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Report No. 18665

PERFORMANCE AUDIT REPORT

BOLIVIA

**POWER REHABILITATION PROJECT
(CREDIT 1818-BO)**

December 9, 1998

Operations Evaluation Department

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Currency Equivalents (annual averages)

US\$ 1.00 = Boliviano (\$b)

1987	US\$1.00 = \$b 1.00	1994	US\$1.00 = \$b 4.62
1991	US\$1.00 = \$b 3.59	1998 (June)	US\$1.00 = \$b 5.26

Weights and Measures

kWh	Kilowatt-hour (1,000 watt-hour)
MW	Megawatt-hour (1,000 kWh)
GWh	Gigawatt-hour (1,000 MWh)

Abbreviations and Acronyms

AFP	Administradora de Fondos de Pensiones (Pension Fund Administrator)
CNDC	Comité Nacional de Despacho de Carga (National Committee for Load Dispatch)
COBEE (BPC)	Compañía Boliviana de Energía Eléctrica S.A. (Bolivian Electric Power Company Ltd.)
Corani	Empresa Eléctrica Corani SA (Corani Electric Power Company)
CRE	Cooperativa Rural de Electrificación (Santa Cruz) Rural Electric Power Cooperative (Santa Cruz)
DINE	Dirección Nacional de Electricidad (National Electricity Directorate)
ELECTROPAZ	Electricidad de La Paz S.A. (La Paz Electric Power Company)
ELFEC	Empresa de Luz y Fuerza Eléctrica de Cochabamba S.A. (Electric Power Company of Cochabamba)
ELFEO	Empresa de Luz y Fuerza Eléctrica de Oruro S.A. (Electric Power Company of Oruro)
ENDE	Empresa Nacional de Electricidad SA (National Electric Power Company)
FNDR	Fondo Nacional de Desarrollo Regional (National Fund for Regional Development)
Guaracachi	Empresa Eléctrica Guaracachi SA (Guaracachi Electric Power Company)
MDE	Ministerio de Desarrollo Económico (Ministry of Economic Development)
SE	Superintendencia de Electricidad (Superintendency of Electricity)
SG	Superintendencia General del SIRESE (General Superintendency of the SIRESE)
SIRESE	Sistema de Regulación Sectorial (Sectorial Regulatory System)
TDE	Transportadora de Electricidad SA (Electric Power Transmission Company)
Valle Hermoso	Empresa Eléctrica Valle Hermoso SA (Valle Hermoso Electric Power Company)
VMEH	Vice-ministerio de Energía e Hidrocarburos (Vice-Ministry for Energy and Hydrocarbons)

Fiscal Year

Government of Bolivia January 1 – December 31

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The World Bank

Washington, D.C. 20433
U.S.A.

Office of the Director-General
Operations Evaluation

December 9, 1998

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

**SUBJECT: Performance Audit Report on Bolivia
Power Rehabilitation Project (Credit 1818-BO)**

Attached is an Operations Evaluation Department Performance Audit Report on the Power Rehabilitation Project (Credit 1818-BO for SDR 5.30 million, approved in FY87). The credit closed as scheduled on December 31, 1994 at which time SDR 0.2 million was canceled.

The primary objective of this operation was to help Empresa Nacional de Energía Eléctrica, ENDE, the state-owned power utility, at that time serving about two thirds of Bolivia's power market, to improve its performance. The improvement was expected to satisfy the power demand growth in the most efficient manner, at least cost, and without government financial assistance. The project encompassed rehabilitation of ENDE's existing power plants and transmission facilities, improvement of ENDE's financial and administrative efficiency, and development of a Power Expansion Master Plan.

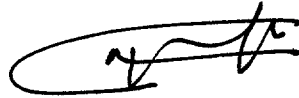
The project's objectives were relevant considering the country's needs and the year of appraisal (1986, well before the Bank's new power sector policy was issued in 1990). This "traditional" Bank project promoted neither radical restructuring of the sector nor greater private sector participation.

In practice, the Bank's involvement in project implementation had a highly positive institutional development impact and was vital to the Bank's support of the power sector reform subsequently undertaken by the government (from 1994 onwards): project supervision helped to deepen the dialogue with ENDE and the government on a new orientation for the power sector, allowing ample participation of the private sector. Within a short time, Bolivia reformed radically the structure and regulation of the power sector following an innovative "capitalization" scheme that some countries are now studying for possible replication in a range of public services.

The outcome of the project is rated as satisfactory and its sustainability likely (as in the PCR). As the presence of the Bank in the power sector through the project contributed to the sector reform, institutional development is rated as high.

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A key lesson learned from this project is that in order to attract private capital, more important than the size of the sector or the relative development of the country is to have in place a clear regulatory system, strong and autonomous institutions to enforce it, and the will of the government to respect its commitments. Another lesson is that power sector reform should include specific approaches to serve people in suburban and rural areas who do not have electricity. Leaving this duty to the central and local governments may be inadequate if corresponding sustainable funding arrangements are not put in place.

A handwritten signature in black ink, consisting of a large, stylized 'r' followed by a series of loops and a final vertical stroke.

Attachment

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Principal Ratings

	<i>ICR</i>	<i>Audit</i>
Outcome	Satisfactory	Satisfactory
Sustainability	Likely	Likely
Institutional Development	Substantial	High
Borrower Performance	Satisfactory	Satisfactory
Bank Performance	Satisfactory	Satisfactory

Key Staff Responsible

	<i>Task Manager</i>	<i>Division Chief</i>	<i>Country Director</i>
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Preface

This is the Performance Audit Report (PAR) for Bolivia's Power Rehabilitation Project (Credit 1818-BO) for which IDA approved a credit of SDR 5.30 million on June 9, 1987. The borrower was the Republic of Bolivia and the beneficiary and executing agency was *Empresa Nacional de Electricidad SA* (ENDE). The credit closed as planned on December 31, 1994; an undisbursed balance of SDR 200,577.12 was canceled.

This PAR is based on the Implementation Completion Report (ICR) prepared by the Latin American and Caribbean Region, the Staff Appraisal Report (SAR), credit documents, project files, and discussions with IDA/Bank staff. An OED mission visited Bolivia in June 1998 to discuss with Bolivian institutions and power sector enterprises the effectiveness of IDA's assistance. Because the government initiated a radical reform of the power sector during project execution, the audit focuses in large part on issues related to reform implementation and initial impact and only to a lesser extent on implementation and achievements of the project *stricto sensu*, which are covered appropriately in the ICR. The assistance and cooperation of *Dirección de Energía e Hidrocarburos*, the General Superintendent of SIRESE, the Superintendent of Electricity, and the management of the electric power companies of Bolivia is greatly appreciated.

Following standard OED procedures, the draft PAR was sent to the Bolivian authorities for comments. Comments received have been incorporated in this final version.

1. Background

1.1 Bolivia's economy stagnated and suffered a severe crisis in the early 1980s, when GDP decreased 2.5 percent per annum over the period 1981–86 and hyperinflation reached over 26,000 percent in 1985. The new government that took office in 1985 initiated a successful economic stabilization program that controlled inflation and promoted economic growth. This program was sponsored and funded by the World Bank, the International Development Bank, and other international lenders and donors. With the foundation of a stable economy, the government of Gonzalo Sanchez de Lozada (1993–97) initiated a series of sweeping reforms of the public administration and transferred state-owned enterprises to the private sector. During this administration, most public enterprises of the hydrocarbon, mining, telecommunications, railroads, airline, and power sectors were privatized.

1.2 The privatization program included a unique scheme of capitalization, a system first applied successfully in Bolivia. Under this scheme, private investors bought a new issue of shares equivalent to 50 percent of the stock of existing or newly created public enterprises. This brought about US\$1,600 million in fresh capital into the enterprises, most of it of foreign origin. Part of the equity was sold to the workers and employees of the enterprises (about 2 percent) at book value. The other 48 percent was transferred to two newly created pension funds (*Administradoras de Fondos de Pensiones*, or AFPs) that paid special pensions (called *bonosol*) to citizens over 65 years of age. The private investors gained management control of the company through administration contracts signed during the capitalization process. The fresh capital remained in the privatized companies, with the obligation of their owners to invest it, within an agreed time, in new projects related with the business of the company.

1.3 During this entire period, including the economic crisis of the 1980s, the Bolivian power sector remained relatively efficient, without the financial crisis or power shortages that affected other countries. However, the shortage of foreign currency caused by the country's economic crisis prevented ENDE, the major player in the power sector,¹ from importing parts and equipment to maintain and rehabilitate generation and transmission facilities. IDA responded to this problem in 1987 by granting the country Credit 1818-BO to help finance a Power Rehabilitation Project, the subject of this audit.

1.4 The project neither promoted nor envisaged a radical structural reform of the sector. This was consistent with Bank policies for the power sector in the late 1980s. Only in the early 1990s did the Bank start promoting a radical shift in its borrowers' power sector policy, aiming among other things at greater private participation and competition. As early as 1989 the Bank had tried to persuade the Bolivian government to advance public sector reform, but only a few state-owned rural development enterprises were privatized. At the time, the government decided not to privatize the power sector, arguing that the existing framework resulted in an efficiently run sector. The government that came to power in 1993 had a different philosophy, and IDA agreed to support its decision to privatize the power sector as part of a public sector reform and capitalization program. As part of a package of credits to support the capitalization process, IDA approved, in 1995, Credit 2790-BO to finance a Power Sector Reform Technical Assistance Project; in 1996, a Capitalization Program Adjustment Credit (Credit 2761-BO); and in 1998,

1. See paras. 3.1 and 3.2 for a description of the sector's structure before the reform.

Credit 3108-BO for a Regulatory Reform Technical Assistance Project. The first credit in particular is supporting activities to help fine tune regulation of the power sector, corporatize the smaller, isolated systems that remain in the public sector, and privatize the national transmission system (achieved in 1997).

2. Project Objectives and Implementation

Project Objectives

2.1 The purpose of the project, as stated in the SAR, was to rehabilitate ENDE's facilities, promote operational efficiency in the agency, improve overall planning of the power sector investment program, and improve power sector organization by better defining the responsibilities of the regulatory agency, *Dirección Nacional de Electricidad (DINE)*. Primarily, the project aimed at helping ENDE improve its performance, with the purpose of satisfying the power demand growth in the most efficient manner, at least cost, and without government financial assistance. No private sector investments were foreseen. In fact, the SAR indicates that all power plants over 5 MW capacity would be constructed and operated by ENDE. The ICR states that ENDE was expected to take over the facilities of COBEE, the private power company serving La Paz, at the end of the original concession period in 1991. The SAR also mentions that the project would help improve power sector organization by better defining the responsibilities of DINE and ENDE. The project's objectives were relevant considering the country's needs and Government policies at the time the project was appraised (1986, before Chile's pioneering reform of its power sector was even completed and well before the Bank's new power sector policy was issued in 1990).

Summary of Project Components

2.2 The project encompassed (a) rehabilitation of ENDE's power plants and transmission system through the purchase of equipment and spare parts, (b) improvement of the agency's financial and administrative efficiency through the execution of studies (asset revaluation, development of a management information system, and development of an energy dispatch program based on least-cost principles), and (c) development of a Power Expansion Master Plan covering the period through 2010. The Credit Agreement was amended twice. It was first amended in 1988 to provide for minor adjustments in the mix of physical project components in order to respond to a slower-than-expected power demand growth in the country. The second time it was amended was in 1989 to add a new component, the execution of a feasibility study for a 500 MW gas-fired thermo-electric power plant in Puerto Suarez. This investment would have enabled ENDE to export electric power to Brazil.

2.3 The Development Credit Agreement with the government and the Project Agreement with ENDE had a total of 71 conditions related to standard IDA credit procedures as well as conditions covering accounting, financial performance, utilization of project funds, counterpart funds, ENDE's management, environment, resettlement, indigenous people, monitoring and reporting, project implementation, sectoral budgetary allocation, and sectoral policies. Such a large number of conditions was not typical of Bank and IDA operations processed in the 1980s. More recent operations have required up-front compliance with essential requirements, leaving

only a few project-related conditions in loan documents. This avoids the confrontation that often results when the Bank requires compliance with a large number of conditions during project execution.

Project Cost and Financing

2.4 The SAR's project cost estimate was US\$10.69 million. Actual cost was US\$13.15 million, 23 percent over the original estimate. The cost overrun was due to ENDE's decision to include, financed with its own funds, additional spare parts, equipment and materials, and consulting services. The project was financed with US\$6.78 million from the IDA credit, close to the amount estimated in the SAR, plus US\$6.38 million from ENDE, 94 percent more than the SAR estimate. Because the SDR was revalued against the U.S. dollar and ENDE was unable to disburse the remaining funds, a credit balance of SDR 200,577.15 was canceled.

Project Implementation

2.5 *Project execution.* Project execution was delayed about a year due to slow compliance with conditions of credit effectiveness and central government delays related with import permits issued to ENDE. Execution subsequently proceeded smoothly with the help of Project Implementation Unit. In addition, IDA provided continuous support to resolve issues related with procurement, selection of consultants, terms of reference for studies, and other issues. Although by 1992, 95 percent of the credit funds had been disbursed, project execution slowed and disbursements weakened for two additional years. ENDE was apparently in no hurry to complete the project as the closing date had been set as the end of 1994. For a project of such limited scope, a seven-year disbursement period, adopted in the SAR following the Bank's standard disbursement profiles, was clearly too long. In hindsight, however, this long disbursement period provided a channel to continue an extended operational dialogue that eventually contributed to power sector reform (see para. 5.3).

2.6 The physical components of the project were successfully executed in the period 1988–91. Consultants helped ENDE prepare a Power Expansion Master Plan, an integrated management information system, a Power Dispatch Program based on economic principles, and revaluation of ENDE's fixed assets. As a consequence, ENDE improved the reliability of its installations and the efficiency of its operations and surpassed some agreed performance indicators (see Annex B). For example, in 1994 installed capacity was 872 kW/employee versus 600 kW/employee estimated at appraisal; energy sales were 3,487 MWh/employee versus 3,152 MWh/employee estimated at appraisal in 1986. Energy losses were kept low and reached only 13.1 percent in 1994 (see Annex C). UNDP and other donors financed the technical assistance to DINE. Bolivian authorities believe that the execution of the project, which helped maintain the efficiency of ENDE, was an important contributor to the agency's successful capitalization and privatization. The successful capitalization of ENDE encouraged the government to continue the capitalization/privatization process with the rest of the public sector.

2.7 In 1987 ENDE decided to plan construction of a 500 MW gas-fired thermal power plant at Puerto Suarez, with the purpose of exporting electric power to Brazil. The second amendment to the Credit Agreement allowed ENDE to finance, with funds from the credit, part of the corresponding feasibility study, an environmental impact study, and the preparation of bidding documents. The studies were completed, and in 1991 ENDE received proposals for construction

of the plant. In the end, however, no construction contract was awarded, because the government decided to substitute an agreement to export gas for the agreement between Bolivia and Brazil for exporting electric power. Instead, a gas pipeline is currently being built with private capital to export large amounts of gas (maximum capacity is 30 MMm³/day) from Bolivia to Brazil. The Bank provided technical assistance to both Bolivia and Brazil and is processing both a loan and a guarantee for a bond issue for the project. The pipeline is expected to be in full service in 1999. Even though the power plant feasibility study was never directly used, it provided useful data for the detailed comparison of alternative energy import strategies during the binational negotiations which ultimately led to the decision to export gas.

2.8 *Compliance with credit covenants.* Of the 33 conditions in the Development Credit Agreement the government complied fully with 29. It met two with delays, one condition was partially met, and the condition that DINE furnish IDA with semiannual reports was not met. ENDE complied with 32 of the 38 conditions in the Project Agreement. It met four with delays and partially met two. The most important condition only partially met was the agency's rate of return on investment: instead of realizing a return of 9 percent in 1991 and subsequent years, the ROR reached only 5 percent in 1994, up from 1.6 percent in 1988. IDA waived full compliance in light of ENDE's good performance on other financial ratios: debt service coverage ratio and contribution to annual investments with internally generated funds were higher than anticipated in the SAR.

3. Power Sector Restructuring

The Power Sector Before the Reforms

3.1 Until 1994 policies for the power sector were established in the *Código de Electricidad* (Electricity Code), issued by Supreme Decree in 1968 and amended in subsequent legal dispositions. Energy policies were the responsibility of the Ministry of Energy and Hydrocarbons. Sector regulation was also the ministry's responsibility through DINE. The main companies serving the areas of the country connected to the national transmission system were (a) ENDE, a state-owned company in charge of generation and transmission; (b) COBEE, a private U.S.-owned company in charge of generation and distribution in the area of La Paz and Oruro (accounting in 1994 for 32 percent of the total energy generation of the country and for 35 percent of all distribution); (c) two privately owned rural electric cooperatives (CRE and CESSA) in charge of distribution in Santa Cruz and Sucre; and (d) three subsidiaries of ENDE (ELFEC, CESSA, and SEPSA) in charge of distribution in Cochabamba, Sucre, and Potosi (see Annex D).

3.2 Several issues hindered development of the sector. The institutional setup and regulatory regime did not provide the incentives generation and distribution companies needed to improve efficiency, to charge efficient prices reflective of marginal costs, or to foster competitive behavior and private sector participation. The granting and renewing of licenses was not transparent. There was an inherent conflict in ENDE's role as de facto regulator (given DINE's weak capacity), system planner, and dominant producer. Political pressures in the tariff approval at the DINE level in accordance with the Electricity Code had politicized the process, leading to tariff distortions between consumers and regions. Although ENDE had been generally effective in operating a generation and transmission system with reasonable reliability, the efficiency of

the national system had shown some signs of weakening in the early 1990's (with losses as high as 16.6 percent in 1990, compared with 11.6 percent in 1986).

Genesis of the Power Sector Reform

3.3 Even in the 1970s and 1980s when the country was in a severe economic crisis, the power sector operated relatively well. Bolivia did not have the power shortages and blackouts that in other countries prompted power sector reform. Under these circumstances, few in Bolivia gave a thought to reforming the sector. However, a new philosophy on the role of governments was sweeping through Latin America and other continents. In 1991, most Latin American ministers in charge of electric power met in Cocoyoc, Mexico, at a conference organized by the Bank and OLADE (the Latin-American Energy Organization) to discuss new principles for power sector reform. In Bolivia, three factors were pivotal to the initiation of reforms: (a) radical reforms of the power sector in Chile, Argentina, and Peru; (b) a strong political will at the highest level of the governments in power from the early 1990's onwards ; and (c) timely and strong technical support by the Bank, which culminated with a May 1993 seminar on power sector reform, held in Santa Cruz, attended by high government officials and the executives of all Bolivian power companies.

The Reforms of 1994

3.4 As an integral part of the overall program of reform of the public sector, the legislative power issued laws for restructuring the power sector. The Capitalization Law (*Ley de Capitalización*) issued on March 21, 1994, authorizes the investment of private capital in state-owned enterprises. The law for the Sectoral Regulatory System (*Sistema de Regulación Sectorial* or SIRESE), issued in October 28, 1994, creates five superintendencies for the power,² telecommunications, hydrocarbon, transport, and water sectors. The final piece of legislation, the Electricity Law (*Ley de Electricidad*), was issued on December 21, 1994. As part of the reform and following a parallelism in the design of the laws, other sectoral regulatory systems were created—SIREFI to regulate the financial sectors (banks, stock market, insurance, and pension funds)³ and SIRENARE for the sectors covering forestry, agricultural lands, and renewable resources.

The New Regulatory System for the Power Sector

3.5 According to the Electricity Law and secondary regulation, the executive branch, through the Ministry of Economic Development, establishes norms and regulations to complement the law. It prepares a plan of reference for the expansion of the generation and transmission facilities. The Superintendency of Electricity (SE), an autonomous agency with an independent budget, is in charge of supervising compliance with sector regulation including the approval of tariffs. The SG supervises the efficiency and efficacy of all regulated sectoral superintendencies including the SE, and hears appeals in second instance in cases when the involved party considers that the sectoral superintendency does not apply correctly the law. A National Committee for Load Dispatch (*Comité Nacional de Despacho de Carga*, or CNDC), with a total of five

2. The Superintendency of Electricity (*Superintendencia de Electricidad* or SE) is in charge of the supervision of compliance of the regulation of the power sector.

3. Changes were made in June 1998 to the SIREFI law.

representatives of the generating, transmission, and distribution companies; of the unregulated consumers; and of the Superintendency of Electricity, is responsible for the coordination of Generation, Transmission, and Load Dispatch at minimum cost in the National Interconnected System. Dispatch is based on marginal cost principles. CNDC is also in charge of proposing every six months, to the Superintendent of Electricity, the nodal prices for generation.

The Power Sector After the Reforms of 1994

3.6 The application of the new legislation in the period 1995–97 resulted in a new structure for the power sector.

- *Generation:* ENDE's generation assets were unbundled into three generation companies that were sold to private investors: Corani, Valle Hermoso, and Guaracachi; and COBEE's assets were also unbundled in a generation company and a distribution company which was sold.
- *Transmission:* ENDE formed a transmission company (*Transportadora de Electricidad SA* or TDE) and sold it to private investors.
- *Distribution:* the main private companies serving the country are ELECTROPAZ (La Paz area), CRE (Santa Cruz), ELFEC (Cochabamba), ELFEO (Oruro), and CESSA (Sucre) (See Annex D).

3.7 ENDE is still a state-owned enterprise and is the owner or shareholder of smaller installations not yet privatized that serve Sucre, Potosí, Tarija, Cobija, and other rural electrification systems. The government intends to transfer these installations to the private sector and liquidate ENDE in a process that may take up to two years.

4. Initial Impact of the Reform and Key Issues

4.1 Once the presidential decision was made, capitalization of the power sector proceeded swiftly. Only 30 months elapsed between the time when the Electricity Law was issued and the last segment of ENDE (the high voltage transmission) was privatized. Today, over 95 percent of the power sector assets and most commercial activities of the power sector are in private hands. In the following paragraphs, we assess the initial impact of the reform and key outstanding issues.

Role of the Bank and Other Institutions

4.2 Reform-minded Bolivian administrations between 1985 and 1997 relied on the advice of the Bank for macroeconomic reform, including reform of the public sector. For the power sector, the Bank helped the government prepare a sector strategy, which was detailed in a 1993 policy letter issued by the Bolivian government and confirmed in 1994 during negotiations for the Bank's Capitalization Program Adjustment Credit. A local group of full-time qualified professionals was established to coordinate all activities of the privatization and reform. The group had direct access to the ministers in charge of the process and to the president and channeled the assistance of foreign institutions and consultants. The formation of this group was

a key factor in the success of the operation. The Bank/IDA provided technical assistance and finance to the group's activities in the context of project preparation and via ESMAP funding.⁴ IDB, UNDP, USAID, NRECA, the Japanese and Dutch governments, and other institutions also provided financial support.

The Capitalization/Privatization Process

4.3 Capitalization and privatization of the state-owned power companies were achieved in the period 1995–97. The price paid by the private investors for 50 percent of the capitalized companies (Corani, Valle Hermoso, and Guaracachi) was US\$139 million, money that remained in the treasury of the companies as equity and was not transferred as a windfall to government. Investors include power companies and investment enterprises from the United States. In addition, employees of the companies bought approximately 2 percent of the shares; the remaining 48 percent were transferred at no cost to pension funds. The transmission company TDE was privatized by ENDE and 100 percent of the shares were sold for US\$40 million to private investors from Spain. The proceeds were transferred to the central government treasury. Also, under the privatization scheme, 96 percent of ELFEC's shares owned by ENDE and the Municipality of Cochabamba were sold to Chilean investors for US\$50.3 million. COBEE, already a private company, in accordance with the requirements of the Electricity Law, was split into two companies: COBEE (generation) and Electropaz (distribution).

Sector Operation and Performance

4.4 The Bolivian power sector performed well before privatization began and continues to perform well today (see Annex B). For example, electricity losses are about 12 percent on average for the country, well below the level of many other developing countries. Until 1994, ENDE kept records for the sector for the entire country. Since reorganization, the quality of information has improved, each power company issues annual reports, the SE issues information for the whole power sector, and the Vice-Ministry of Energy and Hydrocarbons (*Vice-ministerio de Energía e Hidrocarburos*, VMEH) is planning to consolidate all energy information for the entire country. Under the new structure, quality of service is expected to further improve when sector regulations are fully implemented and enforced. Regulations, including quality of service at high voltage and at customer level, are being applied in stages, to allow power companies to adjust their installations and to install the equipment required for keeping standardized records. Power companies are penalized if quality standards are not met. Penalty fees in accordance with the Electricity Law are destined to finance rural electrification through FNDR. The VMEH is planning a program to manage these funds.

Regulation of the Power Sector

4.5 In less than two years, SIRESE and the SE have performed their duties in accordance with the Electricity Law and related regulations. Both agencies operate independently of the central and local governments and the power companies and are respected by all the corporations operating in the power sector. However, the government that took office in 1997, despite the

4. References: (a) "BOLIVIA: Restructuring and Capitalization of the Electricity Supply Industry: An Outline for Change" Joint UNDP/ESMAP Report, September 1995 and (b) "Primer Seminario sobre Reformas en el Sector Eléctrico Boliviano" Proceedings published by ESMAP and the Bolivian Ministry of Energy and Hydrocarbons, September 1994.

financial independence established in the Electricity Law, has imposed salary caps for the personnel of the superintendencies and of SIRESE.⁵ This issue, which could jeopardize the capacity of those institutions to hire qualified personnel, is currently being discussed between the government and SIRESE.

4.6 SIRESE, the SE, and the VMEH are analyzing several concerns and issues raised by the distribution companies: whether there is true competition at generation level, that the generators have no incentive to enter into contracts with distributors, and that the transmission company has no incentives to expand its installations.

Electricity Prices and Regulation

4.7 The SE approves electricity prices.⁶ Generation prices are proposed by the CNDC every six months and are based on marginal cost principles. The maximum or cap price at distribution level for each distribution company takes into account the nodal price of generation or the purchase price of generation. In addition, maximum allowable operating costs are determined and a return on equity is permitted, at a rate not higher than the historical three-year average for the Dow Jones utility index. Distribution prices are set every four years by the SE, based on studies prepared by independent consultants. Any party that feels that the tariffs are not fixed in accordance with the Electricity Law is able to appeal in first instance to the same SE, and in a second instance to SG. Recently the Municipality of La Paz appealed the tariffs from COBEE to ELECTROPAZ approved by the SE and finally SG, after a review, decided a slight decrease in those tariffs.⁷ So far the reform process has not led to higher consumer prices for electricity. Electricity prices in Bolivia are low, mainly because of the large amount of hydroelectricity generated (in 1997, 60 percent of total generation was hydro) and the relatively low price of natural gas for thermal generation (US\$1.40/MMCF, with no subsidies). Prices at consumer level varied from US\$0.061/kWh in La Paz to about US\$0.07 in Cochabamba. Electricity prices for isolated systems are higher. In Trinidad, for example, where diesel oil for the generating plants is brought by road and barges, average price to consumer was US\$0.14/kWh in 1997.

Future Investments

4.8 The reform of the power sector has been successful in attracting new private capital. According to information from the SE, investments in the power sector reached US\$74 million in 1996, US\$114 million in 1997, and US\$300 million would be invested in the following three years. The SE has received several license requests for new generating companies that plan to install new generation beginning in January 2000, when exclusivity for the existing generating companies ends. Bolivia has large gas reserves and hydroelectric potential, which existing and new generating companies plan to use to export power to Brazil, Peru, and Argentina. Immediate export potential is estimated at 2,000 MW, or more than twice the existing installed capacity of Bolivia. Distribution companies are also investing new capital in their concession areas, which is not limited by political boundaries, and in some cases (Cochabamba and La Paz) extending service beyond their concessions. The transmission company TDE has no obligation to expand

5. The salary cap affects all employees of the public administration. It establishes that no one can earn a salary higher than that of the president of the country.

6. COBEE and Electropaz, under a grandfathering clause, are protected from the new pricing system for 7 years, until 2003. Instead, their tariffs are based on a guaranteed 9 percent rate of return on revalued assets.

7. To adjust for an error in the method of determining interest during construction.

the high voltage grid but has no exclusive rights either. If a new facility is needed and is not built by TDE, the SE may decide to grant a license to any other interested party.

Service to Rural Areas

4.9 The Electricity Law establishes that it is an obligation of the central government to provide electricity to rural areas and minor isolated systems. That is, the government has to serve the 48 percent (3.8 million inhabitants) of the Bolivian population who were not benefited by the reform of the sector. The MDE has been studying the issue and plans to face the challenge through its National Rural Electrification Program (PRONER). In particular, the government is considering providing a one-time investment subsidy to existing distribution companies or to new private investors to electrify rural areas as well as suburban areas near the larger cities. Subsequently, however, users would pay the economic cost of service, as provided under the Electricity Law. Serving the remote villages is much more difficult. It will undoubtedly take many years, perhaps decades, to decrease significantly the percentage of population without electric service

Fragmentation of a Small Power System

4.10 Before the reform, there were doubts as to whether the fragmentation of a relatively small power system such as Bolivia's would be an obstacle to attracting foreign investors and whether such fragmentation would permit true competition. However, the Bolivian experience has shown that more important than the size of the existing market is the existence of an adequate regulatory framework and independent regulatory agencies, the will of the state to attract and respect private capital, and the existence of a potential market inside and outside of the country. For now, competition in generation is limited and probably will remain so until the market is fully liberalized and its size has justified the entrance of new generators. However, energy dispatch is working efficiently, according to marginal cost principles.

Winners and Losers of the Reform

4.11 The *winners* of the process were:

- The economy as a whole, as it brought new foreign capital into the country. Private investors paid approximately US\$1,600 million to gain control of all capitalized public companies, of which approximately US\$139 million corresponded to the power companies, plus US\$90.3 million for the privatization of TDE and ELFEC.
- The Bolivian treasury, as fiscal revenues from the power sector (sales and profit taxes) increased by 247 percent in three years (from US\$17 in 1994 to approximately US\$42 in 1997). In addition, the service of ENDE's debt to multilateral and bilateral agencies (approximately US\$600 million), guaranteed by the government, was transferred to the private companies.⁸

8. Total debt transferred to all capitalized companies was about US\$600 million.

- Private investors, who obtained rates of return of up to 14 percent per annum⁹ and saw the price of their shares, increase significantly. For example, the small amount of Corani Shares traded in the Bolivian stock market increased from \$b100 per share in 1994 (just before privatization) to \$b215 per share in 1998. The price of COBEE's shares increased from US\$25 in 1994 to US\$43 in 1996.
- The Bolivian elderly, who now receive a small annual pension from pension funds created during the process of privatization. In 1997, the elderly received a payment of US\$248 (however, the present government has introduced reforms to the pension legislation that may affect future distribution of benefits).
- Electricity customers, who have not seen rate increases (except for inflation and fuel price adjustments, see Annex C) and who now have direct access to the power companies through newly-created consumer offices to resolve grievances concerning the amount of the bill, quality of service, and claims for damaged domestic appliances. Quality of service is expected to improve considerably when the new quality of service regulation is fully implemented in the next three years.

4.12 The probable *losers* of the process are the rural areas, whose situation was not measurably improved by the reform and who continue to depend on decisions of the central and local governments to receive electric service. Today, private companies appear to be reluctant to extend service to areas not economically attractive, unless government is willing to provide some sort of subsidy. The service obligation of the distribution companies is confined to 100 meters beyond existing electric lines.¹⁰

5. Results and Sustainability

Achievement of Project Objectives

5.1 The objectives of the project were fully achieved. All planned equipment, spare parts, and material required for the maintenance and expansion of ENDE's power system were imported and installed. A 1998–2010 Master Plan for the Power Sector was completed. The VMEH will update this plan to provide guidance for decisions by investors for the power sector. The studies and design of the Puerto Suarez power plant were completed, although the plant was not built. In hindsight, the Bank should have investigated further the likelihood of building the proposed project before agreeing to help finance its studies. Today, private investors are considering construction of a plant in the same area. They are not interested in purchasing the engineering design of the plant from ENDE because new technologies are now available. DINE received financial assistance from UNDP and other donors to improve its efficiency and train its personnel. Overall, the project helped ENDE to improve the quality of installations, the efficiency of their operations, and the capacity of their executives. The training of DINE and ENDE personnel improved the chances of Bolivian executives to remain in the reformed sector as

9. SIRESE commented that according to their information, investors' rates of return were mostly less than 14 percent.

10. SIRESE commented that in their opinion, the rural areas are not losers with the reform, taking in consideration that before the reform any institution of the state was directly responsible of rural electrification, according to SIRESE, and now this is clearly a responsibility of the state and the VMEH is taking this responsibility. Also some private distribution companies are reaching agreements with local governments to develop some rural electrification project.

executives and managers of the newly created companies. Both the physical and institutional components of the project laid the groundwork for the successful planning and execution of the privatization program for the power sector.

Institutional Development Impact

5.2 The execution of the project had a high positive impact on preserving and improving the institutional development of ENDE. The economic crisis of the 1980s imposed severe monetary restrictions on ENDE. The timely approval of the credit and execution of the project was a welcome injection of capital needed to keep running the existing power system installations and to update ENDE's management and information systems.

5.3 At the sector level, the project had a high positive impact and was vital to the Bank's support of power sector reform. Project supervision was instrumental in deepening the dialogue with ENDE and the government on a new orientation for the power sector, allowing ample participation of the private sector. Within a short time, Bolivia reformed radically the structure and regulations of the sector. In doing so, the country was able to benefit from lessons learned from reforms previously implemented in Argentina, Chile, and Peru. Although too little time has passed under the new regulatory system, observers inside and outside Bolivia believe the reform of the power sector has been a success. The unique capitalization scheme pioneered by Bolivia is being analyzed by other countries for possible reform of their own economies.

Project and Sector Reform Sustainability

5.4 The benefits of the project, originally directed to ENDE, have been transferred to the companies that were born from the unbundling of ENDE's power system. The sustainability of these benefits therefore depends on the success of these companies, success that seems to be assured, given the very favorable policy environment.

5.5 The entire process of reform of the Bolivian economy including the capitalization of public enterprises, was completed in 12 years under three political administrations of different political backgrounds. The administration that assumed power in 1997 has so far respected the basic principles of the power sector reform and intends to extend the benefits to rural and marginal areas. The general opinion is that, although each new administration may want to put its stamp on the legislation, the basic principles will prevail; therefore, the benefits of sector reform are likely to be sustainable.

6. Borrower and Bank Performance

Borrower Performance

6.1 *Government.* The performance of the government in helping ENDE implement the project before initiation of the reform was less than satisfactory in complying with the commitments of the Credit Agreement for two reasons. First, it did not adequately fund DINE. As a result, DINE was not staffed adequately and could not satisfactorily perform its duties, among them, the approval of new tariffs. Second, it restricted ENDE's ability to import equipment,

which slowed implementation of the project. On the other hand, the government's performance in designing and implementing the radical reform of the sector was highly satisfactory.

6.2 *Executing agency.* ENDE performed well throughout project execution. The Project Execution Unit, which was set up to supervise the project, was well staffed with full-time, qualified professionals. However, given the qualifications of this unit, the project could have been executed in less than the seven years it took. This would have reduced administrative costs and advanced the benefits of the project by bringing the improved installations into operation sooner.

6.3 *On balance* the borrower's performance is rated as satisfactory.

Bank Performance

6.4 *Project-related aspects.* Total resources dedicated to the project over the nine years from identification to ICR were 110 staff-weeks, of which 57 staff-weeks were field and headquarters' supervision of the project. These cost figures are low by Bank standards and indicate an efficient use of Bank resources, particularly given that the project had many components and the execution and credit disbursement periods were long. IDA was prompt in handling procurement and disbursement requests from ENDE and was flexible in waiving compliance with covenanted rate of return targets. IDA also was flexible in accepting requests from the borrower to amend the credit to take into account shifts in power demand growth in the country and to include the execution of a study of a power plant.

6.5 *Bank's overall assistance to the sector.* The project did not include any policy-related issues, except for a condition to reinforce the regulatory capacity of DINE and increase tariffs to permit power companies to receive an agreed rate of return on investments. However, starting in early 1992, the Bank and IDA assisted the government in its decision to restructure public services, including power. Thanks to the government decision to proceed with the reform and the forcefulness and good coordination of advice from the Bank and IDA, major reforms were achieved. Today the power sector is operating under a new, modern regulatory system that some countries are studying for possible application to their public services. On balance, Bank performance is rated as fully satisfactory.

7. Conclusions and Lessons Learned

Overall Assessment and Summary of Ratings

7.1 *Overall project outcome* is rated as satisfactory (as in the ICR) because all the objectives of the project were met. The project's *institutional development impact* is rated as high given the far-reaching reforms carried out in the sector during project implementation with the Bank's support. The *sustainability* of the project is likely (as in the ICR) because the privatized companies that took over ENDE's assets are performing well and the policy environment is highly favorable.

7.2 *Borrower performance* is rated as satisfactory (as in the ICR). Despite shortcomings in project execution, the government's commitment to reform was sustained through three

administrations. The government kept its resolve to implement radical reform despite strong political opposition.

7.3 *The performance of IDA* is also rated as satisfactory (as in the ICR). Despite the limited original policy objectives of the project, IDA took the opportunity of its presence to deepen dialogue on power sector reform and to support strongly the government decision to reform the entire public sector.

Lessons Learned

7.4 *Project-related.* In the past, the Bank designed projects with short disbursement periods only to find out later that disbursements took much longer and that closing dates of loan and credit agreements had to be amended. To avoid this problem, the Bank adopted the use of “standard” disbursement profiles, developed from disbursement statistical data. This project used a “standard” disbursement of seven years, equivalent to the execution period of the project. However, projects with a limited scope, such as this one, being executed by a highly competent agency such as ENDE, should be designed with shorter execution periods.

7.5 *Policy-related.* The policy reforms and the restructuring of the power sector in Bolivia have been hailed by most observers as a success. The unique capitalization approach to privatization attracted foreign capital that went into the coffers of the power companies and transferred administrative control to the private sector. This approach is being promoted by the Bank and is being applied in other countries (Honduras, Dominican Republic, and El Salvador). The reform of Bolivia’s power sector demonstrated that, to attract private capital, more important than the size of the sector or the relative development of the country is to have in place a clear regulatory system, strong and autonomous institutions to enforce it, and the will of the government to respect its commitments. The reform of the power sector in a country should include specific approaches to serve people who do not have electricity. Leaving this duty to the central and local governments may not be enough to cover the needs of large segments of the population.

Basic Data Sheet

BOLIVIA POWER REHABILITATION PROJECT (CREDIT 1818-BO)

Key Project Data (amounts in US\$ million)

	<i>Appraisal estimate</i>	<i>Actual or current estimate</i>	<i>Actual as % of appraisal estimate</i>
Total project costs (US\$ M)	10.69	13.15	123
Credit amount (US\$ M)	6.80	6.78	100
Cofinancing			
Cancellation (in SDR)		200,577	n.a.
Date physical components completed	June 94	October 94	n.a.
Economic rate of return	13.5 %	12.3 %	91
Average Rate SDR/US\$	1.210	1.329	n.a.

Cumulative Estimated and Actual Disbursements

	<i>FY88</i>	<i>FY89</i>	<i>FY90</i>	<i>FY91</i>	<i>FY92</i>	<i>FY93</i>	<i>FY94</i>
Appraisal estimate (US\$M)	0.48	1.29	2.52	3.94	5.24	6.19	6.80
Actual (US\$M)	0.00	1.71	4.43	6.46	6.51	6.51	6.78
Actual as % of appraisal	—	133	176	164	124	105	100
Date of final disbursement:	December 31, 1994						

Project Dates

	<i>Original</i>	<i>Actual</i>
Identification	October 1985	October 1985
Preparation	January 1986	January 1986
Appraisal	June 1986	December 1986
Negotiations	November 1986	April 1987
Board approval	December 1986	June 1987
Signing	July 1987	July 1987
Effectiveness	October 1987	January 1988
Midterm Review		December 1988
Project Completion	June 1994	October 1994
Closing date	December 1994	December 1994

Annex A**Staff Inputs (staff weeks)**

	<i>Weeks</i>	<i>US\$</i>
Preappraisal	12.5	
Appraisal	13.0	
Negotiations through Board approval	25.3	
Supervision	57.4	
Completion	1.3	
Total	109.5	

Mission Data

	<i>Date (month/year)</i>	<i>No. of persons</i>	<i>Staff days in field</i>	<i>Specializations represented</i>	<i>Performance rating (Implementation Status)</i>	<i>Types of problems</i>
Identification/ Preparation	10/85	2	6	EGA-FNA		
	1/86	1	5	EGR		
	7/86	2	10	EGR-FNA		
Appraisal	12/86	2	11	EGR-FNA		
Supervision	12/87	2	8	EGR-FNA	1	
	8/88	2	10	EGR-FNA	2	P.Mg. - Proc. Prog.
	4/89	1	2	Audit		
	10/89	1	6	EGR	2	L. Covn. - Fin. Perf.
	1/90	1	2	EGR	2	L. Covn. - Fin. Perf.
	10/91	2	5	EGR-FNA	2	L. Covn. - Fin. Perf.
	11/92	2	8	EGR-FNA	2	L. Covn. - Fin. Perf.
	7/93	1	1	FNA	2	L. Covn. - Fin. Perf.
Completion	3/96	2	8	FNA	2	L. Covn. - Fin. Perf.

Other Project Data

Borrower/Executing Agency:

FOLLOW-ON OPERATIONS

<i>Operation</i>	<i>Credit no.</i>	<i>Amount (US\$ million)</i>	<i>Board date</i>
Power Sector Reform Technical Assistance	2790	5.1	3/28/1996

Annex B**ENDE's Key Performance Indicators (SAR and ICR)**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Sales GWh.										
SAR			852	927	1030	1149	1898	2035	2185	2348
Actual	811	812	878	974	1069	1156	1297	1343	1533	1768
Installed Capacity MW										
SAR			272	293	319	320	359	378	439	458
Actual	267	264	260	275	286	310	350	419		442
Number of Employees										
SAR			455	462	477	496	723	730	738	745
Actual	494	440	445	446	450	482	513	541	539	507
Energy Sales										
MWh/employee (SAR)			1873	2006	2159	2317	2625	2788	2961	3152
MWh/employee (Actual)	1642	1845	1973	2184	2376	2398	2528	2482	2844	3487
Installed Capacity										
kW/employee (SAR)			598	634	669	645	497	518	595	615
kW/employee (Actual)	540	600	584	617	636	643	682	774	792	872
ENDE's Rate of Return %										
SAR			0.9	2.0	4.0	7.0	9.0	9.0	9.0	9.0
Actual	3.9	2.7	2.3	1.6	2.5	2.6	3.6	2.4	4.8	5.0

Annex C

Power Sector Indicators for the Entire Country

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Total Sales GWh		1498	1474	1607	1709	1779	1936	2062	2315	2454	2633	2854	3055
Gross Generation GWh		1694	1723	1875	2010	2133	2276	2411	2651	2824	3004	3224	3472
Energy Losses %		11.6	14.5	14.3	15.0	16.6	14.9	14.5	12.7	13.1	12.4	11.5	12.0
Installed Capacity MW, country		571	584	606	614	636	679	755	756	787	817	954	1011
Installed Capacity MW, SIN		n.a.	n.a.	n.a.	460	470	510	580	585	600	600	761	844
Average Rate to Consumer (US\$/kWh) current prices													
Electropaz		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.8	5.3	5.6	5.8	6.0	6.1
ELFEC		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.4	6.3	6.4	6.7	6.9	7.0
CRE		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.8	5.8	5.9	6.3	6.7	6.8
Rate of Exchange (\$b to US\$)		1.9 mill		2.36	2.70	3.19	3.59	3.91	4.29	4.62	4.82	5.08	5.26
Inflation Index %	8,170.5	66.0	10.7	21.5	16.6	18.0	14.5	10.5	9.3	8.5	12.6	8.0	6.7

Annex D**Evolution of the Power Sector in Bolivia**

	<i>Before Reform of 1994</i>	<i>After Reform of 1994</i>
Legal instruments for regulation	National Electric Code (1968) (Supreme Decree)	SIRESE Law (1994) Electricity Law (1994)
Policies for the power sector	Executive Branch	Legislative and Executive Branch
Regulation, control and supervision	Executive Branch through DINE	SE; SIRESE
Approval of tariffs	DINE (with authorization of the Executive Branch) and municipal governments	SE
Generation (integrated system)	ENDE (government-owned) COBEE (private) Self-producers (private)	COBEE (private) Corani (private) Valle Hermoso (private) Guaracachi (private) Other private generators (after 2000) Self-producers (private)
Transmission	ENDE (government-owned)	TDE (private)
Economic dispatch	ENDE (government-owned)	CNDC (private)
Distribution	COBEE (private) CRE (private) ELFEO (subsidiary of COBEE) ELFEC (subsidiary of ENDE) CESSA (mixed company) Other small companies and cooperatives	Electropaz (private) CRE (private) ELFEO (private) ELFEC (private) CESSA (mixed company) Other small companies and cooperatives
Service to isolated systems	ENDE Small companies and cooperatives	ENDE Small companies and cooperatives

Capitalization Process in Bolivia

First Stage

Transformation of public companies into CCMs:
Mixed Capital Companies (Compañías de Capital Mixto) are formed.
Shares are sold to employees up to the amount equivalent to their accumulated social benefits.

Approximate Equity Composition:

State: 98%
Workers: 2%

Second Stage

Capitalization of CCMs:
CCMs issue new shares doubling the capital of each CCM.
50% of the shares of CCMs is sold for cash through ICB to strategic partners.
The strategic partner takes over the administration of the company through a Capitalization and Administration Agreement.

Approximate Equity Composition:

Strategic Partner: 50%
State: 49%
Workers: 1%

Third Stage

Disengagement of the state:
The state transfers its shares to the Bolivian people through trust agreements with two AFPs (pension funds) that will administer the shares on behalf and for the benefit of the Bolivian people.
CCMs are transformed into private corporations (Sociedades anónimas or SA).

Approximate Equity Composition:

Strategic Partner: 50%
AFPs: 49%
Workers: 1%

Annex F

Comments from the Borrower

**REPUBLICA DE BOLIVIA***Ministerio de Desarrollo Económico*

VICEMINISTERIO DE ENERGÍA E HIDROCARBUROS

La Paz, Noviembre 13 de 1998
VMEH 6768 - DESP 1906/98

Señor
Roger Slade
JEFE DE EVALUACIONES
SECTORIAL Y TEMÁTICAS
DEPARTAMENTO DE EVALUACIÓN DE OPERACIONES
BANCO MUNDIAL
WASHINGTON D.C. - USA

REF.: POWER REHABILITATION PROJECT - CRÉDITO 1818-BO
INFORME DE EVALUACIÓN EXPOST

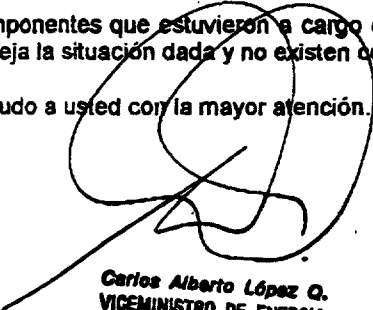
Distinguido Señor:

Luego del análisis de la versión preliminar del informe de referencia, este Viceministerio coincide en general con los términos contenidos en dicho documento, y especialmente en lo concerniente a la Reforma del Sector Eléctrico, aspectos que oportunamente fueron tratados con la Misión del Banco Mundial durante las reuniones mantenidas en este Despacho.

Con relación al punto 4.9 del informe, el Gobierno central tiene la responsabilidad fundamental de desarrollar la electrificación rural, que no es lo mismo que proveerla. A este efecto se está implementando el Programa Nacional de Electrificación Rural (PRONER), el que como mecanismo de promoción prevé la otorgación de incentivos a la inversión no solo a los proyectos ubicados en las áreas cercanas a las concesiones de las empresas de distribución, sino para todo proyecto de carácter sostenible del área rural en general.

En cuanto a los componentes que estuvieron a cargo de ENDE, en opinión de dicha empresa, el texto del informe refleja la situación dada y no existen comentarios.

Con este motivo, saludo a usted con la mayor atención.



Carlos Alberto López Q.
VICEMINISTRO DE ENERGÍA
E HIDROCARBUROS

Annex F**SUPERINTENDENCIA GENERAL
SISTEMA DE REGULACION SECTORIAL****SIRESE**

La Paz, 9 de noviembre de 1998
SG- 884/98

Señor
Roger Slade
Jefe
Grupo de Evaluaciones
Sectoriales y Temáticas
**Departamento de Evaluaciones
de Operaciones**
1818 H Street N.W.
Washington, D.C. 20433
E.E.U.U.

Estimado Sr. Slade:

**Ref.: Observaciones a la versión preliminar del Informe de Evaluación Ex-Post del
Power Rehabilitation Project (Credit 1818-BO)**

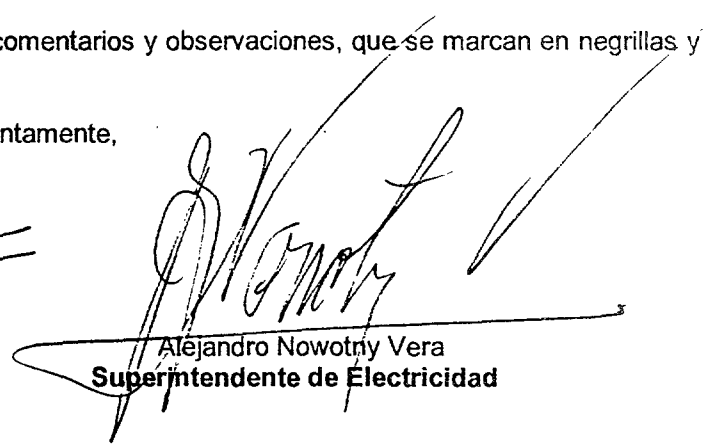
En atención a su requerimiento de 8 de octubre de 1998, remitimos a su consideración las observaciones y comentarios realizados al documento de referencia, tanto por la Superintendencia General del SIRESE como por la Superintendencia de Electricidad.

En adjunto encontrará el detalle de los comentarios y observaciones, que se marcan en negrillas y en estilo cursiva.

Con este motivo, saludamos a usted atentamente,



Claude Bessé Arze
**Superintendente General
del SIRESE**



Alejandro Nowotny Vera
Superintendente de Electricidad