Gas Pipeline Project. Such financing will be for the amount of up to two hundred forty million dollars of the United States of America (US\$240,000,000), 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.