



Simplified Procedure

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From: The Secretary
Subject: Bolivia. Proposal for a loan for a rural electrification program

Basic Information: Borrower Republic of Bolivia
Amount up to US\$20 million
Source Fund for Special Operations

Inquiries to: Mr. Ricardo Pinheiro (extension 2113)

Remarks: This operation was included in the update of Region 1 country strategies approved by the Board of Executive Directors on 21 July 2004 (see document GN-2250-2), and its amount does not exceed the ceiling established for Group D countries.

References: GN-1838-1(7/94), DR-398-5(5/03)

Other distribution: Representative in Bolivia

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BOLIVIA

RURAL ELECTRIFICATION PROGRAM

(BO-0224)

LOAN PROPOSAL

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Annex I Logical framework

Proposed resolution

Electronic Links and References	
Basic Socioeconomic Data	http://www.iadb.org/RES/index.cfm?fuseaction=externallinks.countrydata
Tentative lending program	http://ops.idbloans/
Status of loans in execution and loans approved	http://ops/Approvals/PDFs/BOen.pdf
Information available in the RE1/FI1 technical files	http://idbdocs.iadb.org/WSDocs/getDocument.aspx?DOCNUM=548662
Procurement plan	http://idbdocs.iadb.org/WSDocs/getDocument.aspx?DOCNUM=548678
Map	http://opsws3.reg.iadb.org/idbdocswebservices/getDocument.aspx?DOCNUM=495289

ABBREVIATIONS

CAF	Andean Development Corporation
CESI	Committee on Environment and Social Impact
CNDC	Comité Nacional de Despacho de Carga [National Load Dispatch Committee]
CPNV	Current private net value
CSNV	Current social net value
KFW	Kreditanstalt Fur Wiederaufbau [German Development Bank]
MSOP	Ministry of Public Works and Services
OR	Operating Regulations
PLABER	Plan Bolivia de Electrificación Rural [Bolivian Rural Electrification Plan]
PPM-PASA	Programa de prevención y mitigación y un plan de Aplicación y Seguimiento [Environmental prevention and mitigation program and enforcement and monitoring plan]
PROPEF	Project Preparation and Execution Facility
SEIA	Strategic environmental impact assessment
SIN	Sistema Interconectado Nacional [National Interconnected System]
SIRR	Social internal rate of return
SNPV	Social net present value
TORs	Terms of reference
UBNs	Unmet basic needs
UER-VMEEAT	Rural Electrification Unit of the VMEEAT
UNDP	United Nations Development Programme
UTER-PD	Rural electrification technical units of the departmental governments
VMEEAT	Office of the Vice Minister for Electricity, Alternative Energies, and Telecommunications

PROJECT SUMMARY

BOLIVIA RURAL ELECTRIFICATION PROGRAM (BO-0224)

Financial Terms and Conditions ¹				
Borrower: Republic of Bolivia Executing agency: Ministry of Public Works and Services (MSOP) through its Office of the Vice Minister for Electricity, Alternative Energies, and Telecommunications (VMEEAT)			Amortization period:	40 years
			Grace period:	10 years
			Disbursement period:	60 months
			Commitment period:	54 months
Source	Amount (US\$)	%	Interest rate:	1% during the grace period, and 2% thereafter
IDB (FSO)	20.0 million	90	Inspection and supervision:	1%
Local	2.2 million	10	Credit fee:	0.5%
Total	22.2 million ²	100	Currency:	FSO resources
Project at a Glance				
<p>The program's general objective is to give nearly 44,000 homes in rural areas access to electricity as a way to reduce poverty and raise living standards, and to make more efficient use of public and private resources in the sector.</p> <p>In order to meet this objective, the program seeks: (a) to introduce an incentive program for investment in rural electrification that encourages the design and execution of power grid extension projects and projects for decentralized systems using renewable energy or natural gas; and (b) to strengthen the capacity of departmental governments and municipios to design, execute, monitor, and evaluate electrification projects, and to encourage beneficiary community involvement in the design, execution, and sustainability of the program.</p> <p>Special contractual clauses:</p> <p style="text-align: center;"><i>Conditions precedent to the first disbursement of loan proceeds:</i></p> <p>(i) The establishment of the Rural Electrification Unit of the Office of the Vice Minister for Electricity, Alternative Energies, and Telecommunications (UER-VMEEAT), with the minimum number of staff necessary to help it carry out its functions as the executing agency in a timely manner (paragraph 3.5); and</p> <p>(ii) The entry into force of the Operating Regulations (OR) (paragraph 3.15).</p> <p style="text-align: center;"><i>Conditions precedent to the commencement of grid extension or decentralized systems projects:</i></p> <p>(iii) The UER-VMEEAT will hire consulting firms to evaluate and approve projects being developed by the operators (paragraph 3.7), monitor project execution (paragraph 3.9), and handle program accounting (paragraph 3.11); and</p>				

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.

² The borrower authorities have expressed the desire to apply the Bank's new policy eliminating the financing matrix to this operation, in accordance with Resolution AG-8/05 and document GN-2331-5, so as to finance up to 100% of the program cost. Once conditions are right to introduce such changes, including approval of the country financing parameters and the respective guidelines, a proposal will be submitted to the Board of Executive Directors to increase the portion that the Bank can lend toward the operation's total cost.

- (iv) Evidence will be provided to show that professionals have been hired as environmental monitors; one will serve as a social and environmental expert for the UER-VMEEAT, while the other three will work as social and environmental experts for the technical rural electrification units of the departmental governments (UTER-PD) (paragraph 4.25).

As special conditions precedent to commencement of the first grid extension or decentralized systems project in each departmental government:

- (v) At least one professional staff member from each of the departmental governments has been designated to work on social and environmental issues with the corresponding UTER-PD (paragraph 4.25); and
- (vi) Staff at the UER-VMEEAT, UTER-PDs, and departmental governments have received training on social and environmental issues (paragraph 4.25).

Other special conditions:

The loan contract will stipulate that government incentives are to be transferred through the departmental governments and municipios directly to private operators in the form of loans to the departmental government and municipios, on the same terms as the Bank loan and in accordance with criteria and procedures of the program Operating Regulations (paragraph 3.3).

As a result of the Project Preparation and Execution Facility (PROPEF) operation approved on 8 March 2005, most of the elements needed to make this loan eligible for the first disbursement are expected to be in place (paragraph 3.14).

Exceptions to Bank policies:

None.

Project consistent with country strategy:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Project qualifies as:	SEQ <input checked="" type="checkbox"/>	PTI <input checked="" type="checkbox"/>	Sector <input checked="" type="checkbox"/>	Geographic <input checked="" type="checkbox"/>	Headcount <input checked="" type="checkbox"/>

Verified by CESI on: 4 March 2005

Environmental and social review: N.A.

Procurement: See paragraphs 3.22 and 3.23.

I. FRAME OF REFERENCE

A. Socioeconomic framework

- 1.1 The other countries of the region would be hard pressed to match Bolivia's institutional track record in monetary and exchange discipline, financial reform, trade liberalization, the deregulation and privatization of productive sectors, education and pension reform, and decentralization. This, together with its low income levels and high poverty rates, made Bolivia a beneficiary of the heavily indebted poor countries debt initiative in 1998 and 2001. Yet all this effort has not had the desired results in terms of growth, macroeconomic stability and, especially, poverty reduction. Total and per capita gross domestic product grew respectively by 3.5% and 1.1% year-on-year between 1990 and 2003; these are relatively modest rates compared to low-middle-income countries.
- 1.2 Bolivia's progress in terms of nonmonetary indicators is clear. Social services coverage has expanded, reducing the percentage of people with unmet basic needs (UBNs) from 70.9% in 1992 to 58.6% in 2001. Underpinning this trend were improvements in living conditions in urban areas, where the percentage of people with UBNs fell from 53% in 1992 to 39% in 2001. But the same policies have been less effective in alleviating the severity and proliferation of poverty in rural areas, where it affects 90% of the population or 2.8 million people.
- 1.3 These outcomes provide a glimpse of the wide gaps that will divide society and limit economic and social progress as long as they persist. Bridging and narrowing these gaps is at the heart of development in Bolivia.

B. The electricity sector

- 1.4 Nearly 10 years have passed since the reform of Bolivian electricity sector began, and the results have been satisfactory. The reform put the sector on a new footing with: (i) a standard-setting and regulatory role for the State and the transfer of generating and business activities to the private sector; (ii) a new legal framework; (iii) a new autonomous regulatory agency responsible for obeying and enforcing laws and regulations; and (iv) a competitive wholesale electricity market.
- 1.5 The main players are:¹ the Office of the Vice Minister for Electricity, Alternative Energies, and Telecommunications (VMEEAT) at the Ministry of Public Works and Services (MSOP) as policy-making agency; the Office of the Electricity Superintendent as regulatory agency; and the National Load Dispatch Committee

¹ See the sector legal framework established by the Sector Regulation System Act (known by its Spanish-language acronym, SIRESE, Law 1600 of 28 October 1994) and the Electricity Act (Law 1604 of December 1994).

(CNDC)² as dispatching authority. The main purpose of regulation is to set and control prices so as to reflect economic costs.

- 1.6 **Rates.** The Electricity Act provides that the maximum prices to regulated customers are set using base rates and indexing formulas.³ Base rates are calculated based on the costs of distribution system nodes (energy, capacity, and usage charges), distribution costs (operation, maintenance, and administration), taxes, depreciation, and profits.⁴ The regulatory agency approves the base rates and rate structures for a period of four years. These rates apply to customer categories established based on how the electricity is supplied and consumed. Electricity is bought and sold on the wholesale electricity market either by contract or on the spot market, where transactions are based on prices set each hour. Energy and power are exchanged on the main system nodes, which are connected to electricity distribution companies. The monthly average price of generated power in 2003 was US\$30/MWh. Adding to that the transmission margin at an average of US\$6/MWh, and the distribution margin yields the final average price to the customer. Electricity rates for the customers of the country's two largest distributors, Electropaz and the CRE rural electrification cooperative, have fluctuated between US\$60 and US\$70/MWh over the last two years. These rates are considered reasonable in that they cover the average generation and transmission costs and allow for distribution margins of around US\$30/MWh.
- 1.7 Private companies are mainly responsible for electricity generation, transmission, and distribution. According to the 2001 census, national electrification coverage is 64.4%. The National Interconnected System (SIN) delivers electricity to the cities of Santa Cruz, Cochabamba, Potosí, Sucre, Oruro, and La Paz. The SIN companies engage in a single activity (generation, transmission, or distribution) and account for 84% of installed capacity and 89% of Bolivia's electricity generation. The wholesale electricity market, which is managed by the CNDC, plans the integrated operation of the SIN, dispatches loads in real time at a minimum cost, and determines transactions.
- 1.8 The SIN is currently comprised of eight power-generating companies,⁵ the transmission company Empresa Transportadora de Electricidad (TDE),⁶ and nine

² The CNDC is made up of one representative of the power companies, one from the transmission company, one representative of the distributors, one representative of unregulated customers, and a representative of the Office of the Electricity Superintendent, who chairs the committee.

³ Monthly indexing formulas reflect adjustments for cost variations and efficiency gains of a company. Unregulated customers negotiate their rates directly with power companies.

⁴ The base price of energy is calculated as the weighted average of system's short-run marginal costs of energy, multiplied by the demand values as projected in the discount rate established in the Electricity Act.

⁵ They are: Compañía Boliviana de Energía Eléctrica (COBEE), the Corani, Guaracachi and Valle Hermoso electric companies, Comercial Andina (Synergia), Empresa Hidroeléctrica Boliviana (HB), Río Eléctrico and Compañía Eléctrica Central Bulu Bulu (CECBB).

electricity distributors.⁷ Transmission operates under the principle of open access for all generating plants that wish to transport power within the SIN. The power capacity rose from 580 MW in 1996 to 1,353 MW in 2003—a 133% increase—with the entry of new private companies that doubled existing investments. During that time, the number of customers grew 5% per year from 620,000 in 1995 to 910,000 in 2003.

- 1.9 In isolated systems, companies may be vertically integrated. The largest of these operate in Trinidad, Cobija, Tarija and three other cities in the department of Tarija: Yacuiba, Villamontes, and Bermejo. The Camiri, Germán Busch, and Valle Cruceños systems operate in the department of Santa Cruz, while the Guayaramerín and Riberalta systems operate in the department of Beni. There are also smaller isolated systems⁸ and self-generators, all of which are thermoelectric plants and, generally speaking, cooperatives located in small towns.

C. Rural electrification: country framework and strategy

- 1.10 The rural electrification subsector is governed by the Rural Electrification Regulations (Supreme Decree 24772 of 31 July 1997). The guiding principles are: (i) to adapt and diversify technology for the efficient use of resources, taking into account the supply and usage characteristics of each region and viable technological alternatives, including renewable energies and reliable power service at a minimum cost; (ii) to ensure consumer access to services in rural areas; (iii) to use public funds as an incentive to attract resources for private sector projects; (iv) to acknowledge the legitimacy of the demand for electricity and its prioritization over other needs; and (v) to make service sustainable in the long term.
- 1.11 According to the 2001 census, rural electrification coverage stands at 24.5%. This means that there are more than 575,000 homes in rural areas without electricity. The department of La Paz had the highest number of rural households without electricity (175,000), followed by Potosí and Cochabamba (100,000 each). All departments had low levels of electricity coverage. With the exception of Cochabamba with 35% coverage, no other department had exceeded 29%. El Beni, Chuquisaca, Potosí, and Pando had not even exceeded 20%.
- 1.12 The Plan Bolivia de Electrificación Rural [Bolivian Rural Electrification Plan] (PLABER), launched by the Government of Bolivia in 2002, is part of a strategy to support social and economic development in small towns and rural areas in Bolivia

⁶ To prevent vertical integration of the lone transmission company, it will not be allowed to buy or sell electric power.

⁷ They are: Electropaz (La Paz), ELFEO (Oruro), ELFEC (Cochabamba), SEPSA (Potosí), CESSA (Sucre), CRE (Santa Cruz), y Emprelopaz, SEYSA y Edel Larecaja (which operate in the Department of La Paz and supply the Electropaz distribution company).

⁸ Systems with an installed capacity under 1MW.

by providing access to electricity and using it efficiently and productively. The goal for 2002-2007 is to provide 200,000 homes with electricity through projects to extend electrical grids, increase user density, and install decentralized systems. This would require an investment of some US\$200 million and would create 13,000 temporary jobs and 700 permanent jobs. By 2007, 45% rural coverage is expected, bearing in mind population growth during that time. Coverage had reached an estimated 28.3% by December 2003,⁹ meaning 160,000 more rural homes must be provided with electricity to reach the 45% target.

- 1.13 This operation, together with other programs being executed with support from such international organizations as the Andean Development Corporation (CAF), Kreditanstalt Für Wiederaufbau (KFW), the United Nations Development Programme (UNDP), and the World Bank, would total US\$66.5 million, providing the Government of Bolivia with 70% of the external financing needed for PLABER. The Government of Bolivia continues to seek new sources to fully cover the PLABER financing needs.
- 1.14 For grid extension projects, PLABER calls on the municipios to submit requests stating why the projects are needed, while the departmental governments are responsible for project final designs. For decentralized systems with renewable energies, the VMEEAT verifies that studies have been conducted for the project final designs.¹⁰

D. The Bank's country and sector strategy

- 1.15 The Bank's country strategy with Bolivia for 2004-2007¹¹ seeks to reduce poverty sustainably over the coming years. Accordingly, the Bank will capitalize on

⁹ Romero, Carlos; Vice Minister of the VMEEAT. Presentation at the program technical workshop, 27-28 May 2004, La Paz.

¹⁰ The PLABER guiding principles are as follows:

- a) Rural electrification projects must: (i) be consistent with the Departmental Indicative Plan; (ii) be developed in accordance with the "methodology for project preparation and evaluation" instituted by the Vice Ministry of Public Investment and External Financing; (iii) have a positive social net present value (SNPV); (iv) be technically certified by the electric company in terms of power availability and connection points; (v) have rates compatible with the ability to pay; and (vi) incorporate home connection costs (known as "hook-ups");
- b) For projects in which the execution, operation, and maintenance are tendered together, the bidding conditions should include a rating system that favors the following: (i) the lowest bid; (ii) the lowest subsidy needed; (iii) the lowest resulting rate; and (iv) the most financial participation from the private sector in the project; and
- c) The management contract signed between the departmental government and the winning bidder must include the following stipulations: (i) the period of operation must be a minimum of 20 years; and (ii) the contract and agreements between the departmental government and the private sector must be consistent with the Electricity Act and its regulations.

¹¹ IDB Country Strategy with Bolivia (2004-2007), document GN-2313-2.

opportunities to advance specifically in terms of the following objectives: (i) improving the management capacity and transparency of the State; (ii) supporting competitiveness and sustainable development of the private sector; and (iii) enhancing efficiency and equity in basic social services delivery.

- 1.16 In its energy strategy and policy documents,¹² the Bank identifies as a priority the need to support the public sector in improving rural electrification coverage. Although these projects may have high economic returns, low financial returns often fail to provide enough incentive for the private sector to expand its systems and provide electricity services to the poorest users, particularly in rural areas. Accordingly, the Bank acknowledges that efficient State intervention is needed in this area, and stresses the importance of providing support, given the users' ability to pay, community participation especially by women, and the long-term sustainability of rural electrification systems.
- 1.17 The Bank's recent experience in rural electrification involving private enterprise includes the approval in September 2003 of a US\$40 million loan for a rural electrification program with incentive systems for Chile (1475/OC-CH), and in June 2002 of a US\$27.4 million loan to Guyana for an unserved areas electrification program (1103/SF-GY) with components for renewable energy projects.¹³ As part of the loan for the hybrid program for support to the electric sector in Nicaragua (1017/SF-NI), the Bank is executing a US\$3.5 million component to develop the strategy and execute rural energy projects—not limited to electricity—and nonreimbursable technical-cooperation operations to develop markets for sustainable rural renewable energy in various countries. There is also the loan to Honduras (Puebla-Panama Plan—Support for rural electrification and the energy sector (HO-0224)), approved in 2004 with a specific component to support urban and rural electrification so that the national government can expand coverage.
- 1.18 In Bolivia, the Bank has contributed to the development of the rural electrification subsector, including the expansion and interconnection of systems, and institution-strengthening, through the following loans: (i) project for the expansion and interconnection of the electric power systems of the Empresa Nacional de Electrificación (ENDE), stage I (467/SF-BO); (ii) complementary line of credit to the Republic of Bolivia for the second stage of the ENDE development plan (33/IC-BO); and (iii) second stage of the ENDE development plan (548/SF-BO), already disbursed; and of the active loan for the fiscal accountability and local development program (1075/SF-BO).

¹² IDB Energy Strategy, document GN-1969, February 2000, and preliminary Energy Policy, May 2004.

¹³ More information on these two programs can be found at: <http://www.iadb.org/EXR/doc98/apr/ch1475e.pdf> and <http://www.iadb.org/EXR/doc98/apr/gv1103s.pdf>.

E. Experience of the IDB and other multilateral organizations

- 1.19 Providing government incentives (subsidies) to private investors instead of financing rural electrification projects was one of the lessons learned from the rural electrification program in Chile (1475/OC-CH). Such an approach makes the project development process simpler and more efficient, since the design and construction of the electrical facilities are in the hands of the same companies responsible for operating and maintaining them in the future. Another important lesson was the enhancement of procedures and methodologies at all stages of project development, from identification through operation, specifically to lower government subsidies. The selection of a suitable management system was also important for ensuring the sustainability of the decentralized projects based on renewable energy, as was the case, for example, with microenterprises operating and maintaining the systems.
- 1.20 In order to avoid duplication of effort, draw on relevant experience and lessons learned, and coordinate the proposed program activities with those of other projects already in execution from CAF (grid extension), KFW (hydroelectric microplants), UNDP (renewable energies in general), and the World Bank (increased user density and photovoltaic panels), a technical workshop was held in La Paz on 27-28 May 2004 where several key areas were identified for enhancing the program design, particularly with respect to its scope, contracting systems, and social and environmental considerations.¹⁴

F. Proposed program strategy

- 1.21 The program is consistent with the Bank's energy strategy and policy (paragraph 1.16) and contributes directly toward the third objective of the Bank's country

¹⁴ Key areas for enhanced program design include:

- a) **The program scope:** (i) highlight the issue of increasing user density; (ii) focus on the institutional strengthening of the sector in the municipios; (iii) include activities designed to increase the participation of distributors and other rural power service providers; and (iv) consider improvements to project evaluation methodologies.
- b) **Contracting systems:** (i) bid the services out to third parties in the cases of grid extensions when no agreement is reached with the local power company; (ii) include tax rebates in the contracts; and (iii) recommend the bidding system requiring the lowest subsidy for contracting decentralized services.
- c) **Execution schemes:** (i) create an executing unit exclusively for the program; and (ii) use outside consultants for project evaluation and simplify the execution scheme in order to increase user density and thereby ensure flexible and transparent processes; and
- d) **Social and environmental considerations:** (i) support community leaders, and hence the community, in developing projects; (ii) encourage community members' participation from the onset of project development, with respect to their desire to have power service and their ability to pay for it; and (iii) mitigate the difficulties customers have in paying for the connection to their homes. The full document can be found at [IDB Docs #322947](#).

strategy, to enhance efficiency and equity in basic social services delivery (paragraph 1.15).

- 1.22 The program seeks to meet the short-term, pent-up demand for rural electrification projects, previously identified by the departmental governments and municipios together with the VMEEAT. It incorporates lessons learned, strengthens institutional capacity to efficiently broaden service coverage, and enhances the development, evaluation, and monitoring of projects identified with the support of two nonreimbursable technical-cooperation operations: BO-T1001 and BO-T1004. The technical-cooperation operation will also help to develop a rural electrification master plan for a broader vision of the sector, beyond the scope of the proposed program.
- 1.23 **Improvements identified** in program preparation include: (i) the payment of government subsidies (for only the unprofitable part of the investment) out of program resources to support investments in grid extensions and decentralized systems (directly to operators for grid extensions, or through a competitive process for decentralized systems); (ii) increasing the useful life of facilities; (iii) taking operating, maintenance, and marketing costs into consideration; (iv) correctly calculating taxes on companies' profits; (v) providing welfare benefits for the community; (vi) including hook-up costs; (vii) financing part of the hook-up costs and the the cost of installing essential fixtures for electricity use in homes; (viii) using efficiency prices in investment costs; (ix) providing benefits for the optimal use of the grids. These are expected to lessen the need for government subsidies and lead to more efficient use of government and private resources.
- 1.24 This program is also results-driven, which means that government subsidies for private-sector investments, determined ex ante, will be contingent upon evidence from the operators that customers are connected to the grid.¹⁵
- 1.25 There is broad consensus that giving poor, rural families and communities access to modern power sources has a significant positive direct and indirect impact on their well-being, and that having electricity translates into monetary and nonmonetary economic benefits by lowering the costs of obtaining the power services they need.¹⁶
- 1.26 In terms of **coordination with other institutions** financing rural electrification programs in Bolivia, apart from the technical workshop (paragraph 1.20) where the key features of the proposed program's design were identified, it is important to

¹⁵ Similar to the system planned in *Output Based Aid—PPP Support for Delivery of Infrastructure Services to Low Income Communities*,” World Bank, July 2004.

¹⁶ See: “*Measuring Developmental Impact of Rural Electrification Projects*.” Document prepared by Jaime Millán (Sustainable Development Department), Inter-American Development Bank, Washington, D.C., June 2002.

note that the executing agency, the VMEEAT, is the same for all programs. The technical-cooperation operations cited (paragraph 1.22) also include specific coordination activities to ensure that this program complements the others with no duplication of effort, thus capitalizing on the positive experiences of each.

II. THE PROGRAM

A. Objectives and description

- 2.1 The program objective is to give nearly 44,000 homes in rural areas access to electricity as a way to reduce poverty and raise living standards, and to make more efficient use of public and private resources in the sector.
- 2.2 In order to meet this objective, the program seeks: (i) to introduce an incentive program for investment in rural electrification that encourages the design and execution of power grid extension projects and projects for decentralized systems using renewable energy or natural gas; and (ii) to strengthen the capacity of departmental governments and municipios to design, execute, monitor, and evaluate electrification projects, and to encourage beneficiary community involvement in the design, execution, and sustainability of the program.
- 2.3 By offering incentives for private investment, the program will support broader coverage while seeking to ensure the sustainability of the investments, improve service, and lower project costs through technical enhancements to the evaluation methodology, as well as to reduce the subsidy to be provided by the State. The program also seeks to increase the number and type of beneficiaries by including microenterprises and small businesses as decentralized service providers.

B. Structure

- 2.4 The total cost of the program is US\$22.2 million, of which up to US\$20 million would be financed by a Bank loan and US\$2.2 million would come from the budget of the Government of Bolivia.¹⁷ The direct costs of US\$18.79 million are broken down into two components: one to provide incentives for private investment (US\$17.82 million), and the other for institution-strengthening, training, and promotion (US\$960,000).

1. Investment subsidies component (US\$17.82 million)

- 2.5 The incentives consist of subsidies paid out of public funds to private rural power service distributors or providers (the “operators”), up to the amount needed to ensure the sufficient ex ante profitability of individual projects. The maximum subsidy that may be paid to operators for each individual project exactly offsets the private net present value (PNPV) (when it is negative),¹⁸ and is limited to the cost of the estimated initial investment for the project in question. Once negotiated with the

¹⁷ In addition to program resources, contributions by the private sector and end users would add an expected US\$9.3 million (US\$6.9 million from the private sector and US\$2.4 million from end users).

¹⁸ At private discount rates of 10%.

operator and set, the subsidy amount cannot change, and the operator responsible for the operation and maintenance of the project must bear any additional costs that might subsequently arise.

a. Grid extension subcomponent (US\$13.32 million)

- 2.6 Subsidies will be given for two types of investments: (i) the electrification of communities via grid extension projects; and (ii) increasing the density of customers who for various reasons are still not connected in areas with electricity distribution grids. Approximately 13,000 homes would receive electricity through grid extension projects, while 27,000 would be connected to service through projects to increase customer density. There could be two types of subsidies for the latter case: type “a” (requiring grid extension) and type “b” (not requiring grid extension). In both cases, the program will finance 50% of the cost of hook-up and installing essential fixtures for electricity use in homes. The beneficiary will supply the remaining 50% through a matching grant system. The program would provide electricity to nearly 10,500 type “a,” and 16,500 type “b,” homes.

b. Decentralized systems subcomponent (US\$4.5 million)

- 2.7 Under this subcomponent, investments by operators to provide electricity to nearly 4,000 homes via decentralized systems¹⁹ will be subsidized, making it possible to cover communities beyond the range of grids. The systems will use renewable energies or natural gas and will be designed to preserve the environment. Management should fall to the private sector, e.g. microenterprises and small businesses providing energy services, electricity cooperatives, or user associations, thereby encouraging community participation. This subcomponent will also finance studies to support the development of new projects.
- 2.8 Incentives for investment in decentralized systems will be allocated through competitive processes to socially beneficial projects that can be properly operated and maintained throughout their useful life. Studies will be commissioned to help the VMEEAT’s rural electrification unit (UER-VMEEAT) to design and prepare new projects. This also includes ex post evaluations during program year one of some of the existing decentralized systems, in order to incorporate lessons learned into the new project designs.

**2. Institution-strengthening, training, and promotion component
(US\$960,000)**

- 2.9 This component will finance project promotion and training activities for the main stakeholders, including the social and environmental aspects of the program.

¹⁹ Micro and mini hydraulic power plants (hydroelectric power), wind generators (wind power), photovoltaic panels (solar energy), biomass, and natural gas.

Consultants will help departmental governments, municipios, and other agencies responsible for program management to strengthen systems for operation, monitoring, supervision, and evaluation. Support will also be given for the establishment and/or strengthening of rural electrification technical units of the departmental governments (UTER-PD) in the form of hiring technical staff and purchasing vehicles, computers, and georeferencing equipment. The departmental governments and municipios will guarantee tenure for trained staff, but if there is turnover, individuals with the same qualifications will be hired and trained.²⁰

- 2.10 In the case of the decentralized systems, the institution-strengthening, training, and promotion component will lend special support to new operators, given that they will be managed by the private sector. There will be promotional activities to inform potential users about systems maintenance and limitations, environmental protection requirements, safety standards—especially for photovoltaic systems—and the rights and obligations included in the rate agreements. This will encourage community participation.

3. Program management (US\$2.08 million)

- 2.11 This component will finance operating costs for the VMEEAT's rural electrification unit (UER-VMEEAT) (US\$500,000) and consulting services for project monitoring (US\$440,000), for project evaluations (US\$510,000), for program management and accounting (US\$340,000), and for external audits (US\$290,000). The external audits include a financial/operational and technical supervision audit (US\$250,000), as well as a social and environmental audit (US\$40,000).

C. Cost and financing

- 2.12 A sample of projects found in the Finance Ministry's National Investment Information System (SISIN) was used to determine what projects would be economically and financially feasible in a current base scenario, as well as in different scenarios that might result from enhancements to the methodology. It also made it possible to determine the estimated total cost of the investments, the government subsidies that would be needed for economically viable projects to yield a sufficient private return, the investments to be financed by distribution companies, and the contributions needed from the end beneficiaries.
- 2.13 The scope of the institution-strengthening, training, and promotion component, as well as program management, was determined based on staff requirements, studies, and specialized consulting assignments, identified through an institutional analysis of the different entities responsible for program execution. Table II-1 presents

²⁰ The Operating Regulations and the model contract between the UER-VMEEAT and the departmental governments and/or municipio(s), will contain, respectively, recommendations and a specific clause to this effect.

program cost estimates and the proposed financing, which would account for 90% of the total cost.

**Table II-1 Program costs
(US\$ millions)**

Item	Bank	Local contribution	Total	%
1. Program management	1.76	0.32	2.08	9.36
1.1 UER-VMEEAT	0.42	0.08	0.50	2.25
1.2 Consulting services: project supervision	0.36	0.08	0.44	1.98
1.3 Consulting services: project evaluation	0.43	0.08	0.51	2.29
1.4 Consulting services: administration and accounting	0.26	0.08	0.34	1.53
1.5 External audit	0.29	-	0.29	1.31
1.5.1 Financial/operational audit	0.25	-	0.25	
1.5.2 Social and environmental audit	0.04	-	0.04	
2. Direct costs	17.22	1.57	18.79	84.64
2.1 Investment subsidies component	16.43	1.39	17.82	80.29
2.1.1 Grid extension	12.53	0.79	13.32	
a) Electrification of communities	6.41	0.59	7.00	
b) Increasing user density	6.12	0.20	6.32	
Type "a"	5.20	0.10	5.30	
Type "b"	0.92	0.10	1.02	
2.1.2 Decentralized systems	3.90	0.60	4.50	
a) Subsidies for implementation of systems	3.60	0.40	4.00	
b) Support studies for project development	0.30	0.20	0.50	
2.2 Institution-strengthening, training, and promotion component	0.78	0.18	0.96	4.35
a) Strengthening of UTER-PDs	0.72	0.18	0.90	
b) Training	0.06	-	0.06	
3. Contingencies	0.15	-	0.15	0.68
4. Financial Costs	0.71	0.31	1.02	4.60
4.1 Interest	0.51	-	0.51	2.29
4.2 Credit fee	-	0.31	0.31	1.40
4.3 Inspection and supervision	0.20	-	0.20	0.91
5. PROPEF	0.16	-	0.16	0.72
Program Totals	20.00	2.20	22.20	100.00
Percentages	90%	10%	100%	

III. PROGRAM EXECUTION

A. Borrower and executing agency

- 3.1 The Republic of Bolivia will be the borrower. The Ministry of Public Works and Services (MSOP) will act as the executing agency through its Office of the Vice Minister for Electricity, Alternative Energies, and Telecommunications (VMEEAT).

B. Program execution and management

- 3.2 For rural electrification projects, municipal governments traditionally contract construction firms and firms to oversee the construction of works through a competitive process, and then turn them over to the community once completed, assuming responsibility for their operation and maintenance. The proposed program, however, consists of government subsidies (only for the unprofitable portion of the investment) out of the program resources to promote investment in grid extension and decentralized systems, paid directly to operators in the case of grid extensions, or awarded through a competitive process in the case of the decentralized systems. The Finance Ministry and the VMEEAT have decided that these transferred funds (paragraph 2.5) will be lent exclusively to the departmental and/or municipal governments²¹ on the same terms as the Bank loan and in accordance with the criteria and procedures of the program Operating Regulations. (According to MSOP Ministerial Resolution 013 of 20 April 2003, the departmental and municipal governments have different responsibilities with respect to segments of the electricity grid.) This proposal differs from the traditional system in two ways: First, the funds will not be channeled through the National Regional Development Fund; and second, the transfer of government funds directly to private electric companies represents an innovation not expressly provided for in Bolivian law.
- 3.3 While Bolivia's current legal framework does not allow public funds to be transferred directly to private companies in the electricity sector, the Rural Electrification Regulations (Supreme Decree 24772, as noted in paragraph 1.10) promote the idea that access to rural electricity services will require the use of public funds as an incentive to attract the resources necessary for private sector projects. The proposed option, as agreed with the MSOP/VMEEAT, is to incorporate such a provision into the loan contract, which in any event will have to be ratified by Congress, with the understanding that its scope would be limited to the proposed program while experience is gained in the use of incentives. The loan

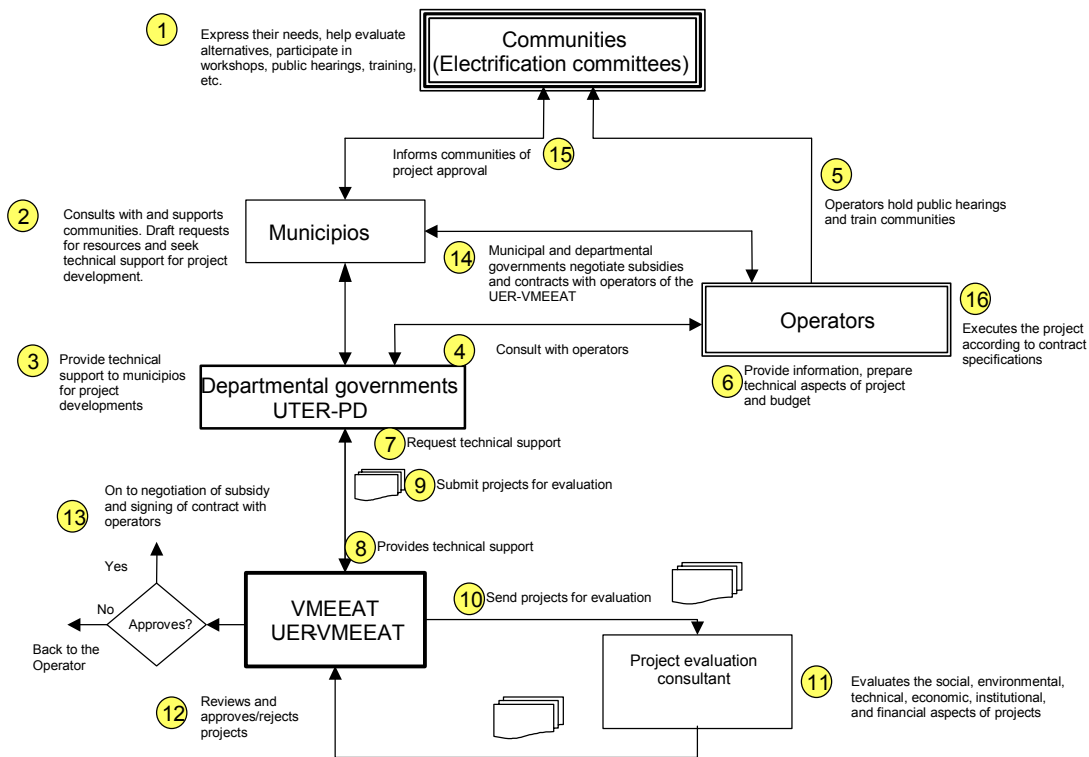
²¹ The Bolivian Constitution provides that: "In each department, the executive branch will be headed and administered by a prefect appointed by the President of the Republic" (Article 109); and the municipios are to be administered by mayors "elected by a majority of valid votes" (Article 200).

- contract will stipulate that government subsidies are to be transferred through the departmental governments and municipios directly to private operators in the form of loans to the departmental governments and municipios on the same terms as the Bank loan and in accordance with the criteria and procedures of the program Operating Regulations.
- 3.4 During program preparation, an assessment was made of the institutional capacity of the agencies that might eventually become the executing agencies for this operation. The assessment indicated that no existing agency would be suitable given the complexity and technical nature of the loan, so the establishment of an ad hoc unit (the rural electrification unit (UER)) was recommended. During the technical workshop, it was also agreed that this was the best solution (paragraph 1.20(c)).
- 3.5 The program UER-VMEEAT will be attached to the VMEEAT. It will be comprised of a small group of senior staff and supported by three consulting firms: (i) one will be responsible for accounting and administration; (ii) another for the evaluation of rural electrification projects developed by the operators and presented by the municipios through the departmental governments; and (iii) a third for the technical supervision of project execution contracts entered into between the departmental and municipal governments and the operators, and reporting to the UER-VMEEAT on the progress of execution and whether contractual obligations have been met. The UER-VMEEAT will commission project support studies and ex post evaluations of the decentralized systems (paragraph 2.8). The establishment of the UER-VMEEAT, with the minimum number of staff necessary to perform its functions as the executing agency in a timely manner, will be a **condition precedent to the first disbursement of program resources**. A headhunter will be engaged using program funds to assist in identifying, selecting, and hiring staff for the UER-VMEEAT.
- 3.6 In each of the departmental governments, existing rural electrification technical units (UTER-PDs) or those created as part of this program will support municipios in the project development process with the assistance of the UER-VMEEAT (mainly in cases where it is necessary to group several municipios together in order to enhance the projects). The institution-strengthening, training, and promotion component's resources will be used to hire technical staff and social and environmental experts and purchase vehicles, computers, and other necessary equipment and materials, in order to strengthen the UTER-PDs' technical capacity.
- 3.7 The projects will be submitted to the municipal and departmental governments, who will send them on to the UER-VMEEAT for evaluation and approval. The technical, social and environmental, economic, institutional, and financial evaluation of the projects will be done by a consulting firm hired in accordance with terms of reference (TORs) consistent with the program Operating Regulations (OR) and Bank procedures for the contracting of services. These TORs will

specifically require the consulting firm to use the Office of the Electricity Superintendent's existing unit price databases, to avoid duplication of effort. A signed contract between the UER-VMEEAT and the consulting firm must be provided as a **condition precedent to the commencement of grid extension and/or decentralized systems projects**.

- 3.8 The UTER-PDs will support the municipios in negotiations with the operators. The operators will be responsible for the technical preparation of the project,²² contracting, and the development of the systems (civil works and the procurement of services and equipment), as well as their operation and maintenance. During contract negotiations with the operators, or during the calls for proposals for decentralized system projects, the departmental and municipal governments will receive advisory support from the UER-VMEEAT. See Figure III-1 for a project execution flowchart.

Figure III-1. Program project execution flowchart



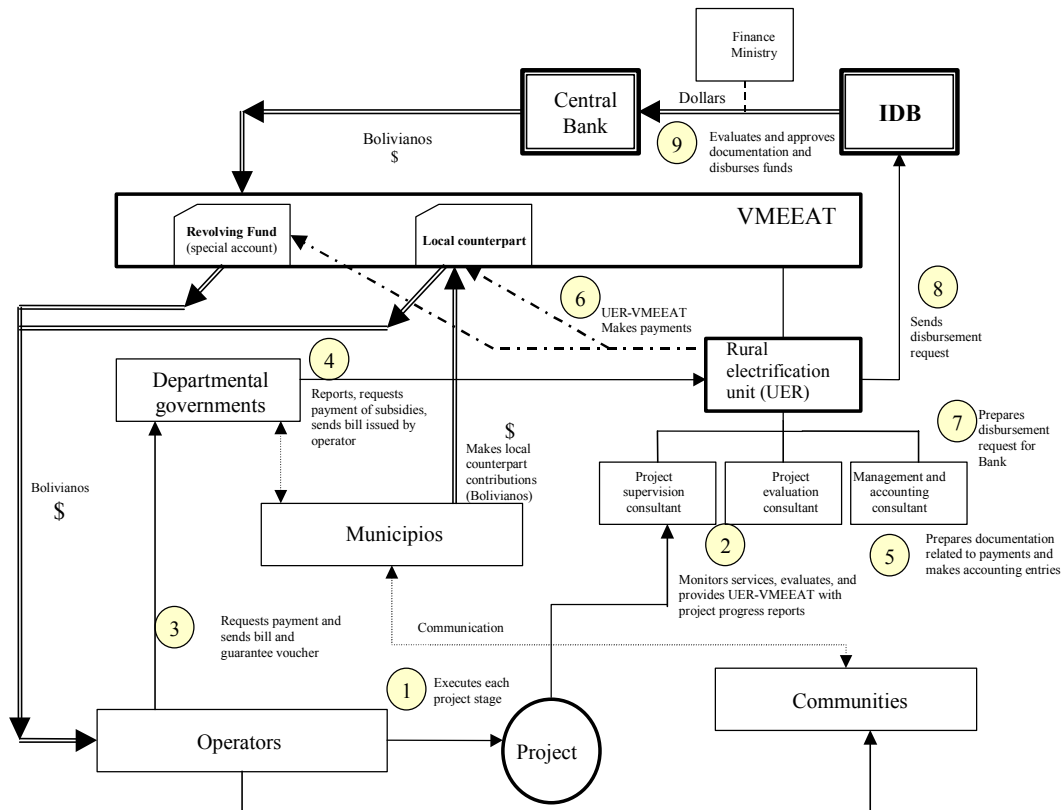
- 3.9 The UER-VMEEAT will contract, in accordance with TORs consistent with the program OR and Bank procedures, services to monitor project execution so as to

²² Including designs, technical specifications, and an itemized budget.

ensure that operators fully comply with the terms of the contracts entered into with the departmental and municipal governments and the UER-VMEEAT. A signed contract between the UER-VMEEAT and the consulting firm must be provided as a **condition precedent to the commencement of a grid extension and/or decentralized systems project**.

- 3.10 A special consolidated account will be opened at the Central Bank of Bolivia for the Bank loan proceeds. The UER-VMEEAT will be solely responsible for managing the revolving fund consolidated account and liaising with the Bank. The municipios will provide the local counterpart resources in agreement with the departmental governments. The municipios will program local counterpart resources for each project, in accordance with a timetable established in their respective annual work plans (AWPs) and budgets. The UER-VMEEAT will administer the local counterpart resources and Bank loan proceeds in accordance with the loan contract and the agreement entered into by the departmental government, the municipal government, and the VMEEAT. The UER-VMEEAT will use the local counterpart resources and Bank loan proceeds to make subsidy payments to the operators. The operators will be responsible for the execution, operation, and maintenance of the systems being partially financed with program resources, pursuant to the terms of the agreement entered into by the operator, the municipal and departmental governments, and the VMEEAT. See Figure III-2 for a program execution flowchart.

Figure III-2. Program execution flowchart



- 3.11 Program resources will be used to hire an accounting firm, in accordance with TORs approved by the Bank, to manage the program's accounting needs. The firm will be responsible for the administrative, accounting, and financial management of the program, including handling of the local counterpart and guarantee vouchers submitted by the operators, as well as the organization and filing of all documents generated. The firm should have an integrated financial management and accounting system that meets Bank requirements, as well as a system for keeping track of documents, the subsidies granted, guarantee vouchers, and goods and services procurement. The electronic system used must ensure the integrity of program data and operations. The accounting firm will also be responsible for reviewing and preparing the documents necessary for making payments to the operators. A signed contract with the accounting firm, incorporating TORs acceptable to the Bank that ensure the implementation of effective internal control and financial accounting record-keeping systems, must be provided as a **condition precedent to the commencement of a grid extension and/or decentralized systems project**.
- 3.12 The Central Bank of Bolivia will transfer the loan proceeds through a special account to the VMEEAT, which will, in turn, make loans to the departmental and/or municipal governments in accordance with the loan contract, the various responsibilities of the departmental and municipal governments as stated in paragraph 3.2, and the criteria and procedures established in the program OR. The Finance Ministry will be responsible for determining whether a municipal or departmental government qualifies for a loan, so that the VMEEAT may onlend loan proceeds to them.
- 3.13 Communities that organize into rural electrification committees or otherwise will attest that resources are available to finance 50% of the costs of hook-up and installing essential fixtures for electricity use in homes, as described in paragraph 2.6.
- 3.14 The objective of the approved Project Preparation and Execution Facility (PROPEF) operation is to establish the UER-VMEEAT and ensure that it is able to coordinate program activities, especially as they relate to: (i) reviewing the projects from program year one so as to incorporate the technical and methodological enhancements identified; (ii) supporting the departmental governments and municipios as they negotiate the amounts of the subsidies and number of homes to be connected in the projects; (iii) preparing the contracts and subsidiary agreements; and (iv) contracting the three consulting firms that will support UER-VMEEAT. As a result, nearly all of the elements needed for declaring the loan eligible for the first disbursement are expected to be in place.
- 3.15 **Operating Regulations (OR).** The program OR will incorporate technical and operational enhancements with respect to: (i) the new project flowchart, including a description of the functions and responsibilities of the different entities involved in

their execution; (ii) the new evaluation methodology for grid extension and decentralized systems projects; (iii) social and environmental considerations, taking into account the recommendations of the strategic environmental impact assessment (SEIA); (iv) mechanisms for the transfer of loan proceeds; (v) mechanisms for coordination with other public utilities; (vi) what is eligible for financing; (vii) synergy with other projects; and (viii) the development of basic plans for rate schedules and management frameworks applicable to the decentralized systems projects, including model subsidiary documents for the program.²³ The entry into force of the OR is a **condition precedent to the first disbursement of program resources**.

C. **Project eligibility**

- 3.16 **Grid extension projects.** Grid extension projects negotiated between the municipios and the operators on the basis of the maximum subsidy, calculated incorporating the various enhancements identified, will be eligible for program financing. With respect to increasing type “a” user density, the government subsidy to the operator will be a fixed amount per customer connected, and the maximum subsidy for each project will be calculated according to the evaluation criteria agreed upon between the UER-VMEEAT and the municipios and set out in the OR for each project.
- 3.17 **Decentralized systems.** Only decentralized systems projects with mechanisms to ensure that service delivery will be sustainable for the life of the system will be eligible. Unlike grid extension, where there would only be one interested operator, in the decentralized projects the subsidy amounts can be determined through competition. In any case, the maximum amount of the subsidy may not exceed the negative private net present value (PNPV) calculated for the project.
- 3.18 **Projects for the first round of the program.** The grid extension projects from the sample will be returned to the departmental governments to be presented to the corresponding operators, so that the enhancements identified by the program may be incorporated. The decentralized systems projects will be reanalyzed, using program funds, by the UER-VMEEAT and the departmental and municipal governments based on new studies and ex post evaluations of projects that have been executed.
- 3.19 **Synergy with other projects.** One of the UER-VMEEAT’s functions will be to identify synergies in programs and projects executed by the VMEEAT (for example, by exchanging program and project progress reports) and other sectors,

²³ Program subsidiary documents: (i) model contract between the UER-VMEEAT and the participating department and/or municipal governments; (ii) model contract entered into by the UER-VMEEAT, the participating departmental and municipal government(s), and the operator; and (iii) letter of agreement among the UER-VMEEAT, the municipal government, and the participating community’s electrification committee.

with goals that are furthered by rural electrification programs. The UER-VMEEAT will identify potential synergies with other social-sector projects already in execution or to be executed by departmental and municipal governments pursuing rural electrification projects. It will also promote the program where it deems appropriate, in order to encourage the use of rural electrification for competitiveness and productivity.

D. Environmental considerations

- 3.20 The Environment Act (Law 1333/92) establishes that each project must submit an environmental brief²⁴ to the environmental authorities, in order to determine the category of environmental impact assessment it will undergo to obtain an environmental license. Most of the program works, because of their nature and pursuant to Supreme Decree 27173/03, would fall under category four and require only a standard form with basic project information. Projects directly affecting areas of conservation or traditional, culturally isolated communities will be ineligible.
- 3.21 A strategic environmental impact assessment (SEIA) was done, and a single environmental brief drafted, to identify the social and environmental impact of the program. The Office of the Vice Minister for the Environment and Natural Resources (VMRNMA) is reviewing both for purposes of simplifying the procedure to obtain environmental licenses for the projects. The SEIA includes the identification, analysis, and evaluation of the direct, indirect, positive, and adverse impacts, with emphasis on social, cultural, and economic considerations, e.g. studies on the ability and willingness of low-income, indigenous, or campesino communities to pay. Under the SEIA, public hearings were held, and the institutional strengthening in environmental issues of the institutions involved was proposed. The SEIA also incorporates a model for the environmental prevention and mitigation program and enforcement and monitoring plan (PPM-PASA) with prevention, mitigation, remediation, and compensation measures for any potential environmental impact. These will be included in all contracts with operators.²⁵

²⁴ The environmental brief is a technical document that marks the beginning of the environmental impact assessment process and determines the SEIA category. This document is an affidavit and includes information about the project, work, or activity, and identifies key impacts and possible solutions to mitigate adverse impacts.

²⁵ These measures include: (i) emissions and noise control; (ii) handling and disposal of liquid, solid, industrial, and household waste; (iii) handling and storage of inflammable liquids; (iv) materials transport; (v) protection of the landscape, and flora and fauna, as well as cultural heritage protection; (vi) health, workplace hygiene, and safety; and (vii) soil protection and potential synergetic impacts. The program's management system will take environmental variables into account at all stages of the project cycle.

E. Procurement

- 3.22 Program-related goods and services will be procured pursuant to the January 2005 policies for the procurement of works and goods financed by the IDB (document GN-2349-4). Consulting services will be selected and contracted pursuant to the January 2005 policies for the selection and contracting of consultants financed by the IDB (document GN-2350-4). International competitive bidding will be used for the procurement of goods whose estimated cost is equal to or greater than US\$200,000, and the contracting and selection of consulting services whose estimated cost is equal to or greater than US\$200,000. Local competitive bidding will be used for the procurement of goods whose estimated costs are equal to or greater than US\$50,000, but less than US\$200,000. Shopping will be used for amounts less than US\$50,000. Short lists of consulting firms may consist entirely of local consultants for amounts less than US\$200,000, as long as they meet the other policy requirements of document GN-2349-4. The Bank will conduct ex ante review of procurement and contracting. However, at the executing agency's request the Bank may authorize ex post review on the following terms: (a) the Bank determines that the executing agency has demonstrated the necessary capacity and meets the requirements; and (b) the Bank may revoke the use of ex post review in whole or in part.
- 3.23 Because the program will be financing incentives (subsidies), rather than works, set ex ante to encourage operators to invest in rural electrification in priority areas, program execution and management make no provision for bidding related to the construction, operation, or maintenance of works. Nevertheless, the contracts with operators that will execute grid extension and decentralized systems projects will be required to include certain conditions.²⁶

²⁶ Such conditions include: (i) the obligation to implement the planned environmental protection measures (paragraphs 3.20 and 3.21); (ii) the right of the departmental and municipal governments, the VMEEAT, and the Bank, as well as monitoring and auditing firms to examine the goods, premises, works, and the construction of the respective projects; (iii) operators' obligation to supply information requested by the departmental and municipal governments, the VMEEAT, the Bank, and the monitoring and auditing firms: (a) certification of the national origin of the goods and services procured; (b) the value and percentage of the total project cost represented by goods and services coming from Bank member countries; (iv) operators' obligation to submit, prior to the provisional acceptance of projects by the departmental and municipal governments, a list of users who have been connected to the grid or decentralized systems, signed by representatives of the corresponding UTER-PD; (v) operators' obligation to submit bank guarantees acceptable to the borrower and the Bank upon receipt of the first payment of the corresponding subsidy, for the advance of that subsidy for the respective project and the proper execution of the contract; (vi) operators' obligation to submit, upon acceptance of the respective project, a guarantee of proper project execution that replaces the aforementioned guarantees; (vii) for decentralized systems projects, a mechanism that allows the municipio to reassign the equipment and respective systems as well as responsibility for service delivery to another provider via a new bidding process, in the event that the operator definitively interrupts the contracted service or fails to meet the minimum quality standards specified in the contract; (viii) the obligation to follow established business practices for procurement; and (ix) the obligation to maintain the works and equipment included in the respective individual project.

F. Execution period and disbursement schedule

- 3.24 The commitment period for the program loan proceeds will be 54 months, and the disbursement period 60 months. Table III-1 shows a preliminary estimate of Bank disbursements for the 2005-2009 period.

**Table III-1 Disbursement schedule
(US\$ millions)**

Category	2005	2006	2007	2008	2009	Total
1. Administration	0.18	0.35	0.44	0.44	0.35	1.76
2. Direct costs	1.66	3.48	4.30	4.30	3.48	17.22
3. Contingencies	0.01	0.03	0.04	0.04	0.03	0.15
4. Finance charges	0.07	0.12	0.20	0.20	0.12	0.71
5. PROPEF	0.16	-	-	-	-	0.16
Bank total	2.08	3.98	4.98	4.98	3.98	20.00
%	10.0	20.0	25.0	25.0	20.0	100.0

G. Revolving fund

- 3.25 The Bank will retroactively finance expenditures made under the PROPEF operation requested by the VMEEAT to begin setting up the UER-VMEEAT. A revolving fund for the equivalent of 12% of the loan amount is deemed necessary since the only payments recognized will be the government subsidies transferred to electric companies once they have concluded the respective projects, the connections required by the respective contracts have been made, and departmental governments have officially accepted the projects, and in view of the financing needs created by the project execution timeline.
- 3.26 The UER-VMEEAT, which will manage the revolving fund, will submit semiannual status reports within 60 days after the close of each six-month period, in the format requested by the Bank.

H. Monitoring and evaluation

1. Supervision by the Bank

- 3.27 The Bank's Country Office in Bolivia will monitor the program. There will be annual administration and monitoring meetings with the participation of the project team, at which: (i) semiannual program reports and progress will be reviewed against the previous year's annual work plan (AWP); (ii) the meeting of targets, objectives, indicators, and the assumptions included in the Logical Framework (Annex I), as well as the evolution of the risks identified, will be identified; and

- (iii) the AWP for the coming year will be agreed upon, detailing targets and corrective measures.
- 3.28 Also, bearing in mind that the program is a pilot and learning experience for Bolivia, a midterm review will be done, once loan disbursements have reached 50%. Inputs will include consultants' and auditors' work, and the evaluation will consider the impact on the departmental and municipal governments and on the users, program sustainability, the institutional capacity of the executing agency according to the Institutional Capacity Assessment System (ICAS), lessons learned, and the possibility of financing a subsequent stage.

2. External audit

- 3.29 A financial/operational and technical-supervision external audit of the program will be conducted, issuing an interim report at the end of every June and an annual report at the end of each fiscal year. The audit will be done by an independent firm acceptable to the Bank, based on the TORs previously approved by the Bank (documents AF-400 and AF-500). Standard Bank procedures will be followed in selecting and contracting the auditing firm (document AF-200). The cost of the audits will be part of the program costs and be financed using the Bank loan proceeds. The Bank's TORs (documents AF-400 and AF-500) will be adjusted to incorporate a technical supervision component that would be responsible for reviewing the external audit. The auditors, with the support of a specialist at their own expense and under absolute professional accountability, would be in a position to do that. The program's annual financial statements will be delivered within 120 days after the end of the fiscal year, and the final audit within 120 days after the last disbursement, in accordance with the TORs approved by the Bank. The social and environmental audit will be conducted by a specialized consultant in special cases as established in the loan contract.
- 3.30 The external audit's interim report, including an environmental evaluation and evaluation of the executing agency's internal control structure, a comprehensive review of procurement and disbursement procedures, and a review of the subsidy system, must be delivered within 60 days after the end of the first six-month calendar period, and include: (i) an environmental evaluation and evaluation of the executing agency's internal control system; (ii) a comprehensive review of procurement and disbursement procedures and their application; (iii) an audit of the subsidy system with an analysis of the accuracy of the number of final users connected and whether the other subsidy requirements have been met. The social and environmental audit reports will be delivered once fifty percent (50%) of the loan proceeds have been disbursed, and within the first quarter following the last disbursement.

3. Ex post final evaluation

- 3.31 The executing agency has agreed to compile the data necessary to set a baseline and conduct annual monitoring of the progress made against program indicators, which will be included in the project performance monitoring report prepared by the Bank with information from the executing agency. A final evaluation will be done, with the participation of the executing agency and the Bank, once the program resources have been disbursed, in accordance with the rules for project completion reports. The objective of this evaluation will be to analyze outcomes and learn lessons that may be applicable to future projects.
- 3.32 In accordance with Bank policy, upon consultation with the executing agency, the Bolivian authorities reported that, because there will be annual reports detailing program progress and targets, they do not believe it is necessary to commit program resources for an ex post evaluation.

IV. FEASIBILITY AND RISKS

A. Technical feasibility

- 4.1 The technical feasibility of providing electricity to an area is established in each case through feasibility studies with the corresponding certification of power availability, issued by the electricity distributor that holds the concession for the respective area. The feasibility of the customer density subcomponent is based on customer proximity to the grid, which should meet the quality standards established by the Office of the Electricity Superintendent. The feasibility of the decentralized systems subcomponent must be based on feasibility studies for each project and have the support of the UER-VMEEAT.
- 4.2 The program is not thought to place too high a demand on the availability of electric power in Bolivia, given that only 6 MW²⁷ and approximately 11.5 GWh of annual consumption would be added. This represents less than 0.5% of domestic power capacity and only 0.3% of 2003 energy consumption levels. Known power-generation technologies currently in use in Bolivia will be used for the decentralized systems subcomponent (natural gas, wind, solar, and hydroelectric microplants), and resources have been earmarked for technical feasibility studies to be done before calls for proposals are issued for the various projects.

B. Institutional feasibility

- 4.3 The program is feasible from an institutional standpoint. It will be executed by the Office of the Vice Minister for Electricity, Alternative Energies, and Telecommunications (VMEEAT), through a rural electrification unit (UER-VMEEAT) comprised of senior officials selected with the support of specialized firms. The UER-VMEEAT will have the support of three consulting firms: the first will be responsible for program accounting, financial management and control, keeping records, and drafting reports; the second will be responsible for the technical, social and environmental, economic, institutional, and financial evaluation of the projects; and the third will be responsible for monitoring project execution and verifying, certifying, and reporting to the VMEEAT on the full compliance with contractual obligations by the participating operators, so that they may receive subsidies. In addition, technical units will be strengthened and/or established in the departmental governments (UTER-PD) with qualified staff, and they will be given equipment and the technical support necessary to operate effectively. These units will support the municipal governments in project identification and development, as well as in negotiating contracts with operators.

²⁷ Of that amount, nearly 2 MW will come from the electrification of areas for residential, general, and industrial consumption (13,000 homes at 150 W) and, the remaining 4 MW from increasing customer density (27,000 homes at 150 W).

- 4.4 Actions will also be taken to increase the participation of beneficiary communities in the project development and execution phases. Microenterprises and small businesses are expected to participate in decentralized systems projects, and technical assistance will be provided on issues related to the management, marketing, operation, and maintenance of the electricity systems.

C. Socioeconomic feasibility

1. Willingness to pay

- 4.5 The socioeconomic analyses of the projects in the sample indicate that people generally use substitute energy sources such as candles, kerosene, electric batteries, gas, etc., forcing poor families to spend significantly more than they would have to with grid extension and decentralized systems projects.

2. Social and economic feasibility of the grid extension subcomponent

- 4.6 **Representative sample.** The economic analysis of the grid extension subcomponent was based on a representative sample of 61 projects and concluded that 32 projects involving 9,462 homes were eligible.²⁸ These 9,462 homes represent 72% of the subcomponent's target of 13,000 homes, and constitute a "large" sample for purposes of evaluating a global multiple-works program.
- 4.7 **Least-cost analysis.** The methodology involves a comparison of available electricity alternatives for each individual program to determine whether electrification via grid expansion is, in fact, the best option before a cost-benefit analysis is done.
- 4.8 **Impact of the improvements.** The expected improvements will lower the subsidy per home connected by US\$417 (from US\$850 to US\$432), a reduction representing savings per home connected of US\$553 (the unit cost of investment drops from US\$1,243 to US\$690). These amounts are consistent with the outcomes of the most recent competitive processes.²⁹ The aggregate impact of the improvements is reflected in the increase in eligible projects (from 29 to 32), with the accompanying increase in the number of home with electricity (from 4,748 to 9,462). The economic impact will raise the social net present value (SNPV) for June 2004 by US\$2.4 million, from US\$4.5 to US\$6.9 million. Adding US\$57 to

²⁸ Based on the findings of studies by consultants hired by the Bank.

²⁹ Ten projects recently executed in La Paz covering 554 homes at a cost of US\$643/home. Thirteen projects executed in Santa Cruz covering 3,498 homes at a cost of US\$793/home. Ten projects are currently in execution in the Department of La Paz, covering 4,552 homes; on average, the projects have been awarded at US\$658/home.

cover 50% of the cost of hook-up and interior fixture installations raises the subsidy required per home from US\$432 to US\$489.³⁰

- 4.9 **Findings of the cost-benefit analysis.** The economic analysis of the sample estimates a June 2004 SNPV of US\$6.9 million, discounted at 12% from 1 January 2004. The social internal rate of return (SIRR) is an estimated 25.3%. Because the methodology bases the economic analysis of the sample on aggregate cost-benefit flows for only those projects that are economically acceptable, each of the individual projects can be said to have a positive SNPV discounted at 12%.
- 4.10 **Sensitivity analysis.** Table IV-1 shows the findings of the sensitivity analysis. Clearly, the subcomponent is very robust, because even with significant adverse variations in the main variables determining economic outcomes, the acceptable sample remains large with SIRR values that exceed 22% in all cases.

**Table IV-1 Sensitivity analysis of the sample of grid extension projects
(US\$ millions)**

Acceptable sample	Cost of investment (US\$000)				Beneficiaries		Indicators			
	In grids	Subsidy	Company	Hook-up & fixtures	Families connected ³¹	Project	US\$ per family		SNPV US\$000	SIRR %
							Investment	Subsidy		
Baseline	4,873	3,052	1,025	796	7,060	32	690	432	6,873	25.26
1. The cost of investment in grids rises:										
a. 10%	5,360	3,506	1,057	796	7,060	32	759	497	6,363	23.38
b. 20%	4,287	2,608	1,046	634	5,620	31	763	464	5,872	25.40
2. Buy/sell rates fall:										
a. 10%	5,099	3,402	873	823	7,301	33	698	466	6,867	24.72
b. 15%	5,099	3,477	798	823	7,301	33	698	476	6,865	24.72
c. 20%	5,099	3,553	722	823	7,301	33	698	487	6,862	24.71
3. Residential demand falls:										
a. 10%	4,873	3,147	930	796	7,060	32	690	446	5,835	23.37
b. 15%	4,873	3,194	882	796	7,060	32	690	452	5,316	22.42
4. Operation and maintenance costs rise:										
a. 50%	4,873	3,286	790	796	7,060	32	690	465	6,570	24.63
b. 100%	4,873	3,521	555	796	7,060	32	690	499	6,268	24.01

- 4.11 **Economic evaluation of the subcomponent.** An analysis of the sample yields an indicator of US\$974 SNPV per family, making it possible to estimate an SNPV of US\$12.7 million for the entire subcomponent of 13,000 households.

³⁰ To size the component, the 13,000 homes were considered at a unit cost of US\$538.

³¹ The modeling assures that a percentage, but not all, of the homes (9,462) in the sample that studies predicted will be connected when the grid begins to operate.

3. Social and economic feasibility of the customer density subcomponent

- 4.12 Simulations of typical rural residential customers were done using a model incorporating the improvements identified and found that without vertical growth, and with unit consumption of 40 kWh/month growing by 2.5% annually during the 20-year design period alone, it is economically feasible to provide electricity to these types of customers if they are located less than 500 meters from the existing grid.
- 4.13 For purposes of analysis, the subcomponent was evaluated based on an average distance of 250 meters, with a unit cost of grid investment of US\$765. Under these conditions, the average type “a” customer (requiring grid extension) needs a subsidy of US\$426, produces an SNPV of US\$721, and has an SIRR of 23.05%. Adding US\$57 to cover 50% of the costs of hook-up and interior fixtures, raises the subsidy required for type “a” residential connections from US\$426 to US\$483.³² Type “b” customers (not requiring grid extension) need financing (US\$113 each) only for hook-ups and the interior fixtures essential to obtain the proposed benefits, and have an SNPV indicator of US\$1,440 and an SIRR indicator of 166%. Because the program will finance just 50% of these costs, the subsidy required for type “b” residential connections is US\$57.³³

4. Socioeconomic feasibility of the decentralized systems subcomponent

- 4.14 **Sample.** An analysis of the decentralized systems subcomponent was conducted based on a three-project sample. The first two involve hydroelectric microplants, and the third involves the installation of photovoltaic systems.
- 4.15 **Analysis.** In order to identify and propose methodological enhancements, the comments on the first project—the Mallku Villamar hydroelectric microplant³⁴—focus on the cost-benefit analysis, and those relating to the Agua de Castilla microplant focus on the least-cost analysis. With respect to the municipio of Ichoca’s photovoltaic systems, a methodology was developed for this type of project, which does not specifically fall within the program’s parameters, and a standard project³⁵ was developed to provide a structure for the operation photovoltaic systems and the competitive selection of operators, based on the subsidies requested.

³² In sizing subcomponent “a,” 10,500 homes were considered at a unit cost of US\$504.

³³ In sizing subcomponent “b,” 16,500 homes were considered at a unit cost of US\$62.

³⁴ The results are indicative (investment per customer of US\$1,365, total subsidy of US\$117,000, subsidy per home, US\$607, hook-ups and interior fixtures, US\$113 per home, a SNPV of US\$1.63 million and a SIRR of 74%). It is necessary to verify the availability of funds.

³⁵ A standard project yields the following indicators: total residential customers: 1,500; number of special customers: 100; a total investment of US\$1.05 million; total subsidies of US\$605,000; an investment per home of US\$656; subsidies per home of US\$379; an SNPV of US\$62,000; and an SIRR of 13.3%.

- 4.16 **Impact of enhancements.** Despite how few projects there are for decentralized systems, the three available have made it possible to address significant issues and make some relevant enhancements.
- 4.17 **Results of the simulations.** It was impossible to simulate the average cost of connecting customers for any of the three decentralized systems projects. All of the enhancements developed were methodological, and so for sizing purposes it is better to keep the initially planned unit cost indicator of US\$1,000 per home, based on international experience. Those results are to be taken together with the studies for project development under the decentralized systems subcomponent (paragraph 2.8) and the ex post evaluations of some existing decentralized systems, and the lessons learned incorporated to support the departmental and municipal governments in developing and preparing new decentralized systems projects.

D. Financial feasibility

- 4.18 During program execution the VMEEAT, with support from the Finance Ministry, will assess the financial capacity of each departmental and municipal government wishing to participate in the program. A preliminary analysis of Finance Ministry data, however, indicates that there are enough departmental and municipal governments with borrowing capacity and counterpart resources. Other resources for project execution, not covered by the subsidies, will come from the private companies that have concessions in the area or, in the case of decentralized systems, have won the corresponding tender. The preliminary analysis indicates that the operators have sufficient financial capacity to execute the grid extension projects identified.

E. Social and environmental feasibility

- 4.19 Despite the fact that each project must meet set standards, the strategic environmental impact assessment (SEIA) identified certain deficiencies in social and environmental management and the design of complementary and/or corrective measures for those deficiencies. The measures that do meet Bank requirements include: (i) a model for the environmental prevention and mitigation program and application and monitoring plan (PPM-PASA) (see paragraph 3.21) to be included in operators' contracts so as to prevent and mitigate any potential impact; (ii) proposed social and environmental institution-strengthening and training measures required for controlling and monitoring program execution at the level of each institution involved; and (iii) public hearings in the affected communities to identify expectations, conflicts, and difficulties.
- 4.20 The program includes a set of institutional mechanisms for activities to mitigate environmental impact and calls for effective social and environmental management, so that social and environmental considerations can continually be addressed in the different types of projects during their various phases.

- 4.21 Measures for the social and environmental management of the program were duly detailed and budgeted in the SEIA. Funds for their execution were included in the program budget, and their execution timeline is compatible with the projects timeline.
- 4.22 The SEIA concluded that: (i) what was most significant in other rural electrification projects was the improvement in the quality of life for the communities served; and (ii) to be sustainable, the decentralized systems projects need to provide effective dissemination and training on the use of this type of power generation (paragraph 2.10).
- 4.23 The SEIA concluded that the program is not expected to have any cumulative impact. The social study did not identify any need for special support for indigenous or campesino communities in the beneficiary regions, or for any social programs, because, among other things: (i) what they spend on electricity with the program will be less than what they pay currently, without the program; and (ii) according to the public hearings, the program fulfills one of these communities' basic aspirations. Even so, specific socioeconomic studies will be done for communities where a need is determined.
- 4.24 Public hearings were held in 16 communities without electricity, two in each department. The outcomes of these hearings are included in the program's SEIA report, which was made public for comments on 5 August 2004. An announcement had previously been published with information on the locations, dates, and times of the hearings. While the projects are being developed, the operators will be required to hold public hearings to identify potential social and economic impacts. Following the hearings, community training workshops must also be held to discuss issues relevant to energy use as well as socioeconomic and environmental considerations.
- 4.25 In order to ensure proper implementation of the planned environmental measures, the loan contract should include the following contractual clauses: (a) **prior to the commencement of a grid extension and/or decentralized systems project**, the executing agency will provide evidence to the Bank that professionals have been hired as environmental monitors, including a social and environmental expert for the UER-VMEEAT and at least three social and environmental experts for the UTER-PDs as a group, to ensure that social and environmental safeguards are instituted in the design and execution of rural electrification projects; and (b) **prior to the commencement of any individual project in each departmental government**, (i) one professional staff member from each of the departmental governments has been designated to work on social and environmental issues with the corresponding UTER-PD; and (ii) staff at the UER-VMEEAT, UTER-PDs, and departmental governments have received training on social and environmental issues.

- 4.26 The UER-VMEAAT's social and environmental specialist, besides providing advice to and supervising the other social and environmental specialists from the consulting firms and the UTER-PDs, who will monitor the projects and their execution, will develop an environmental procedures manual specifically for rural electrification projects. All of these professionals will be trained and will supervise and support the operators in their work with the communities.
- 4.27 Transformers using polychlorinated biphenyls (PCBs) are not generally used in Bolivia. International regulations governing PCBs will be followed, particularly the Stockholm Convention on Persistent Organic Pollutants, ratified by Bolivia in 2003.
- 4.28 The UTER-PDs will submit semiannual reports to the Bank detailing the environmental measures adopted and the results obtained, and any problems resulting from project execution and corrective measures taken. The executing agency will submit a report on the results of the implementation of the program's social and environmental measures **at the end of the third year after the effective date of the loan contract**.
- 4.29 This strategy will ensure that the projects supported by the program are socially and environmentally feasible, and that the necessary safeguard measures are taken when potential adverse environmental impacts are detected.

F. Social equity and poverty reduction

- 4.30 Bolivia is still one of the poorest countries in the region, with poverty and extreme poverty rates of 64.3% and 37.1%, respectively, for 2002.³⁶ The breadth and depth of poverty in rural areas affects 90% of the population (paragraph 1.2). Because the program will focus on investment, training, and dissemination specifically in rural areas, it is deemed to promote social equity (SEQ) and qualifies as a poverty-targeted investment (PTI).

G. Private sector participation

- 4.31 The operation will increase private-sector participation by making operators responsible for the execution and maintenance of the works, particularly microenterprises and small businesses, which will help make the decentralized systems sustainable in the long term.

H. Benefits

- 4.32 Program outcomes will be evaluated using a series of objective technical indicators specified in the program's Logical Framework (Annex I). The values of those indicators will be determined before and after program execution.

³⁶ IDB Country Strategy with Bolivia (2004-2007).

- 4.33 Program resources are expected to make it possible to connect 40,000 families to the grids and provide electricity to 4,000 families in areas where it is not technically or economically feasible to extend distribution grids, through decentralized systems projects (individual systems and local mini-grids) using renewable energy sources or natural gas. By focusing on rural areas, the proposed program will contribute to a progressive improvement in quality of life, promote new productive activities, and help create new income and employment opportunities and reduce poverty in those parts of the country.
- 4.34 The program will help introduce and institute a set of technical and methodological improvements, making it possible to lower the unit costs of the new projects and make more efficient use of resources by lowering government contributions (paragraphs 1.23 and 4.9).
- 4.35 In addition, under the institution-strengthening, training, and promotion component, departmental governments' capacity will be strengthened so that they can better develop, evaluate, and monitor projects. With respect to decentralized systems, stronger emphasis on community participation (paragraph 2.7), on issues related to program dissemination (paragraph 2.10) in more remote areas, and proper system operation and maintenance is expected to help make the projects more sustainable.
- 4.36 The main direct, intangible social and environmental benefits are: (i) easier access to better education, health care, cultural development, information, communication, recreation, and easier productive activity development; (ii) greater opportunities to access and participate in local, regional, and national social and economic development; (iii) better air quality through the use of less polluting power sources; and (iv) less use of imported fuel.

I. Risks

- 4.37 Incorporation of the recommended enhancements could spark resistance among operators to participating in grid extension works because they might cut into profits. This risk is minimized by the fact that the improvements to be introduced not only produce lower investment costs than traditional projects, but will also require less financial input from operators, thus guaranteeing attractive returns.
- 4.38 Smaller companies, nongovernmental organizations, or community associations often manage decentralized systems projects. The case might arise where these entities are technically, financially, or institutionally unsustainable in the long term. In order to mitigate this risk, the program strategy provides that only decentralized systems projects approved by the VMEEAT will be eligible; such projects will have to demonstrate that they have effective mechanisms for ensuring that service delivery is sustainable throughout the provider's useful life, particularly with respect to system maintenance.

- 4.39 A third risk relates to the complexity of coordinating among the different donors supporting rural electrification programs. This risk is mitigated in two ways: (i) the design of the proposed program has expressly taken into account the scope of other organizations' operations (paragraph 1.20); and (ii) the executing agency—the VMEEAT—is the same for all the programs. The technical-cooperation operations in execution are also specifically supporting coordination activities (paragraph 1.26).
- 4.40 A fourth risk involves some weaknesses detected in the departmental and municipal government units responsible for the development, evaluation, and execution of rural electrification projects. These weaknesses might cause delays during the program's implementation phase. This risk will be mitigated through the creation of the UER-VMEEAT under the institution-strengthening and program administration components (paragraphs 2.9 to 2.11).
- 4.41 A fifth risk is that the National Congress may not approve the transfer of subsidies to the private sector. If this were not approved, the program would not generate the benefits mentioned in paragraph 3.2 (transfer of government subsidies to cover only the unprofitable portion of the investment). This risk is reduced because the principle of paying subsidies to the private sector is recognized in the Rural Electrification Regulations (Supreme Decree 24772) and, as noted in paragraph 3.3, the MSOP/VMEEAT strategy is to treat this as a pilot program, thereby limiting the scope of Congress's authorization to the program activities in order to gain experience before introducing a bill to amend the sector law.
- 4.42 Furthermore, a department or municipio could have difficulty participating in the program depending on its financial situation. The VMEEAT will avoid this risk by selecting, *ex ante*, with the support of the Finance Ministry, those in acceptable financial condition acceptable for program execution (paragraph 4.18).
- 4.43 Lastly, as with other sectors that receive public funds, because of the political transformation the country is undergoing, there is a risk that rural electrification will cease to be the priority the government considers it to be today, or will suffer the consequences of a volatile institutional climate. This could lead to delays in program execution. The program's social dimension, the strong support of beneficiary communities, and growing awareness of the importance of electrification for the economic development of rural areas can limit this risk.

Bolivia
Rural Electrification Program (BO-0224)
Logical Framework

Narrative summary	Indicators	Means of verification	Assumptions																								
Goal To help reduce poverty and raise living standards of the beneficiary rural population.	1.1 A reduction in poverty indexes in the beneficiary rural population.	1.1 National statistics reports and surveys conducted in beneficiary neighborhoods and communities	1. Rural electrification remains a priority for the government.																								
Purpose To give nearly 43,000 homes in rural areas access to electricity, making more efficient use of public and private resources in the sector.	<div>1.1 Annual targets for the increase in the number of homes with electricity (in thousands) (*):<table><tr><th>Year</th><th>Grid extension</th><th>Decentralized systems</th></tr><tr><td>2005</td><td>3,400</td><td>-</td></tr><tr><td>2006</td><td>10,850</td><td>-</td></tr><tr><td>2007</td><td>10,850</td><td>1,000</td></tr><tr><td>2008</td><td>7,450</td><td>1,500</td></tr><tr><td>2009</td><td>7,450</td><td>1,500</td></tr><tr><td><i>Subtotal</i></td><td>40,000</td><td>4,000</td></tr><tr><td>Total</td><td>44,000</td><td></td></tr></table></div> <div>1.2 New project evaluation forms, which include the enhancements identified, approved, and implemented by 30 September 2004.</div> <div>1.3 The amount of the subsidy drops between 30% and 40% with respect to what it would have been without the technical and methodological enhancements to be introduced as a result of this operation.</div>	Year	Grid extension	Decentralized systems	2005	3,400	-	2006	10,850	-	2007	10,850	1,000	2008	7,450	1,500	2009	7,450	1,500	<i>Subtotal</i>	40,000	4,000	Total	44,000		<div>1.1 Census and national statistics reports/special surveys/operators' reports/program progress report</div> <div>1.2 Program progress report</div> <div>1.3 Program cost estimates with and without the enhancements to project evaluation methodologies (see specific simulation studies).</div>	<div>1. Distributors, electricity cooperatives, and rural power service providers (operators) fulfill the commitments they have made to operate and maintain electricity services.</div> <div>2. The National Congress approves the transfer of program subsidies to the private sector, thus making optimal use of them and ensuring that they cover solely the unprofitable portion of the investment.</div>
Year	Grid extension	Decentralized systems																									
2005	3,400	-																									
2006	10,850	-																									
2007	10,850	1,000																									
2008	7,450	1,500																									
2009	7,450	1,500																									
<i>Subtotal</i>	40,000	4,000																									
Total	44,000																										

Narrative summary	Indicators	Means of verification	Assumptions
	(*) In the unexpected event of a permanent interruption in service to homes receiving electricity through the program, the UER-VMEEAT, based on operators' monitoring reports, will help the municipios find possible remedies.		
Components 1. Subsidies for investments in rural electrification via grid extension and decentralized systems.	1.1 Grid extension: <ul style="list-style-type: none"> • Average electricity consumption per household of less than 20 kWh/month, beginning in program year 2. • At least one appliance per household in beneficiary communities in the Altiplano (highlands), and two in the remaining regions, beginning in program year 2. • All health clinics in the beneficiary communities have a refrigerator by program end. • All schools in the beneficiary communities have at least one piece of electrical equipment for educational purposes by program end. 1.2 Decentralized systems: <ul style="list-style-type: none"> • Electricity in beneficiary community households is more than 85% of annual availability (only for photovoltaic panel systems). • At least five studies annually of new decentralized systems projects. 	1.1 and 1.2 - Census and national statistics reports/special surveys/component progress report; Reports from the VMEEAT, distributors, electricity cooperatives and rural power service providers (operators); and audit reports/monitoring reports/monitoring of activities.	1. Operators accept the subsidies and the enhancements proposed by the program. 2. The private sector participates broadly in cofinancing new types of business in decentralized systems. 3. Users accept and use the new electricity services. 4. Income levels among the rural population served by the program hold steady or increase, such that planned electricity consumption levels may be verified.

Narrative summary	Indicators	Means of verification	Assumptions
<p>2. Institution-strengthening, training, and promotion.</p>	<p>2.1 The rural electrification unit (UER) of the VMEEAT is up and running by 30 April 2005.</p> <p>2.2 The rural electrification technical units (UTER-PD) of the eligible departmental governments have been strengthened in terms of their technical and social and environmental management capacity, project monitoring and control, and ability to negotiate subsidies with the operators by end-2006.</p> <p>2.3 At least 20 municipios a year, through 2008, will receive training from the UTER-PDs in technical and social and environmental management and in the development and promotion of community rural electrification projects.</p> <p>2.4 Institutions that train microenterprises and small businesses have been identified and hired and training programs, developed and approved, by end-2006.</p> <p>2.5 At least 100 microenterprises and small businesses are trained in organizing, managing, operating, and maintaining the rural electricity systems operators and on social and environmental issues inherent in their activities, by the time the program concludes.</p>	<p>2.1 to 2.6 - Program progress report / component progress report</p>	<p>1. Officials in the different units assisting in program implementation are available to receive the necessary training.</p> <p>2. The power services provided meet the expectations and needs of the communities.</p>

Narrative summary	Indicators	Means of verification	Assumptions
	<p>2.6 Training on social and environmental issues:</p> <ul style="list-style-type: none"> At least 2% of the beneficiary population engages in productive activities using electricity beginning in year three of program execution. A minimum of 40 VMEEAT, departmental government, and operators staff trained on social and environmental issues by the end of program year 2. At least 80% of the representatives of the mayors' offices and communities trained on social and environmental issues by the end of program year 2. 		
<p>Activities</p> <ol style="list-style-type: none"> Program management Investment subsidies component <ol style="list-style-type: none"> Grid extension <ol style="list-style-type: none"> Electrification of communities Increasing customer density Decentralized systems <ol style="list-style-type: none"> Subsidies for system implementation Studies for project development Institution-strengthening, training, and promotion 	<ol style="list-style-type: none"> For US\$2.08 million. For US\$17.82 million. <ol style="list-style-type: none"> US\$13.32 million <ol style="list-style-type: none"> US\$7 million US\$6.32 million US\$4.50 million <ol style="list-style-type: none"> US\$4 million US\$500,000 For US\$960,000 	<ol style="list-style-type: none"> Budget and execution timelines Plan of activities/program monitoring and evaluation system 	<ol style="list-style-type: none"> The rural inhabitants of the new areas to receive electricity through the program request electricity services, whether via grid extensions or decentralized systems.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK
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PROPOSED RESOLUTION

Bolivia. Loan ____SF-BO to the Republic of Bolivia
Rural Electrification Program

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Republic of Bolivia, as Borrower, for the purpose of granting it a financing to cooperate in the execution of a rural electrification program. Such financing will be for up to the amount of US\$20,000,000 or its equivalent in other currencies, except that of the Republic of Bolivia, which are part of the resources of the Bank's Fund for Special Operations, and will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Executive Summary of the Loan Proposal.