

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

COLOMBIA

PORCE III HYDROELECTRIC POWER PLANT

(CO-L1005)

LOAN PROPOSAL

This document was prepared by the project team consisting of Roberto Manrique, Project Team Leader (RE3/FI3); Alejandro Melandri, José Manuel Cabral, Jennifer Wakeham, Gloria Lugo (RE3/FI3); Gerónimo Frigerio, Kevin McTigue (LEG/OPR); and Jairo Salgado (COF/CCO); with contributions from Ignacio Coral, Ramón López-Rivera, María Edna Gonzalez, Pablo Roda, Carlos De Moya, Alfredo Ibarguen, Plinio Montalván, and Fernando Lecaros (consultants).

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Electronic Links and References	
Basic socioeconomic data	http://www.iadb.org/RES/index.cfm?fuseaction=externallinks.countrydata
Status of loans in execution and loans approved	http://ops/approvals/pdfs/COen.pdf
Tentative lending program	http://opsgsl/ABSPRJ/tentativelending.ASP?S=CO&L=EN
Information available in the RE3/FI3 files	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=559511
Procurement plan	http://idbdocs.iadb.org/WSDocs/getDocument.aspx?DOCNUM=590754

ABBREVIATIONS

AMCP	Average market and contracts price
ASIC	Administrador del Sistema de Intercambios Comerciales [Commercial Exchange System Administrator]
CAGR	Compound annual growth rate
CESI	Committee on Environment and Social Impact
CREG	Comisión de Regulación de Energía y Gas [Energy and Gas Regulatory Commission]
EBITDA	Earnings before interest, taxes, depreciation, and amortization
EIA	Environmental impact assessment
EIRR	Economic internal rate of return
ENPV	Economic net present value
EPM	Empresas Públicas de Medellín E.S.P. [Medellín Municipal Utilities]
ESMR	Environmental and Social Management Report
GDP	Gross domestic product
GWh	Gigawatt hours
ICB	International competitive bidding
IMF	International Monetary Fund
ING	Interconnected national grid
kV	Kilovolts
kWh	Kilowatt hours
MEM	Mercado de Energía Mayorista [Wholesale Energy Market]
MVA	Megavolt amperes
MW	Megawatts
NCB	National competitive bidding
OC	Ordinary Capital
PBL	Policy-based loan
REDI	Recent Economic Developments in Infrastructure
rpm	Revolutions per minute
SBU	Strategic business unit
UPME	Unidad de Planeación Minero Energética [Energy and Mining Planning Unit]
UPS	Uninterruptible power supply

PROJECT SUMMARY
COLOMBIA
Porce III Hydroelectric Power Plant (CO-L1005)

Terms and Conditions ¹				
Borrower:	Empresas Públicas de Medellín, E.S.P. (EPM)		Amortization period:	20 years
Guarantor:	Republic of Colombia		Grace period:	7 years
Executing agency:	Empresas Públicas de Medellín, E.S.P.		Disbursement period:	7 years
Source	Amount	Percentage	Interest rate:	Adjustable
IDB (OC)	US\$200 million	22%	Inspection and supervision fee:	0%
Local	US\$711 million	78%	Credit fee:	0.25% per annum
Total	US\$911 million	100%	Currency:	United States dollars from the Single Currency Facility
Project at a Glance				
Objective: To help meet Colombia's growing demand for electric power, beginning in the second half of 2010, by efficiently and sustainably utilizing hydraulic resources from the Porce River.				
Special contractual conditions precedent to the first disbursement of the loan proceeds: The borrower will, to the Bank's satisfaction, meet the following special contractual conditions precedent to the first disbursement of the loan: 1. Present evidence that the external socioenvironmental audit has been commissioned under the terms previously agreed upon with the Bank (paragraph 3.16); 2. Present evidence that the environmental authority has approved the modified environmental license authorizing construction of the transmission lines (paragraph 3.23); 3. Submit the work plan agreed upon for the first year of corporate development activities (paragraph 3.24). Special execution conditions: The borrower will, to the Bank's satisfaction, meet the following special conditions for execution: 1. Submit progress reports on implementation of the corporate development measures and submit the findings of the external evaluation to the Bank annually (paragraph 3.25); 2. Submit semiannual comprehensive project supervision reports and socioenvironmental management monitoring reports as required by the environmental authority (paragraphs 3.19 and 3.24); 3. Before the filling of the reservoir begins, furnish evidence that it has relocated, resettled, and compensated the affected population in accordance with the Resettlement Program (paragraph 3.23); 4. Request prior authorization from the Bank to carry out expansion projects under its Power Generation strategic business unit (SBU) whose annual investments, excluding project-related investments, exceed 20% of the total value at that time of fixed assets in service plus the value of works in execution of the Power Generation SBU (paragraph 3.22); 5. Not assume new financial obligations with terms greater than one year as a result of which: (a) the ratio between EPM's total financial debt and earnings before interest, taxes, depreciation, and amortization (EBITDA) would be over 2.5; in other words, at the end of each analysis period the ratio of EPM's total financial debt to EBITDA must be less than or equal to 2.5. Special conditions during the term of the loan contract: The borrower will, to the Bank's satisfaction, meet the following special conditions during the term of the loan contract: 1. Implement the best business measures within its reach aimed at keeping the AMCP for its market above 90% of the AMCP values for the Colombian market (paragraph 3.21); 2. Prior to 30 July 2006, present the findings of the assessment and management study of the synergic and cumulative environmental impacts on the Porce River basin and a proposed management plan for preventing, compensating for, and mitigating the identified impacts that includes the specific allocation of resources to execute the feasible measures for which the EPM is responsible in that plan (paragraph 3.23);				

3. Prior to 31 December 2006, submit the contingency plan deriving from the study of the operating condition of the set of hydropower developments in the Porce River basin, to be prepared under the terms agreed to with the Bank; and after that date, implement the plan's measures that are feasible and for which EPM is responsible and report to the Bank semiannually on their implementation (paragraph 3.20); 4. Maintain separate accounting for its strategic business units and apply the recommended International Accounting Standards for the valuation of asset investments and their corresponding disclosure in its financial statements, beginning with the fiscal year ending 31 December 2005 (paragraph 3.21); 5. In the event that financial transactions take place between EPM's strategic business units, base those transactions on commercial market conditions and not compromise the timely availability of resources needed for project execution or to service the debt (paragraph 3.21); 6. Not sell, dispose of, or transfer—in one or a series of transactions—assets whose value exceeds 50% of the total assets of EPM consolidated without prior authorization from the Bank (paragraph 3.21); 7. Submit an annual financial report with financial statements and updated 10-year financial projections, both broken down by strategic business unit and in consolidated form (paragraph 3.21); 8. Once construction of the hydroelectric power plant is completed, submit annual reports on the condition of project works and equipment as well as annual maintenance plans (paragraph 3.19); 9. Not assume after execution is completed new financial obligations with terms greater than one year as a result of which: the ratio between EPM's total financial debt and EBITDA would be over 2.9; in other words, at the end of each analysis period the ratio of EPM's total financial debt to EBITDA must be less than or equal to 2.9; and 10. Not assume new financial obligations with terms greater than one year as a result of which the ratio between consolidated EPM's long-term debt and equity would exceed 1.5 times its equity (paragraph 3.21).					
Exceptions to Bank policy: An exception is being requested to the policy on guarantees required from the borrower (OP-303) with respect to the local contribution and proper project execution, since the Republic of Colombia will only be guaranteeing the obligation to pay back the loan, including interest and fees. The guarantor will, however, provide extensive cooperation to ensure that project objectives are met (paragraph 3.1).					
The project is consistent with the country strategy: Yes					
The project qualifies as: SEQ [] PTI [] Sector [] Geographic [] Headcount []					
Procurement: The procurement of works, goods, and consulting services will be governed by the Bank policies set out in documents GN-2349-4 and GN-2350-4 (paragraphs 3.9-3.16).					
Date of review by CESI: 11 July 2005					

1. The interest rate, credit fee, and inspection and supervision fee mentioned in this document are established pursuant to document FN-568-3 Rev. and may be changed by the Board of Executive Directors, taking into account the available background information, as well as the respective Finance Department recommendations. In no case will the credit fee exceed 0.75%, or the inspection and supervision fee exceed 1% of the loan amount (*).

(*) With regard to the inspection and supervision fee, in no case will the charge exceed, in a given six-month period, the amount that would result from applying 1% to the loan amount divided by the number of six-month periods included in the original disbursement period.

I. FRAME OF REFERENCE

A. Socioeconomic framework

- 1.1 Colombia's macroeconomic policy has remained consistent with the government's objectives of stability and growth. The last review of its standby arrangement with the International Monetary Fund (IMF), prepared in December 2004, noted that Colombia had more than met all the established targets. The IMF technical team has since reached a new standby arrangement with the country, which it submitted to its board on 29 April 2005. Nonetheless, it should be pointed out that there are several stress points in the government's fiscal program. For one, the depletion of the Social Security Institute's reserves necessitated transfers from the central government of about 4.4% of the gross domestic product (GDP) in 2004, a percentage that will grow in the 2005-2006 period. The cost of the government's Democratic Security Policy amounted to another 4% of GDP in 2004.
- 1.2 The above factors, compounded by budget inflexibility—about 65% of the budget is absorbed by interest on the debt, pensions, and transfers to subnational entities—brought the central government deficit to 5.7% in 2004 and the consolidated public sector deficit to 1.2% (the IMF target was 1.3%). This difference is explained by the surplus run by State-owned companies (0.8%), some subnational entities (1.1%), Banco de la República (Colombian Central Bank), and the Financial Institutions Guarantee Fund (0.4%), as well as by the surplus of payments by the subnational entities into the subnational pension system (1.7%). To lower the deficit, the Colombian government has reformed the tax system several times, boosting receipts from 11.2% of GDP in 2000 to 14.9% in 2004, and proposed a constitutional amendment to modify the public pension systems that has been approved.

B. The electric power sector: institutional and regulatory framework

- 1.3 Since 1994, the Colombian electric power sector has been characterized by: (i) promoting competition; (ii) encouraging the participation of private capital; (iii) consolidating the State's policy-making, regulatory, and oversight functions; (iv) separating generation, transmission, distribution, and commercialization activities; (v) regulating those activities that do not allow for competition; and (vi) creating a competitive energy market that ensures unfettered access to the generation market and to the use of transmission networks, while regulating distribution and commercialization for regulated users.
- 1.4 The National Planning Department, together with the Energy and Mining Planning Unit (UPME) of the Ministry of Mines and Energy, formulates sector policy and indicative plans; the Energy and Gas Regulatory Commission (CREG) and the Office of the Superintendent for Residential Utilities perform the regulation and oversight/control functions, respectively. Both public and private companies are involved in generation, distribution, and commercialization. Transmission is provided by various public enterprises, the foremost of which is Interconexión Eléctrica, S.A.

- 1.5 Since 1995, the power generated has been traded on the Mercado de Energía Mayorista [Wholesale Power Market] (MEM), operated by the Centro Nacional de Despacho [National Dispatch Center]. On the MEM, short-term transactions are carried out through a power exchange, and long-term transactions through quantity and price contracts. Remuneration for power generation, based on contracts, covers the exchange price and the so-called “capacity charge”. Extensive regulations exist to prevent price gouging in response to short-term events or resulting from the undue flexing of market muscle; oversight and control falls to the Office of the Superintendent of Industry and Commerce, the agency in charge of competition. Every month, the Commercial Exchange System Administrator (ASIC) calculates and publishes the “average market and contracts price,”¹ which constitutes the best available public indicator² of the average price of electric power transactions on the MEM.
- 1.6 Based on their level of usage, end customers are classified as regulated or unregulated. The CREG establishes five-year rate schedules applicable to regulated customers that cover the recognized costs of providing the service, including the cost of generation, transmission, distribution, and commercialization plus an efficient level of losses. Subsidies provided to low- and middle-income consumers are funded through transfers from residential consumers based on their socioeconomic stratum.³ Unregulated customers are served by sellers at freely agreed prices.
- 1.7 **Performance of the sector model.** The sector model seeks to delegate investment decisions to market agents that respond, among other factors, to (i) regulatory standards; (ii) perceived country, sector, and market risk; and, especially, (iii) the price signals sent by the MEM. This sectoral structure has worked well inasmuch as it has allowed for the inflow of significant amounts of private investment, particularly through the sale of large generating plants, the signing of power purchase agreement contracts, and the capitalization of some distribution companies. The scheme has been less successful, however, with respect to bringing in new at-risk investment to meet future demand. This is due to multiple factors, including (i) the perception that regulations are unstable; (ii) the risk associated with a slow return of investment; (iii) Colombia’s country risk, which is adversely affected by terrorism; and (iv) questions with respect to the sector model’s real capacity to produce the set of stimuli needed to effectively entice private actors to invest in new plants. In addition, there was the economic recession of 1999 that created income instability for players in the market.

¹ Defined in detail in Colombian regulations and known as M_m .

² This price reflects the average price of power traded on the wholesale market – on the power exchange and through long-term contracts in the regulated marketplace.

³ Improvements to the way this subsidy scheme is targeted are envisaged in the Bank’s sector program for public utilities, currently under way.

- 1.8 These challenges have translated into hurdles to completing the process of privatizing distribution companies, as well as into a growing concern about private investors' lack of interest in building new generation plants, which is becoming increasingly worrisome given the consequences for the economy and for governance in the event of future shortages. These problems call for a structural solution designed to send correct, timely, effective, and constant economic signals and for the implementation of actions aimed at remedying the stagnation in the installation of new generating capacity that may have resulted from current signals.
- 1.9 **Pending elements of sector reform.** Recent sector studies confirm that after a decade, the outcomes of sector reform have been very favorable.⁴ The finances of the electric power sector have ceased to be the burden for the government that they were during the 1980s, when the guaranteed debt service accounted for 40% of its budget. The government has not been able to complete its effort to privatize State shares in those regional electric power distributors saddled with weak markets, high technical and commercial losses, and strained finances, though these do not include Empresas Públicas de Medellín (EPM), which has distinguished itself for the quality of the services it provides and for its institutional strength. The Bank has been promoting⁵ the pending elements in modernizing the sector, primarily those related to: (i) increasing the effectiveness of the regulatory, oversight, and control agencies; (ii) enhancing the efficiency of the State's entrepreneurial, regulatory, and policy-making functions; and (iii) boosting the efficiency and financial sustainability of the sector.
- 1.10 **Empresas Públicas de Medellín.** EPM is a State-owned municipal commercial and industrial enterprise that serves as the parent company for a group of public utilities providing power (generation and distribution of electricity and distribution of natural gas), water (sewerage and treatment), and telecommunications services. In the electric power sector, it is involved in generation, distribution, and commercialization, operating as a vertically integrated company by virtue of the fact that the Electric Power Act allows for companies that were vertically integrated at the time of its passage to continue to do so, provided they keep separate accounts for each activity. Its installed capacity as of December 2004 was 3,135 megawatts (MW), which amounts to 23% of the national total.⁶ That year, EPM produced 22.8% of the 48,619 gigawatt hours (GWh) generated nationwide.
- 1.11 EPM's organizational structure boasts a series of strengths:⁷ it integrates the visions of each of the businesses under a first-tier agency; it grants autonomy to each of the strategic business units; and it capitalizes on economies of scale through the creation of synergies within the shared service units. The following agencies are

⁴ World Bank, Colombia REDI: Diagnostics of the Infrastructure Sectors; November 2004.

⁵ Sector program for public utilities (policy-based loan, CO-0270), approved 29 September 2004.

⁶ Source: EPM data. Includes 2,575 MW produced by EPM itself (18.9% of the national total); the remainder comes from its subsidiaries and its shares in the company ISAGEN S.A.

⁷ See organizational chart under the execution and administration section in Chapter III.

involved in the oversight of EPM: the Prosecutor's Office, the Office of the Attorney General of Colombia, the Municipal Ombudsman, the Comptroller General of Medellín, the Internal Control Office, and the Office of the Superintendent for Residential Utilities.

- 1.12 EPM has distinguished itself for its sound, high-quality management, as is reflected by the AAA rating of its local bond issues (this rating is given to the highest quality credit issues for which risk factors are virtually nonexistent). This rating is backed by the financial soundness of EPM, the quality of its management, the qualifications, stability, and experience of its specialists, and the continuity and coherence of its strategies. Its business management capacity is recognized at home and abroad, and both the national government and subnational entities consult it on issues related to management of State-owned companies. It keeps separate accounts for its strategic business units, creating transparency and accountability, and it commissions external audits to monitor contractual obligations with multilateral banks and to audit its financial statements. Financial transactions between its strategic business units are performed under commercial market conditions, which makes for optimized, transparent cash management and avoids cross-subsidies between businesses. Except for the valuation of asset investments and their disclosure in the financial statements in accordance with International Accounting Standards, EPM meets all the criteria established by the IMF to be considered "commercially run".⁸
- 1.13 The municipio of Medellín owns EPM and, for the municipio, EPM's size is considerable. In December 2004, the total assets of the municipio of Medellín, not including EPM, was equivalent to 23% of EPM's assets. Likewise, excluding transfers from EPM, in 2004 the municipio's revenue were 30% of EPM's revenue. The company transfers⁹ 30% of its profits from the previous year to the municipio of Medellín as regular payments, plus any special payments agreed on by the Medellín Council. In 2004 this transfer amounted to US\$126 million (58% of 2003 profits), of which US\$66 million were regular payments. EPM is an internationally renowned company with a distinguished track record. It is supported by the citizens of Medellín for having contributed, since its inception, to the region's economic and social development, which has helped it to form significant social capital. Still, it is not immune to political influences that could undermine its performance. As a State-owned industrial and commercial company with a sole owner, its current corporate governance practices, compiled in a code of good governance, are based

⁸ IMF document SM/04/93 establishes a set of criteria relating to financial condition, government structure, administrative independence, and the relationship between public enterprises and the central government to determine whether these companies are commercially run. If so, their investments are excluded from total public investment in the primary deficit or surplus targets to be met by the country under the IMF Standby arrangement. Colombia was one of the pilot countries in the application of these criteria to national public enterprises.

⁹ Municipal Agreement 069 of 1997.

on the recognition of a series of legal standards of various orders, some of which reflect internationally recognized corporate governance practices.¹⁰

- 1.14 EPM's financial performance and track record in meeting its financial obligations have been highly satisfactory. An analysis of financial performance over the period reveals that the Power Generation SBU is more dynamic than EPM consolidated, since its net profits grew at three times the rate of the company as a whole. The remaining financial indicators point to a sound financial footing, with debt ratios under 36%. The Power Generation SBU's internal generation of funds rose from 24% of the company total in 1999 to 39% in 2004 and, additionally, grew 20% annually in nominal terms, all of which reflects a dynamic, positive condition that ensures that EPM will have the sufficient financial capacity to make timely investments and properly service its debt.
- 1.15 Internationally, EPM is carrying out the Bonyic Hydroelectric Plant Project in Panama.¹¹ This undertaking is part of its strategy to grow and diversify its power generation business, and constitutes a pilot project that will help it gain direct knowledge of foreign energy markets, with a view to later taking the business global, which would: (i) provide an investment alternative to the domestic market, and (ii) enable it to diversify risk.

C. The Bank's country and sector strategy

- 1.16 The Bank's country strategy with Colombia aims to: (i) lay the groundwork to revive and boost the economy; (ii) promote social development and protection for the most vulnerable groups; and (iii) improve the country's governance and support modernization of the State. This project fits with that strategy in three main ways: (i) by meeting the demand for energy, it will help to revive and boost the economy; (ii) it promotes social development and the protection of the most vulnerable groups by helping to keep the generation component of power rates at an efficient level, which favors consumers in general and lower-income consumers in particular; and (iii) it supports the country's governance by being consistent with a scenario of economic growth, wise use of resources, and satisfied demand for electric power. Additionally, the Sector Program for Public Utilities seeks to protect the most vulnerable groups by better targeting subsidies so they reach those who really deserve them. The project also promotes the country's governance and supports modernization of the State with specific measures conducive to strengthening the institutions in charge of regulation, oversight, control, and competition.

¹⁰ IAAG Consultoría and Corporate Finance, Review of the Code of Good Corporate Governance. Preliminary report, May 2005. RE3/FI3 technical files. Conclusions of the workshop for international companies using internationally recognized corporate-governance standards, sponsored by the Bank in Medellín in May 2005.

¹¹ In November 2003, EPM acquired control of Sociedad Hidro Ecológica del Teribe (HET), whose purpose is the construction and operation of the 30 MW Bonyic hydroelectric plant. This project has been declared eligible for financing by the Bank's Private Sector Department.

- 1.17 Sector development has been hindered by a series of factors inherent to the sector and other, external factors including country risk, public safety risk, and regional risk. The Bank's strategy in the electric power sector, which is part of its Energy Sector Strategy, seeks to: (i) support the consolidation of institutional, structural, and economic reforms (economic, financial, environmental, social, and political sustainability); (ii) develop efficient and environmentally sustainable patterns of energy production and consumption (environmental sustainability); and (iii) mobilize capital to finance the sector (financial sustainability). The public utilities policy-based loan (PBL) is supporting the consolidation of institutional reforms by strengthening the oversight, regulatory, and control agencies as well as helping attract financing to the sector through new regulatory signals¹² that encourage private participation in the expansion of generating capacity, signals that should be sent by the CREG—the independent regulatory agency. The project supports the second pillar of the Energy Sector Strategy, as it promotes efficient and environmentally sustainable energy production.
- 1.18 **Bank experience in the sector.** The Bank has been involved with the development of Colombia's electric power sector for the last 30 years, from when it had an installed capacity of only 2,700 MW up to its current 13,000 MW capacity. The Bank's loans to the sector, distributed over 35 operations for a total of US\$2.75 billion, have helped finance 30% of current generating capacity through support for the construction of 11 hydroelectric power plants, the largest of which were San Carlos, Guavio, and Chivor, each with a capacity of about 1,000 MW; the most recent was Porce II, at 405 MW, which began operation in 2001. At the same time, it supported construction of the transmission and control infrastructure for the above projects as well as for the national transmission system; the 230 kV and 500 kV lines constructed with the Bank's assistance account for 35% of the system. Through the above projects, the Bank has supported programs involving administrative restructuring, training of personnel, provision of data-processing procedures and equipment, customer service, loss control, and rational energy use. Through its Private Sector Department, the Bank supported the 160 MW Termovalle thermoelectric plant with two loans totaling US\$147.2 million.
- 1.19 The Bank had a major hand in the restructuring of the electric power sector, which resulted in a totally public sector moving toward one with considerable private participation (60% in generation, 45% in distribution, and 20% in transmission). This process produced the CREG and the UPME and launched the Power Exchange to manage the MEM. Stage II of the program to support private participation and concessions in infrastructure (PPCI-2, loan 1594/OC-CO) is in execution. In the

¹² The current signal, the so-called "capacity charge," distributes part of revenues from generation based on the power that each generating plant would supply to the system during critical hydrological conditions. Generation revenues are valued at the market price, which is determined by the offer price of the marginal dispatched generator in order of merit. There is evidence that the capacity charge has not produced the right incentives to encourage private investment in expanding generating capacity.

portfolio analysis, all the projects in the sector have been rated satisfactory and have met their targets, except Termovalle.

- 1.20 The Bank has financed eight EPM projects in the electric power and water sectors since 1961, with 13 loans granted for a cumulative total of US\$825 million. To date, EPM has fully met all its contractual obligations, including those it has contracted with the Bank and with other entities such as the World Bank, the Japan Bank for International Cooperation, the Andean Development Corporation, private banks, its bondholders, and the Government of Colombia. As of 31 March 2005, EPM's outstanding loan balance with the Bank was US\$386 million. All of EPM's projects have been rated satisfactory by the Bank and have met their targets and objectives.
- 1.21 **Lessons learned.** The Porce II project, recently executed by EPM, has yielded valuable experiences because of its similarity to Porce III. Every aspect of the construction of Porce II was characterized¹³ by an extensive preparatory phase: project engineering, environmental impact estimates, and thorough social management planning. This helped to prevent surprises once the project was under way, explaining why the vast majority of the lessons associated with Porce II are positive; a noteworthy example lies in its social management, a significant experience which should be studied and borne in mind owing to its level of complexity and the multiplicity of variables considered. Original expectations and estimates were surpassed in: the handling of environmental issues and particularly of the relocated population; the handling of the issue of public health and disease; the handling of environmental issues surrounding the project site and area of influence; the archeological recovery efforts; the plant's greater capacity, which went from an initially estimated 392 MW to a final operating capacity of 405 MW; and the lower cost of the project, initially estimated at US\$605.4 million and ultimately executed for US\$559.8 million (current dollars). At constant 1992 prices, the cost fell from US\$536 million¹⁴ to US\$497.5 million, meaning a reduction of 7.2% and a savings of US\$38.5 million. This successful methodology is being implemented for Porce III.
- 1.22 The above successes notwithstanding, Porce II went into operation 21 months after the initially planned date. The greatest difficulty that arose during the execution of Porce II had to do with contractual incidents involving the main contractor for the civil works, who had to be replaced more than four years after construction began. The primary cause was lack of unity within the consortium, consisting of five firms, leaving the lead company alone with the burden of finding solutions and providing financial support. This experience has been factored into Porce III in the form of a strict prequalification process that steps up the financial capacity requirements and limits the number of consortium members to a maximum of three. As for EPM's

¹³ Project completion report for Porce II Hydroelectric Power Plant, project CO-0221, loan 792/OC-CO, completion date 14 July 2001.

¹⁴ Excluding finance charges.

sphere of action, the lesson learned¹⁵ should be reflected in an appropriate treatment of contractual breaches, favoring an early decision based on clear, predefined criteria that spell administrative cancellation for unfulfilled contracts, thus avoiding successive temporary arrangements insofar as possible.

- 1.23 In addition to the specific experience with Porce II, lessons have been learned from other Bank projects and there is a wealth of experience worldwide relating to the construction of hydroelectric power plants that suggests, among other things: (i) ensuring that project-related agreements are clearly spelled out before procurement begins; (ii) ensuring that the project meets all the previously established conditions before it is placed into service; (iii) monitoring project operations to take into account any changes that might affect it; (iv) ensuring a priori that those affected by the project are consulted and that their opinions are taken into consideration in carrying it out; (v) becoming deeply familiar with the project basin and its ecosystem with a view to maintaining them; and (vi) conducting a broad assessment of different options, granting social and environmental considerations the same high priority as technical factors.

D. Colombia's strategy in the sector

- 1.24 The government, through its UPME, developed the National Energy Plan containing the 2003-2012 indicative plan for expanding generation. As this plan identifies an absence of enough projects registered with the UPME to meet demand after 2010, the government's concern centers around its legal obligation to take the necessary measures to meet demand.¹⁶ To forestall the problems associated with the lack of new private investment, the government has adopted the following measures: (i) studying reforms to the MEM and to the regulatory framework that would produce better price signals to encourage private participation in new generation—reforms that it has undertaken to implement under the public utilities PBL; and (ii) supporting projects that, like Porce III, show an appreciable degree of progress, enabling them to contribute to meeting demand. The reforms to the MEM will likely only bear fruit in the medium or long term, making support for projects showing concrete progress all the more vital. Porce III is one of five existing projects that are at an advanced stage of readiness.

E. Project strategy

- 1.25 The project strategy consists of helping the public sector to fulfill its role of ensuring that the demand for electric power is met efficiently and sustainably and contributing to the consolidation of EPM's institutional qualities through the

¹⁵ Fernando Lecaros, "Informe evaluación ex post de Porce II [Porce II ex post evaluation report]," February 2005, RE3/FI3 technical files.

¹⁶ Taking priority over the strategic guideline of improving the ratio of hydraulic to thermal generation—currently 66/34—aimed at lowering the system's vulnerability to critical hydrological events, such as the "El Niño" phenomenon (Carmenza Chain and Juan Manuel Rojas: "Colombia: Desarrollo Reciente e Infraestructura. Sector Electricidad [Colombia: Recent Development and Infrastructure. Electricity Sector]," Baseline Reports, World Bank documents.

- adoption of international best practices in corporate governance. By financing a public electric-power generation project whose construction may be categorized as certain or highly probable, it seeks to solve the problems associated with the absence of new private generation projects. These problems are rooted primarily in the price signal called the “capacity charge,” which has been in place since 1996 and has proven ineffectual in encouraging private investment in new generation projects. The medium-term strategic action the Bank is promoting through the public utilities PBL consists of implementing a new price signal soon. While this measure takes effect, however, the situation already created must be corrected by the complementary strategy of setting the Porce III project in motion.
- 1.26 To that end, the project strategy consists of supporting the construction of Porce III, whose technical feasibility has been extensively analyzed, which makes better use of the public investments already made in existing hydraulic regulation works in the basin, which has minimal economic costs and positive indicators in terms of economic virtue, and which is profitable, socially and environmentally friendly, sustainable, and consistent with Bank policy. This support will be lent through a company with a distinguished track record and with the right conditions and capacity to execute it successfully, as ensured by its experience with similar works and the proper servicing of its debts. The Bank’s value added with regard to the hydroelectric power plant works lies in continuing and deepening the successful environmental and social management approach whose implementation it fostered when it financed Porce II, and even enhancing it with lessons learned, during construction and operation of Porce III. The virtues of this strategy were widely publicized through regional and national project dissemination seminars organized by EPM. Additionally, it is promoting a risk analysis for the set of dams located in the basin, which will lead to the identification of preventive measures and to the implementation of a contingency plan of immeasurable impact on the proper operation of the powerhouses associated with them, and on the welfare of the population living in their areas of influence.
- 1.27 EPM’s adoption of international best practices in corporate governance is aimed at maintaining and consolidating its qualities and shielding it from potentially harmful political influences. Here, the Bank’s value added took the form of basic studies done during preparation of this operation, a preparatory workshop, and another workshop on successful international corporate-governance practices. These actions made it possible to identify financial practices, such as the application of international accounting standards, that will have a synergic influence on the central government by making EPM a commercially run business according to IMF criteria, and to mark out the general areas of action for honing or adopting international best practices in corporate governance.
- 1.28 The project is consistent with the Public Utilities Policy (OP-708) in that it: promotes the economic development of the region and the welfare of its population;

keeps prices as low as possible by temporarily displacing¹⁷ the more costly plants that determine the price paid for power;¹⁸ and promotes competition among generators because of its participation in the MEM. The project is also consistent with the sector model in place in Colombia, which allows for the existence of both public and private generators, in that it complies with the installed-power restrictions established in the regulatory framework.¹⁹ Given the established rules, it is legitimate for the public sector to use its comparative advantages, such as better financing options and efficient use of its resources. One of the main reasons why the project costs less²⁰ is the existence of hydraulic works, built by the public sector, that regulate the basin's flow.

- 1.29 The project also adheres to the guidelines set out in the following Bank policies: Disclosure of Information (OP-102), and Involuntary Resettlement (OP-710).

¹⁷ This displacement will last until demand growth once again forces the displaced plants to be dispatched, which is an economic efficiency effect in keeping with the Public Utilities Policy.

¹⁸ Available economic analyses indicate that the entry into service of Porce III will lower short-term marginal cost by US\$0.735/MWh.

¹⁹ Maximum available installed power per generating company is limited to 25% of the total installed power in the interconnected national grid.

²⁰ The cost of the power generated by the project, measured as the quotient between the present value of the total cost of investment, operation, and maintenance of the project and its associated works and the present value of the power dispatched in the average-demand scenario, calculated over the project's useful life of 50 years, is estimated at US¢3.27/kWh, expressed in 2002 market prices. In the UPME's "2000–2010 Expansion Plan," the incremental average long-term cost of generation is US¢4.3/kWh.

II. THE PROJECT

A. Objective and description

- 2.1 **Objective.** The general objective of the project is to help meet Colombia's growing demand for electric power, beginning the second half of 2010, by efficiently and sustainably utilizing hydraulic resources from the Porce River.
- 2.2 **Description.** To this end, the project will support construction of the Porce III hydroelectric power plant and its entry into service beginning in the second half of 2010, while also helping to maintain and gradually consolidate the institutional performance and efficiency of Empresas Públicas de Medellín (EPM).
- 2.3 **Location.** The site of the Porce III hydropower project is on the Porce River, approximately 147 km northeast of the city of Medellín, in the department of Antioquia, in the jurisdiction of the municipios of Amalfi, Anorí, Gómez Plata, and Guadalupe.
- 2.4 **Basin.** The basin lies in the Andean region north of Colombia's central mountain range, between 218 and 2,700 meters above sea level. It spans four subbasins, one of which is the Porce River subbasin, which covers 5,230 km²; the area of the Porce River subbasin corresponding to the dam site covers 3,756 km². The Porce River basin is home to the Troneras, Guadalupe III, Guadalupe IV, Riógrande, Niquía, La Tasajera, and Porce II hydroelectric plants and the works to divert the flows of the Nechí River basin through the diversion of the Nechí, Pajarito, Dolores, and Tenche rivers. The flows of the Negro, Buey, Piedras, and Pantanillo River basins, which feed into Medellín's water supply system, are also diverted to the Porce River.
- 2.5 **Capacity.** Porce III will have an installed capacity of 660 MW, firm generation of 3,105 GWh/year, and average generation of 4,254 GWh/year. Owing to its size and characteristics, the Porce III hydroelectric power plant plays a fundamental role in Colombia's indicative plan for expansion.
- 2.6 The project comprises the following activities:
 - a. **Engineering and administration:** Includes design and comprehensive supervision;²¹ the panel of consultants/advisory group; administration and management of EPM, including logistics and public safety in the project area; the external financial/operational and socioenvironmental audits; and the midterm and final evaluations.
 - b. **Civil works:** Comprises the major infrastructure and civil works. The latter include the 150 meter-high concrete-face rockfill dam, a bottom outlet tunnel, a channel spillway, an underwater intake structure, a 12.72 km headrace tunnel, a 159 m vertical pressure shaft, a four-junction distributor and tunnel, a surge tank,

²¹ Designs commissioned from the INGETEC-Klohn Crippen consortium; comprehensive supervision already contracted with Consultores Interventoría Porce III.

a machine bay 121.15 m long, 18.20 m wide, and 41.70 m high, a transformer bay, tailrace works, and a 493 m access tunnel to the bay.

- c. **Electromechanical equipment:** Comprises four sets of spherical inlet valves; 172 MW vertical-shaft Francis turbines; 218 MVA, 60 Hz, 360 rpm generators producing voltage on the order of 13.8 kV; 145 MVA, 500 kV transformers; and a cable, ventilation, and discharge gallery.
- d. **Connection to the electric power grid:** Comprises 6 km, 500 kV lines between the powerhouse portico and a conventional substation in the Alto de San Benigno. This substation will be connected with the interconnected national grid (ING) via two 23 km, 500 kV lines extending to the point where the existing line between the San Carlos plant and Cerromatosos will be opened via a control substation.
- e. **Environmental and social management plan:** This plan aims to ensure the project's socioenvironmental sustainability, in keeping with Bank policy and Colombian legislation, through measures and actions in the following areas: (i) prevention and mitigation of physical or biotic impacts and compensation therefor; (ii) prevention and mitigation of social impacts and compensation therefor; (iii) environmental technical specifications and programs to implement environmental management measures; (iv) monitoring of environmental and social indicators; (v) socioenvironmental follow-up; (vi) contingencies; and (vii) institution-strengthening.
- f. **Corporate development activities:** These activities will help EPM to maintain and gradually consolidate its institutional performance and efficiency. To that end, the project will finance the identification, validation, and implementation of corporate development measures at EPM as well as provide for monitoring, dissemination, and ongoing evaluation. These activities will mainly be organized around the following: an overall focus on corporate governance, property rights and equitable treatment of property, ownership structure and control, the Board of Directors, financial and nonfinancial information, and dispute resolution.²² It will also finance yearly external evaluations that will determine EPM's progress in this area.

B. Cost and financing

- 2.7 The estimated cost of the project, including financial expenses, is US\$911 million, of which US\$200 million will come from the Single Currency Facility of the Bank's Ordinary Capital.²³ The remaining US\$711 million will be contributed by EPM. The Bank will partially finance engineering and administration, civil works,

²² The first activities expected to be financed during year one of execution include: (i) specialized workshops and seminars for members of the Board of Directors, the Municipal Council, and the boards of directors of EPM's subsidiaries; and (ii) an analysis of specific issues so as to generate a consensus and make progress toward marking out the specific activities to be carried out over the course of the project.

²³ The loan contract will stipulate that the proceeds of the Bank loan will be used exclusively for project-related expenses.

electromechanical equipment, and corporate development activities. The local counterpart funds will come from EPM's operating cash flow (Table II-1).

Table II-1 Costs and Financing (millions of current U.S. dollars)

Activities		Totals			
		IDB	Local	Total	Percentage
1	Engineering and administration	0.40	48.53	48.93	5.37%
1.1	Design	0.00	1.64	1.64	0.18%
1.2	Supervision	0.00	23.87	23.87	2.62%
1.3	Advisory services	0.00	1.03	1.03	0.11%
1.4	Administration	0.30	21.99	22.29	2.45%
1.4.1	Project management	0.00	14.78	14.78	1.62%
1.4.2	Logistics	0.00	4.61	4.61	0.51%
1.4.3	Security in the project area	0.00	2.59	2.59	0.28%
1.4.4	External audits	0.30	0.00	0.30	0.03%
1.5	Midterm and final evaluations	0.10	0.00	0.10	0.01%
2	Direct costs	189.10	569.35	758.45	83.26%
2.1	Infrastructure	0.00	95.15	95.15	10.45%
2.2	Main works	175.57	234.11	409.69	44.97%
2.2.1	Dam	56.15	103.43	159.59	17.52%
2.2.2	Underground works	119.42	130.68	250.10	27.46%
2.3	Equipment	13.53	199.34	212.87	23.37%
2.3.1	Mechanical equipment for civil works	0.00	45.23	45.23	4.97%
2.3.2	Primary equipment	13.53	113.75	127.28	13.97%
2.3.3	Secondary equipment	0.00	40.36	40.36	4.43%
2.4	Environmental and social management	0.00	28.63	28.63	3.14%
2.4.1	Physical/biotic environment	0.00	6.05	6.05	0.66%
2.4.2	Social environment	0.00	19.82	19.82	2.18%
2.4.3	Monitoring	0.00	1.37	1.37	0.15%
2.4.4	Environmental follow-up	0.00	0.14	0.14	0.02%
2.4.5	Institution-strengthening	0.00	1.25	1.25	0.14%
2.5	Transmission	0.00	12.12	12.12	1.33%
2.5.1	Equipment for connection to the ING	0.00	7.48	7.48	0.82%
2.5.2	Transmission lines	0.00	4.64	4.64	0.51%
3	Associated costs	0.00	2.83	2.83	0.31%
3.1	Land and easement	0.00	2.83	2.83	0.31%
4	Unallocated	10.00	46.97	56.98	6.25%
4.1	Contingencies	10.00	46.97	56.98	6.25%
5	Corporate development	0.50	0.50	1.00	0.11%
5.1	Corporate development	0.50	0.50	1.00	0.11%

Activities		Totals			
		IDB	Local	Total	Percentage
6	Financial expenses	0.00	42.74	42.74	4.69%
6.1	Interest	0.00	39.41	39.41	4.33%
6.2	Commitment fee	0.00	3.32	3.32	0.36%
	TOTAL PORCE III	200	711	911	100%
	% share	22%	78%	100%	

III. PROJECT EXECUTION

A. Borrower, guarantor, and executing agency

- 3.1 EPM will be the borrower and executing agency. The Republic of Colombia will be the guarantor of the obligation to pay back the loan, including interest and fees. An exception is being requested to the policy on guarantees required from the borrower (OP-303) with respect to the local contribution and proper project execution, since the Republic of Colombia will only be guaranteeing the obligation to pay back the loan, including interest and fees. The guarantor will, however, provide extensive cooperation to ensure that project objectives are met.

B. Execution and administration

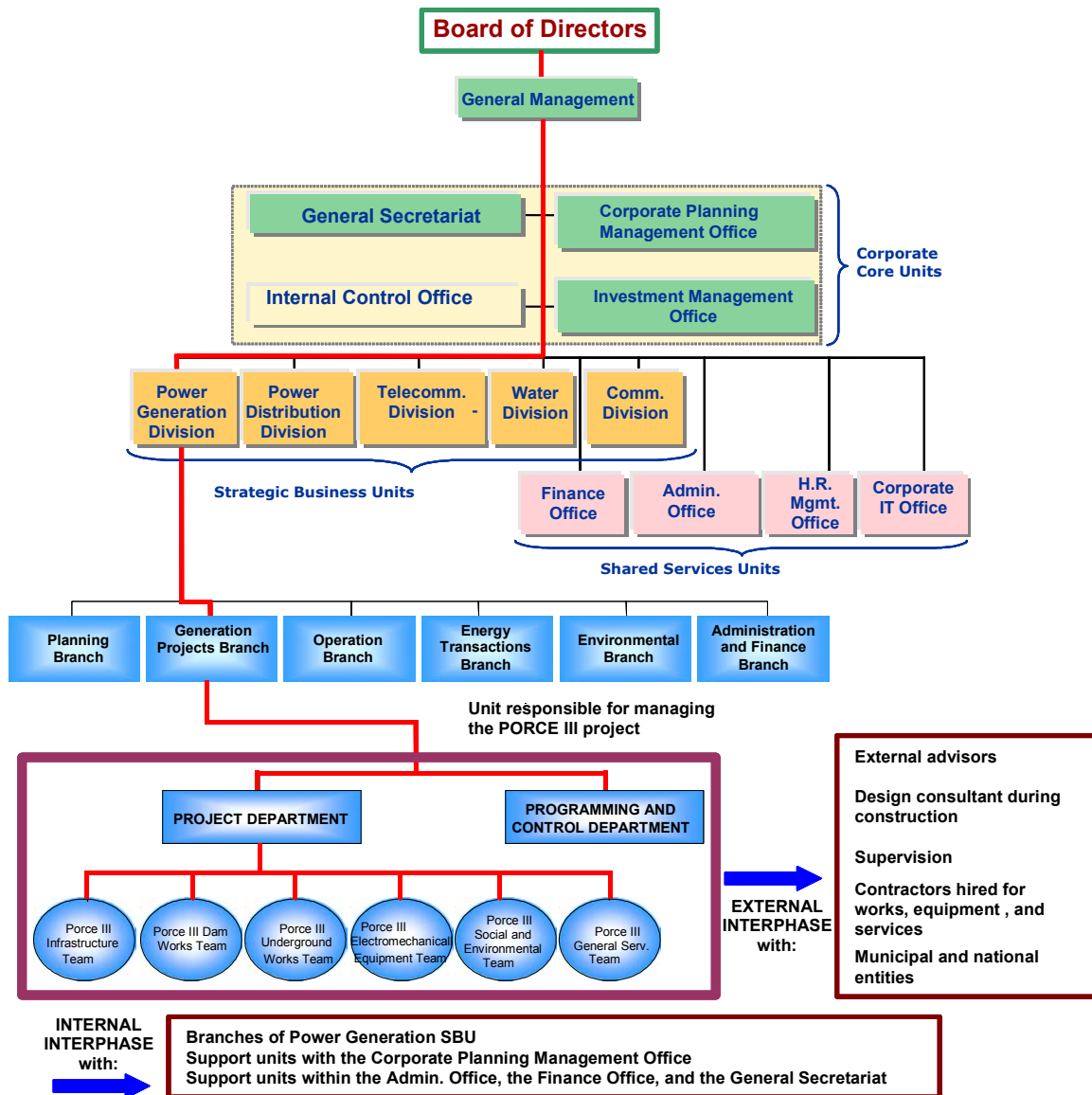
- 3.2 The construction and engineering of Porce III will be the responsibility of the Generation Projects Branch. It is divided into two departments: the Projects Department and the Programming and Control Department. The Projects Department is in charge of the infrastructure works, dam works, underground works, electromechanical equipment, environmental and social management, and general services. The Programming and Control Department and the Communications Unit support the Projects Department in managerial tasks such as preparing the execution plan, monitoring and control, financial management support, and handling communications and information within EPM. The Branch will receive assistance from the Administration and Finance Branch in carrying out functions associated with administrative, accounting, and financial monitoring.
- 3.3 A consortium of specialized firms will help the Generation Projects Branch with the comprehensive supervision of Porce III.²⁴ For technical matters, the executing agency will also be assisted throughout the construction period by a team of four internationally renowned experts who will provide advisory services and support, primarily in areas relating to the dam and underground works. Once the hydroelectric power plant is built, its operation and maintenance will be the responsibility of the Operation Branch, which is in charge of the operation and maintenance of all the hydroelectric power plants in the basin.
- 3.4 The corporate development activities will be coordinated by the Corporate Planning Management Office, one of the corporate core units that answers directly to General Management.²⁵ These activities will be carried out based on annual work plans, and will include activities to help EPM hone or adopt international best practices in

²⁴ EPM has already hired the consortium Consultores Interventoría Porce III to carry out comprehensive supervision, which includes supervising works as well as the environmental and social management measures.

²⁵ This office performs strategic and financial planning for the corporation and for the strategic business units and recommends strategic and policy guidelines for allocating financial resources to EPM's various investment projects.

corporate governance, taking into account the findings of annual external evaluations that will determine progress made in this area.

- 3.5 The following figure shows the corporate organizational chart for EPM and a breakdown of the Generation Projects Branch, which is in charge of project execution. The figure also illustrates internal and external coordination relationships:



C. Procurement

- 3.6 **Goods and works.** Goods will be procured in accordance with the Bank's policies for the procurement of works and goods financed by the IDB (document GN-2349-4, approved 19 January 2005) with the procurement plan.

- 3.7 International competitive bidding (ICB) will be mandatory for goods that are procured in part or in whole with foreign exchange from the loan and whose value exceeds the equivalent of US\$250,000. Goods for amounts between US\$50,000 and US\$250,000 may be procured through national competitive bidding (NCB), according to Colombian law; and goods for amounts below US\$50,000 may be procured through shopping.
- 3.8 In the case of works, ICB will be used to contract works costing more than US\$5 million. NCB will be used for amounts between US\$350,000 and US\$5 million; and shopping will be used for works with budgets under US\$350,000.
- 3.9 **Consulting services.** Consulting services will be selected and hired in accordance with the Bank policies established in document GN-2350-4, approved 19 January 2005, and with the procurement plan. The executing agency will be responsible for preparing the short list. In the case of contracts for values less than US\$350,000, the short list may be composed entirely of local consultants.
- 3.10 **Procurement plan.** With advisory assistance from the Bank, the executing agency has prepared a procurement plan.²⁶ The borrower will update the procurement plan annually as needed, or when substantial changes occur, always covering the next 18 months of the project execution period. Any proposed revision of this plan must be submitted for the Bank's approval. The current version of the procurement plan must always be available.
- 3.11 **Review of procurement.** The procurement of goods and works through ICB and the first two NCB processes for works will be supervised ex ante and in accordance with the provisions of document GN-2349-4, Annex I. The process of selecting consulting services through ICB will also be supervised ex ante, in accordance with the provisions of document GN-2350-4, Annex I. Despite the executing agency's proven capacity in terms of managing procurement, the Bank's Country Office in Colombia will train EPM staff in the Bank's new procurement policies and procedures.
- 3.12 **Recognition of prior expenditures.** Expenditures of up to US\$110 million, made within a maximum of 18 months prior to the date this operation was approved by the Bank's Board of Executive Directors, will be recognized and charged against the local counterpart contribution. These outlays reflect payments under contracts awarded by EPM using procedures acceptable to the Bank for items such as the access roads to work sites and facilities, construction camps, power lines for construction, construction of access portals to the tunnels, acquisition of land, and socioenvironmental studies and activities; it also includes the corresponding consulting services for supervision of the above activities.

²⁶ The procurement plan is included in the table of electronic links and references.

D. Revolving fund

- 3.13 A revolving fund of up to US\$10 million, equivalent to 5% of the proceeds of the Bank loan, will be set up in a bank account under the project's name. The executing agency will be responsible for submitting semiannual reports to the Bank on the status and adequacy of this revolving fund within 60 days following the close of each six-month period.

E. Accounting records and control of disbursements

- 3.14 The executing agency will set up separate and specific bank accounts for handling the proceeds of the Bank loan and will keep the necessary records in order to identify the resources from local contributions. Financial accounting for transactions and disbursements made during the execution stage and maintaining financial information on the project will be the responsibility of the Administration and Finance Branch.

F. External audits

- 3.15 External audits will be conducted by an independent auditing firm in accordance with Bank policies and requirements (documents AF-300 and AF-400). These audits will be commissioned according to the procedures set out in the document governing bidding for consulting service contracts (AF-200), and will follow the guidelines set out in the terms of reference for external audits for IDB-financed projects (AF-400). The cost of these audits will be covered with resources from the Bank loan. The independent auditors will be hired for a minimum period of three years. The audited financial statements will be submitted within 120 days following the close of each fiscal year, beginning with the fiscal year during which project execution began and throughout the term of the loan contract.
- 3.16 The executing agency will hire a firm to conduct external socioenvironmental audits that will include findings as to its compliance with the measures and requirements of the environmental and social management plan. These audits will be conducted twice yearly during the construction stage of Porce III. Commissioning these audits under the terms agreed to with the Bank constitutes a **condition precedent to the first disbursement of the loan resources.**

G. Execution period and disbursement timetable

- 3.17 The anticipated execution period is seven years. Table III-1 shows the tentative schedule of disbursements per year of the proceeds of the Bank loan and of the local counterpart funds.

Table III-1
Tentative Disbursement Schedule
(millions of current U.S. dollars)

	2004	2005	2006	2007	2008	2009	2010	2011	Total	%
Bank	0	38.44	41.00	50.33	40.08	28.87	1.28	0	200	22
Local	36.94	96.14	97.01	131.55	224.16	92.77	29.01	0.65	711	78
Total	39.64	134.58	138.01	181.88	264.25	121.64	30.29	0.65	911	100
% per year	4	15	15	20	29	13	3	0	100	

H. Monitoring and evaluation

- 3.18 The logical framework that will serve as the basis for monitoring and evaluation may be found in Annex I. The project's complete logical framework contains the indicators for the project's chief outputs and outcomes, along with the means of verification (sources and systems for gathering information) and the major assumptions (risks), in both the hydroelectric power plant's construction phase and in its operation phase. The outcome indicators are accompanied by the relevant baselines, as well as quantified intermediate and final targets. The output indicators selected for the construction phase were the most important ones, as well as those that would make the semiannual monitoring required by the Bank possible.
- 3.19 As with Porce II, the executing agency will use several monitoring and data collection systems for comprehensive management of the project. The physical works will be monitored through a proven system of comprehensive supervision that generates monthly reports. Although these reports are monthly, the executing agency will submit semiannual supervision reports to the Bank—a **special execution condition**. Once the plant is built, the executing agency will submit an annual report on the condition of the project works and equipment with an annual maintenance plan that ensures that those works and equipment are kept in the same working condition they were in at the time of completion—a **special condition during the term of the loan contract**.
- 3.20 Additionally, a study will be done of the operating condition of all the hydropower developments in the Porce River basin, under the terms agreed to with the Bank. This study will serve as the basis for preparing a contingency plan for managing floods, dam breaks and failures, and other risks that may arise. **As a special condition during the term of the loan contract**, the executing agency will, prior to 31 December 2006, submit this contingency plan to the Bank under the agreed terms and subsequently implement the feasible measures in the plan that are EPM's responsibility and report to the Bank twice a year on their implementation.
- 3.21 **Monitoring of financial and accounting matters.** During the life of the contract, EPM will calculate monthly the average market and contracts price (AMCP) for its own market, following the same methodology as the Commercial Exchange System Administrator (ASIC), and will submit the corresponding figures for the close of each six-month period to the Bank semiannually. EPM will implement the best

business measures within its reach aimed at keeping the AMCP for its market above 90% of the AMCP values for the Colombian market published by the ASIC.²⁷ The executing agency will submit, within 120 days of the end of the fiscal year, an annual financial report with financial statements and updated 10-year financial projections, both broken down by strategic business unit and in consolidated form. This annual report will assess compliance with the contractual clauses relating to financial matters and the status of the indicators included in the logical framework. With a view to meeting the IMF criteria for being considered commercially run, EPM will apply the recommended international accounting standards for the valuation of asset investments and their corresponding disclosure in its financial statements beginning with the fiscal year ending 31 December 2005. In the event that financial transactions take place between EPM's strategic business units, those transactions are to be based on commercial market conditions and not compromise the timely availability of resources needed for project execution or to service the debt. The executing agency may not, without prior authorization from the Bank, sell, dispose of, or transfer assets whose value exceeds 50% of the assets of EPM consolidated

- 3.22 During project execution, EPM will not assume new financial obligations with terms greater than one year as a result of which: the ratio between EPM total financial debt and earnings before interest, taxes, depreciation, and amortization (EBITDA) would be over 2.5; in other words, at the end of each analysis period the ratio of EPM's total financial debt to EBITDA must be less than or equal to 2.5. After execution is completed and during the life of the contract, it will not assume new financial obligations with terms greater than one year as a result of which the ratio between EPM's total financial debt and EBITDA would be over 2.9; in other words, at the end of each analysis period the ratio of EPM's total financial debt to EBITDA must be less than or equal to 2.9. During the life of the contract, the ratio between long-term debt and equity will not exceed 1.5 times equity. As a **special execution condition**, the executing agency will request prior authorization from the Bank to execute expansion projects under the Power Generation strategic business unit whose annual investments, excluding project-related investments, exceed 20% of the total value at that time of fixed assets in service, plus the value of works in execution of the Power Generation SBU.
- 3.23 **Social impacts and social management will be monitored** through a data collection tool used twice a year to gather information from families who must be relocated, resettled, and compensated for the works who are living in the municipios to which most of the population has relocated. This tool makes it possible to evaluate observable results or effects in terms of living conditions, housing, community infrastructure, access to education, health, and family income—indispensable inputs for verifying that the measures in the environmental and social management plan have helped to maintain or improve these conditions.

²⁷ In the event that regulations change the definition of the “average market and contracts price,” the borrower and the Bank will agree on a new indicator.

The executing agency will submit evidence to the Bank that the environmental authority has approved the modified environmental license authorizing construction of the transmission lines **prior to the first disbursement of the loan resources**. Before the reservoir is filled, the executing agency will furnish the Bank with evidence that it has relocated, resettled, and compensated the affected population in accordance with the Resettlement Program—a **special execution condition**. The executing agency will also produce quarterly and annual reports on the implementation of epidemiological measures, based on epidemiological risk maps.

- 3.24 **Environmental impacts and management will be monitored** through: (i) reports every two years, based on field work, on the vegetation monitoring plan; (ii) semiannual reports on the plan for monitoring water quality; (iii) annual reports on the fauna monitoring plan; and (iv) other monitoring indicators.²⁸ **As a special execution condition**, the executing agency will submit to the Bank a semiannual environmental and social management monitoring report—a report required by the Ministry of Environment, Housing, and Land Development. Prior to 30 July 2006, the executing agency will present the findings of the study on the synergic and cumulative impacts on the Porce River basin and a proposed management plan for preventing, compensating for, and mitigating the impacts identified therein that includes the specific allocation of resources to execute the measures in that plan that are feasible and for which EPM is responsible, **as a special condition during the term of the loan contract**.
- 3.25 **Corporate development activities will be monitored** through annual progress reports on implementation of the annual work plans and by commissioning annual external evaluations that judge progress in this area. The executing agency and the Bank will agree upon the terms of reference for these evaluations. **Prior to the first disbursement of the loan resources**, the executing agency will submit the work plan for the first year of execution. It will also submit, annually, the findings of the external evaluations of its implementation of corporate development measures as well as its own reports on progress in this area—a **special execution condition**. During the execution period, it will also submit a proposed work plan for the following year.
- 3.26 **Evaluations**. Once 50% of the proceeds of the Bank loan have been committed, the executing agency will commission a study so that EPM and the Bank can conduct a **midterm evaluation**. A **final evaluation** will be conducted when 95% of the proceeds of the Bank loan have been disbursed. These evaluations will cover, at a minimum, the following: (i) general progress in building the hydroelectric power plant, including adherence to the timetable and procurement procedures and outcomes; (ii) progress in implementing the corporate development activities; (iii) progress with the environmental and social management plan; (iv) fulfillment

²⁸ Other monitoring indicators include: the flows of the Porce River and its tributary streams, aggradation and/or degradation of the riverbed, air quality, instability and erosion, the landscape, and the lowering of groundwater levels associated with streams above the headrace tunnel. Specific measuring sites, frequency, duration, resources, and procedures are detailed in briefs.

of the special contractual conditions for execution; and (v) fulfillment of the indicators in the logical framework. Both evaluations will be commissioned with proceeds of the Bank loan. The definitive objectives, scope, and outputs for both evaluations will be agreed on jointly. The executing agency will gather, store, and keep all the information, indicators, and parameters, including the annual plans and the midterm and final evaluations, needed to help the Bank prepare the Project Completion Report.

IV. VIABILITY AND RISKS

- 4.1 The evaluations conducted confirm that the project is institutionally, economically, financially, technically, environmentally, and socially viable. The principal findings and conclusions of these evaluations are presented in detail below.

A. Institutional viability²⁹

- 4.2 There are no legal impediments to construction by EPM under this project, nor are there regulatory impediments, for its installed generating capacity will not exceed the limit of 25% of nationwide installed capacity. Current control and oversight mechanisms are sufficient, as EPM is overseen by six different agencies. The institutional assessment confirms that EPM has the capacity, organizational structure, and human resources to execute the project, so no specific institution-strengthening will be necessary.

- 4.3 As a result of the experience gained in the construction of several generation projects, and specifically as a result of the lessons learned from Porce II, which is similar to Porce III, the organizational structure of the Projects Branch is well suited to carrying out the various activities and making decisions as needed to successfully complete the plant. This Branch is divided into thematic work teams that are responsible for carrying out activities in their area, and operate based on critical paths and a project management approach. The Branch operates in an integrated fashion, and enjoys autonomy with regard to all project-related decisions, thereby avoiding diluted responsibilities and coordination problems. Its institutional executing capacity will be enhanced through the services of a panel of highly qualified specialists; through advisory assistance during construction from the consortium INGETEC–Klohn Crippen, in charge of the five designs; and through the support of the consortium hired to supervise the works. This Branch also has the experience, organizational structure, and human resources to carry out procurement and implement the environmental and social management plan. Its resources will be complemented and strengthened in the environmental and social field by setting up an environmental geographic information system and a socioenvironmental learning plan. The institutional sustainability of EPM will be strengthened through corporate development activities that will help it to maintain and consolidate its qualifications.

B. Socioeconomic viability³⁰

- 4.4 **Planning and data.** The assessment was done in the context of Colombia's indicative planning process. It excludes external market demand, an assumption that places the project in a worst-case scenario. The assessment used 2002 efficiency prices, calculated using shadow price ratios that incorporated updated

²⁹ Económica Consultores, "Evaluación Institucional de EEPPM [Institutional Assessment of EPM]," June 2005.

³⁰ Ignacio Coral, "Evaluación Económica de Porce III [Economic Assessment of Porce III]," June 2005.

estimates of the shadow price of foreign exchange and of unskilled labor. It also factored in plant availability as reported by the National Dispatch Center; various demand scenarios; fuel, operation, and maintenance costs provided by the Energy and Mining Planning Unit (UPME); the hydrology of Porce III, updated by EPM in 2001; and the quality-of-supply specifications established by the Energy and Gas Regulatory Commission. The fuel costs reflect 2002 efficiency prices, estimated by the UPME based on US\$35 per barrel of oil and US\$15 per ton of coal.³¹

- 4.5 **Least-cost analysis.** The analysis of the generation expansion plan assumes that Porce III will go into operation on the date set by EPM and concludes that currently installed generating capacity can meet demand until 2009. In the low-demand scenario, new thermal generating capacity would only be needed beginning in 2013; in the average-demand scenario, beginning in 2011; and in the high-demand scenario, beginning in 2010. A cost comparison of generation expansion plans enables one to conclude that if the deadline is met, the total economic cost of the solution that includes Porce III lies below that of the thermal alternatives. The sensitivity analysis confirms that the expansion plan that includes Porce III, balanced with the right blend of gas combined-cycle and coal thermal plants is, from the standpoint of total economic cost, indistinguishable (with confidence intervals of 95%) from the exclusively thermal plan that constitutes the second-best option and clearly superior with respect to the other alternatives considered.
- 4.6 **Cost-benefit analysis.** The project's economic net present value (ENPV), at 2002 boundary prices and discounted at 12% up to December 2004, is US\$111 million for the low-demand scenario, US\$142 million for the average-demand scenario, and US\$153 million for the high-demand scenario. The values for the economic internal rate of return (EIRR) are 14.1%, 14.8%, and 15.1%. The sensitivity analysis shows that the project's EIRR remains above 12% even if the investment cost rises by 35%, the price of generated power drops to 67%, benefits associated with the nonresidential consumer surplus are not considered, or the energy substitution benefits are not considered. A one-year delay in project readiness owing to delays in the main civil works would lead to a US\$40 million loss of ENPV.

C. Financial viability³²

- 4.7 **Scope and methodology.** Financial viability was analyzed for the project, for the Power Generation, Power Distribution, Water, Gas Distribution, and Telecommunications SBUs, and for EPM taken as a consolidated enterprise. An individual analysis of the subsidiaries was not done, but their respective resource needs for capital and debt and the corresponding dividends to be distributed were considered. The methodology focuses on quantifying, for each of the above

³¹ Simulations used the Stochastic Dual Dynamic Programming (SDDP) model.

³² Inversiones e Ingeniería Financiera, "Evaluación Financiera [Financial Assessment]," June 2005. Financial projections not include financial income from undistributed cash surpluses invested in EPM's liquid assets. The financial viability of the Power Generation SBU is maintained under the assumption that the ratio between EPM's AMCP and the AMCP for the Colombian market will be 90%--the minimum historic level.

business units, the operating cash flow after debt-service obligations and investment in operating assets.

- 4.8 **Financial viability of the project.** The project has an investment recovery period of 36 years from 2002, when the infrastructure investments began. The internal rate of return on total investment in the project, estimated for a 58-year horizon, is approximately 13.92%, based on current, after-tax pesos. The available cash flow generated by the project will be insufficient to service the debt with the IDB during the first year of operation, but will amply cover the service of this debt thereafter. As for the construction period, the service of the IDB debt for 2005 cannot be covered with the cash flow generated by the Power Generation SBU, requiring the cash holdings of this SBU or the cash flow generated by EPM to be used. The Power Generation SBU will not be able to service the debt with the IDB with the cash flow generated in 2008 either, but it will be able to do so with the balance left over from 2007. From 2009 to 2011, the Power Generation SBU will be able to service the debt with the IDB and generate surpluses. Starting in 2012, the cash flow generated by the project will be sufficient to service the debt with the IDB. The project's financial viability depends primarily³³ on the payment received for energy sold on the exchange and through contracts. To ensure the project's financial viability, energy produced by EPM should be traded at opportunity prices, which are reflected in the average market and contracts price.
- 4.9 **Financial viability of the Power Generation SBU.** The Power Generation SBU, under which the project will be executed, is financially viable, and all its financial results, expressed in millions of U.S. dollars, as well as all its indicators of financial strength, will improve steadily over time, as seen in Table IV-1. In fact, the projected figures are higher than those observed during the last five years. Worth noting is its low debt ratio, which in the long term will fall to 21.2%, which, despite the debt resulting from Porce III, is less than the 28% average observed during the last five years. The average growth rate for net profits is 13.8%. The average growth rate for internal generation of funds is 8.9% and will increase significantly once Porce III goes into operation.
- 4.10 **Financial viability of EPM.** As for EPM's financial standing and outlook, the financial projections show that enough operating cash flow will be generated to cover the obligations acquired to date and to service its debt with the Bank. For all the projected years, the operating flow after honoring commitments and servicing the debt is sufficient to pay dividends to the municipio and to address commitments with subsidiaries. As of December 2004, cash holdings stood at US\$185 million. The projections for operating efficiency show stable indicators, with some improvement toward the end of the projected period, explained primarily by the entry into service of Porce III. In this context of financial viability, it bears mention that EPM should analyze its telecommunications and gas businesses, as they show

³³ Other, minor revenue sources exist, such as the "capacity charge" and auxiliary generation services (voltage regulation, frequency regulation, etc).

some weakness in the financial projections. The growth in net profits stands out, propelled mainly by growth in the net profits of the Power Generation SBU (Table IV-1).

- 4.11 The financial strength of the Power Generation SBU and of EPM points to a low sensitivity of their principal financial results to major changes in key variables. The analysis indicates that the present value of the operating flow after obligations, estimated at US\$1.38 billion in the base scenario, falls to US\$755 million when a shock scenario is assumed in which all the negative events considered in the various sensitivity analyses occur simultaneously. One may therefore conclude that EPM is a sound corporation with no major risk of lacking the resources it needs to cover all its financial obligations.

(in millions of current U.S. dollars)

ITEM	POWER GENERATION SBU				EPM CONSOLIDATED			
	Total 2000-2004	Total 2005-2009	% Change	Total 2010-2014	Total 2000-2004	Total 2005-2009	% Change	Total 2010-2014
Operating revenue	1,364	2,038	49.4%	3,216	4,639	6,901	48.8%	9,131
EBITDA	893	1,450	62.4%	2,483	2,407	3,654	51.8%	5,099
Net profit	402	846	110.4%	1,574	1,072	2,460	129.6%	4,141
Internal generation	878	1,185	35.0%	1,843	2,316	3,106	34.1%	3,979
Change in working capital	15	34	129.8%	73	301	138	-54.3%	141
Operating flow	864	1,152	33.3%	1,770	2,015	2,968	47.3%	3,837
	Average 2000-2004	Average 2005-2009	% Change	Average 2010-2014	Average 2000-2004	Average 2005-2009	% Change	Average 2010-2014
Assets	1,803	2,327	29.1%	2,938	4,689	5,870	25.2%	7,655
Liabilities	505	719	42.4%	613	1,325	1,297	-2.1%	1,076
Equity	1,298	1,609	23.9%	2,325	3,364	4,573	35.9%	6,579
EBITDA/sales	64.7%	70.9%	N.A.	77.0%	51.9%	52.9%	N.A.	55.8%
EBITDA times debt service	2.0	4.7	N.A.	9.0	2.6	5.3	N.A.	14.1
EBITDA times interest	7.0	8.9	N.A.	32.6	7.5	13.0	N.A.	46.3
Debt ratio (liabilities/assets)	28.0%	30.7%	N.A.	21.2%	28.4%	22.1%	N.A.	14.2%

D. Technical viability³⁴

- 4.12 **Engineering.** The project phases already completed are surveys, prefeasibility, feasibility, feasibility updates, complete detailed designs and bidding documents with construction plans for principal civil works, and procurement of equipment. Studies have included topographical surveys; climatology, hydrology, sediments, geology/geotechnical, and seismology studies; geotechnical, structural, hydraulic, and electrical design studies; and optimization studies for the various works, equipment, and the system for connecting Porce III to the national transmission system. The project has also benefited from the specialized advisory assistance of a group of individual consultants of renowned professional capability. Porce III's engineering³⁵ is considered sound and executed in accordance with best practices.
- 4.13 **Optimization.** The various project components have been optimized from a geological/geotechnical, structural, hydraulic, construction, and cost perspective. The following were selected and optimized: the dam site and its features; the works associated with the dam (diversion, bottom outlet, spillway, and intake); the

³⁴ Ramón López Rivera, "Evaluación Técnica de Porce III [Technical Assessment of Porce III]," June 2005.

³⁵ Designed by EPM and the consortium INGETEC-Klohn Crippen.

headrace tunnel, the surge tank, the machine and transformer bays; the power to be installed (number and size of the turbines), generator units, and transformers; the tailrace tunnel; and the works for sending out the electric power generated.

- 4.14 **Execution.** The strategy for construction, organized by works and contracts, and the respective plan for supervision and control of project execution are considered appropriate for a project of the size, complexity, and characteristics of Porce III. The requirements set out in the bidding documents to bid on the various activities (the prequalification stage) are considered adequate for execution. EPM's experience with building, operating, and maintaining hydroelectric power plants, as illustrated by its recent experience and lessons learned in the construction of the Porce II plant, combined with its organizational structure and its physical and human resources, are considered sufficient and adequate to satisfactorily execute the project. All these qualities as a whole lead to the conclusion that the project execution plan is technically viable.

E. Environmental and social viability³⁶

- 4.15 The project's environmental and social viability is based on: (i) feasible measures to prevent, mitigate, and compensate for impacts; (ii) good construction practices and specific environmental mitigation measures that constitute contractual obligations; (iii) programs for systematically and regularly measuring critical variables; (iv) mechanisms that ensure adherence to Colombian regulations and the Bank's Environment and Safeguards Compliance and Involuntary Resettlement policies; (v) monitoring mechanisms involving an organizational control structure, clearly defined responsibilities, periodic reporting mechanisms, independent verification mechanisms, and sanctions; (vi) plans for responding to risks during the construction and operating stages; and (vii) training tools and technological equipment in support of environmental and social management. This set of actions is embodied in a project environmental and social management plan presented in detail in the project Environmental and Social Management Report (ESMR).³⁷
- 4.16 **Environmental impact assessments and environmental license.** The environmental impact assessments (EIAs) for the principal works and for the transmission lines meet internationally accepted technical quality criteria, present an impact analysis, and propose environmental management plans that include risk management plans and monitoring plans for the execution and operation phases. The EIA for the principal works was analyzed by the environmental authority, which granted the corresponding environmental license in May 2003, after EPM completed a far-reaching program to inform and consult with the affected community. The license includes permits, authorizations, and concessions for the use and development of natural resources. The EIA for the transmission lines was

³⁶ Carlos De Moya, Informes de Evaluación Socio Ambiental [Socioenvironmental Assessment Reports], 2004-2005 and the Environmental and Social Management Report.

³⁷ This report is available on the Bank's website:
<http://www.iadb.org/projects/Project.cfm?project=CO=L1005&Language=English>

performed in 2004 and was subjected to an intensive information, consultation, and consensus-building process. In keeping with the Bank's information disclosure policy, this EIA was forwarded to the Bank's Public Information Center on 3 January 2005. On 17 December 2004, EPM requested that the environmental authority modify the environmental license so it would include construction of the lines.³⁸

- 4.17 **Potential impacts.** The socioenvironmental impacts were identified as a result of the review of a large set of studies, the EIAs in particular. The direct impacts on the social environment during construction have to do with structural changes within the directly affected population, especially gold-mining and farming communities; 494 families (2,039 residents) will be affected, as will 650 casual miners whose homes will not be disturbed, for a total of 2,689 persons. The Resettlement Program, prepared following Bank Policy OP-710, is aimed at minimizing, mitigating, and compensating for these impacts. The project will have positive direct impacts such as job creation, especially for unskilled labor, and demand for locally produced goods and services. The operation phase will produce positive indirect impacts, such as an increase in municipal revenues and in income for the Centro de Antioquia Regional Autonomous Corporation, as the legal framework calls for it to receive transfers based on power generated.
- 4.18 The direct impacts on the physical and biotic environments during the construction stage include changes to the flow pattern of the Porce River downstream from the dam site, changes to the water quality of the future reservoir, erosion and instability, the loss and deterioration of plant cover, and the alteration and destruction of habitats for land and aquatic fauna. During operation, the main adverse direct impacts include changes to the water quality of the future reservoir, changes to the flow pattern of the Porce River, and the formation of new aquatic habitats.
- 4.19 **Environmental and social management plan.** This plan, detailed in the ESMR, seeks to ensure the project's socioenvironmental sustainability in keeping with Bank policies and Colombian legislation through the execution of measures and actions in the following areas: (i) prevention and mitigation of physical/biotic impacts and compensation therefor; (ii) prevention and mitigation of social impacts and compensation therefor; (iii) environmental technical specifications and programs to implement environmental management measures; (iv) environmental and social monitoring through the systematic measurement of key indicators; (v) socioenvironmental monitoring through comprehensive supervision and socioenvironmental audits; (vi) a contingency plan for responding to emergencies; and (vii) institution-strengthening measures.

F. Benefits and beneficiaries

- 4.20 Energy, as an intermediate input in the productive process and in its use by the population, is closely linked to economic and social development. In the case of

³⁸ The modified license should be approved in the third quarter of 2005.

Colombia, the power sector is a major energizer for the economy in the process of developing available resources and meeting the country's needs. The impact of the project consists of helping to maintain sustained economic growth and foster the competitiveness of the economy. The beneficiaries of the Porce III project will be, in general, the country's consumers of electric power, who will be able to meet their demand for electric power through the incremental energy produced by the project. EPM and the public sector will also benefit from the implementation of corporate development measures, which will foster the institutional soundness of the company. This project does not qualify as a poverty-targeted or social equity enhancing investment (PTI/SEQ).

G. Risks

- 4.21 **Construction and hydrological risks**, common to hydraulic works of the magnitude of Porce III, have been mitigated through sufficient studies and conservative designs for critical project elements.
- 4.22 **Contract risk**, associated with breach of contract by contractors, is being mitigated through a strict prequalification process and will be controlled through timely actions in the face of any such breach.
- 4.23 **Regulatory risk**, associated with regulatory changes, is being mitigated through mechanisms of public consultation and stakeholder participation—prior to the enactment of new regulations—processes being promoted by the public utilities PBL, currently in execution.
- 4.24 The **risk of terrorism**, associated with the presence of armed groups, will be mitigated much as it was for Porce II—with intensive efforts in support of the local population that promote a favorable image of the company and of the project and lead people to reject violent groups. Additionally, the financing for security in the project area includes resources allocated under the heading of engineering and administration.
- 4.25 **Operating risk**, associated with the condition of the dams, the management of flows, and seismic events, will be controlled through a study, slated for 2006, of the operating condition of existing dams and the subsequent formulation and implementation of a contingency plan as suggested by that study.
- 4.26 **Exchange risk**, associated with the fact that EPM earns its revenues in pesos and repays its external debt in foreign currency is being mitigated with the swap operations conducted to date. With these operations, EPM has managed to cover the equivalent of 73.2% of its external debt in dollars with pesos.
- 4.27 **Financial and institutional sustainability risk**, associated with the nature of EPM as a company comprised of multiple businesses with a sole owner that may require larger payments to finance the municipio's investment plan or may decide to grant cross-subsidies between businesses will be mitigated through the gradual implementation of corporate development measures as a result of the activities included in the annual work plans. It will also be mitigated through the contractual

requirement that financial transactions between businesses take place under commercial market conditions.

**COLOMBIA: PORCE III HYDROELECTRIC POWER PLANT
(CO-L1005)
LOGICAL FRAMEWORK**

Narrative Summary	Indicators	Means of Verification	Assumptions
Goal			
To contribute to Colombia's economic development by means of a reliable energy supply.	1. The reliability indexes set by the Energy and Gas Regulatory Commission are met between 2010 and 2013. 2. Energy prices with Porce III are lower than the prices that would have prevailed in its absence. 3. Soundness of the financial statements of Empresas Públicas de Medellín (EPM): the ratio of EPM's total financial debt to earnings before interest, taxes, depreciation, and amortization (EBITDA) is less than 2.9 (2004 baseline: 1.1).	1. Wholesale Energy Market statistics 2. Wholesale Energy Market statistics 3. EPM's audited annual accounting records	(Sustainability) The country will have new regulations that effectively promote an expansion of generating capacity as needed by the economy.

Purpose	Indicators	Means of Verification	Assumptions
To increase the amount of Colombia's demand for electric power met by efficiently and sustainably using the water resources of the Porce River.	- Incremental demand met (GWh/year) 2010: 582 GWh 2011: 2,910 GWh 2012 and thereafter: 3,105 GWh, equivalent to the project's firm energy. - The average cost, measured when the commercial operation of the last unit begins in 2011, is US\$1,380 per installed kW. - The real cost does not exceed the budgeted cost (baseline: budgeted cost of US\$911 million). - The living conditions for relocated and resettled families are not worse than before. - International corporate governance practices are adopted as of 2007.	- Annual EPM operating reports - EPM reports including budget performance - EPM reports including budget performance - EPM social management monitoring reports - Annual external evaluations	It becomes certain during 2006 and 2007 that arrangements are commencing for the expansion of generating capacity needed as of 2012 (projects registered with the Energy and Mining Planning Unit). The country will have new regulations that effectively promote an expansion of generating capacity as needed by the economy (regulatory risk). The resettlement program is carried out under the agreed terms. The owners and Board of Directors support EPM's adopting internationally recognized corporate governance practices.

Components	Indicators	Means of Verification	Assumptions
1. Hydroelectric power plant built and operating	1.1 Hydropower plant on the Porce River, comprising the 151 m maximum height concrete-face rockfill dam and associated works, underground machine bay (660 MW over 4 generator units), and connection to the national transmission system, built to specifications and in operation as of 2011 1.1.1 Infrastructure works for construction (roads, camps, 44 kV transmission line) fully complete in April 2006 1.1.2 System for diverting the Porce River finished in June 2010 1.1.3 Spillway completed in January 2010 1.1.4 Bottom outlet fully complete in December 2009 1.1.5 Intake fully complete in December 2009 1.1.6 Reservoir filled in June 2010 1.1.7 Underground works completed in February 2011 1.1.8 Four generator units enter into service in February 2011 1.1.9 Substation and connection line to the national system in May 2010 1.1.10 Excavation of headrace and tailrace tunnels completed in January 2007 1.1.11 Crane transported and cleared through customs by January 2007 1.1.12 Traveling crane installed by December 2007 1.1.13 Liner and distributor for the headrace completed in August 2008 1.1.14 All generator units transported and cleared through customs by July 2008 1.1.15 Installation of liners for the bottom outlet completed in July 2008 1.1.16 Excavation and support for all underground works finished in August 2008 1.1.17 Headrace tunnel and associated works completed in October 2008	1.1 Semiannual works supervision reports from EPM	a. The growth in demand for power from 2005 to 2012 matches the projections for the average-demand scenario. b. Hydrological conditions after the power plant begins operating are consistent with projections. c. Operation of installed capacity occurs as expected. d. The Guadalupe-Porce chain upstream from Porce II and the transmission lines for the entire chain operate under normal conditions. e. The contingency plan is implemented such that it addresses natural, technical, man-made, and operational contingencies (operating risk).

Components	Indicators	Means of Verification	Assumptions
2. Socioenvironmental management plan executed.	1.1.18 Spiral case for turbine 1 completed in October 2008		
	1.1.19 Power and control cables installed by December 2008		
	1.1.20 Three generators assembled in December 2008		
	2.1 Compensation provided for 600 hectares which are recovering two years after the civil works are completed.	2.1 Reports from EPM on areas of vegetation acquired.	f. Projections of demand for skilled and unskilled jobs among the population in the project's area of influence are borne out.
	2.2 The water quality index developed by the Fundación para la Sanidad Nacional [National Health Foundation], calculated and measured in Playa Dura, remains within the 71-to-90 range during construction of Porce III (2005 baseline: 82.4 after discharge from the Guadalupe IV plant; 71.5 after discharge from the Porce II plant, and 82.9 at the site of the future Porce dam).	2.2 Semiannual reports from EPM on the water quality monitoring plan.	g. Workers find the working conditions they are offered satisfactory (EPM employment policy).
3. Financial and institutional stability of EPM maintained and consolidated.	2.3 The 494 affected families are relocated, resettled, or paid compensation before the reservoir is filled in 2010.	2.3 Semiannual reports from EPM on the social management monitoring plan.	h. The four municipios in the project's area of influence continue to follow the epidemiological surveillance system guidelines.
	2.4 The epidemiological surveillance system is in execution as of November 2006. (Baseline: epidemiological surveillance system for the Porce II project covers three of the municipios in Porce III's area of influence)	2.4 Report from EPM with a diagnostic assessment of epidemiological conditions for the baseline and quarterly results reports.	i. A level of law and order is maintained that allows the epidemiological surveillance system to work and the relocated or resettled families to keep up their productive activities.
			j. Interventions to control illegal crops do not adversely affect the fauna in the project's area of influence.
	3.1 International Accounting Standards are applied and adjustments derived therefrom are made in the fiscal year ending 31 December 2005.	3.1 EPM's audited financial statements	
	3.2 The code of corporate governance and other internal systems reflect international corporate governance practices applicable to EPM's form of legal organization and consistent with the recommended activities in the annual work plans.	3.2 Annual external evaluation	
	3.3 The ratio between the average market and contracts price	3.3 Commercial Exchange System Administrator publication and semiannual calculations by EPM	

Components	Indicators	Means of Verification	Assumptions
	(AMCP) of EPM and the AMCP for the domestic market remains above 0.9 (2004 baseline = 0.97). 3.4 The ratio between EPM's total financial debt and EBITDA is less than 2.5 (2004 baseline = 1.1). 3.5 The ratio between the long-term debt and equity is less than 1.5 times equity.	3.4 EPM's audited financial statements 3.5 EPM's audited financial statements	

Activities:	Indicators	Means of Verification	Assumptions
(Steering program)	See Table II-1 of the loan proposal.	Project accounting records and LMS	a. Actual flooding in January-August 2007 is less than that of the 500-year return periods (hydrological risk). b. Geological formations are as studies predicted (construction risk). c. The State guarantees the necessary security conditions for the project to be executed (risk of terrorism). d. The contingency plan implemented during construction addresses natural and man-made risks. e. The calculated and measured water quality index from the National Health Foundation remains within the acceptable range at two points: Guadalupe IV and Porce II. f. EPM's employment policy and the region's supply of goods and services support on-schedule construction of the works. g. The negotiation with residents to be relocated and resettled enjoys their acceptance. h. The power plant equipment is received according to the project timetable. i. The schedule for connection with the national interconnected grid is met. j. The Ministry of Environment gives its clearance by February 2010 to proceed with filling the reservoir. k. A level of law and order is maintained that allows the epidemiological surveillance system to be implemented on time and productive activities to be carried out. l. Health agencies keep updated records of the health of the population in the project's area of influence. m. The strict prequalification process is effective in achieving contractor compliance (contract risk).