

(CA-0007)

BORROWERS:	<u>Infrastructure loan:</u> Empresa Propietaria de la Red (EPR), S.A., a mixed capital company with a majority public interest.
	<u>Technical cooperation:</u> Consejo de Electrificación de América Central (CEAC). The plan of operations is included in Annex II-2.
GUARANTOR:	The six countries of Central America: Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama.
EXECUTING AGENCY:	For the infrastructure loan: EPR For the technical cooperation: CEAC
AMOUNT AND SOURCE OF THE INFRA-STRUCTURE LOAN:	IDB Ordinary Capital: US\$170,610,000 Quincentennial Fund: US\$ 70,000,000 (in ECUs) Local contribution: US\$ 89,100,000 Total: US\$329,710,000
TERMS AND CONDITIONS OF THE INFRASTRUCTURE LOAN:	Ordinary Capital: Amortization period: 25 years Disbursement period: 5 years Interest rate: variable Inspection and supervision: 1% Credit fee: 0.75 Currency: US\$ under the Single Currency Facility
COFINANCING:	Quincentennial Fund: Amortization period: 35 years Disbursement period: 5 years Interest rate: variable Inspection and supervision: 0% Credit fee: 0% Currency: ECUs
OBJECTIVES:	The project has two main objectives: (i) to support the gradual formation and gradual consolidation of a regional energy market through the creation and establishment of appropriate legal, institutional, and technical mechanisms to promote private sector participation, particularly in the development of

additional generating capacity; and (ii) electric interconnection infrastructure (transmission lines, substations, and a regional coordination and transactions center) to facilitate exchanges of electric power among the members of the regional energy market.

DESCRIPTION:

The project consists of a comprehensive operation with two components: (a) a loan to finance a technical-cooperation program to support the establishment of regional agencies and a regional energy market, with a total direct cost of US\$14.5 million (see Annex II-2); (b) a loan to finance infrastructure under the SIEPAC project, which includes 1,802 km of 230 kV lines from Panama to Guatemala, connections to transformer substations in each country, with a total direct cost of US\$232.3 million, and a regional coordination and transactions center, for US\$3.5 million, to ensure reliable, secure, and economical operation of the regional electric grid. Parallel to these two components, the participating countries will carry out works to upgrade their national grids, including transmission lines and transformer substations to attain the levels of reliability that will be demanded by binding electricity transactions between agents in the different countries. In the event that Bank financing is required for some of the works to build up the system in one or more countries, which appears to be likely (at least in the case of Nicaragua), Management will present a supplementary document to the Board of Executive Directors, containing the pertinent proposed resolutions (see paragraph 2.15).

**ENVIRONMENTAL
CLASSIFICATION:**

The environmental brief for this operation was approved by the Committee on Environment and Social Impact at its February 4, 1997, meeting.

**POVERTY
TARGETING:**

Owing to its nature, this project does not qualify under the poverty-reduction criteria set forth in paragraph 2.5 of the Eighth Replenishment document.

BENEFITS:

This project gives a decisive impetus to the electrical integration of Central America, which will lead to large economic benefits related to savings in operating and expansion costs in the electric power grids. The benefits include savings in petroleum products used to generate electricity, which could help to lessen the region's exposure to international oil shocks. It is expected that a market of 35 million people will attract investments under adequate conditions for new generating capacity. Further, reducing the cost of electricity service

will stimulate the Central American productive apparatus and intraregional trade.

RISKS:

The main risks of the operation are possible constraints on the development of the energy market as a result of the survival of traditional market structures in national electric sectors, possible restrictions or disincentives affecting participation by new investors in the sector, and potential barriers to regional trade. If these liabilities materialize, the benefits of coordinated operation and expansion of electric systems under competitive conditions could be lessened. The conditions precedent to the first disbursement of the investment loan are intended to minimize these risks by requiring that an institutional structure be established to govern the regional system, which is consistent with the gradual development of an increasingly open and competitive market.

PROCUREMENT:

Owing to the complexity of the project, it is recommended that the design and construction of the transmission works be performed under a turnkey contract, unless otherwise agreed by the parties based on technical and economic criteria, which will require international prequalification (see paragraph 3.21).

International competitive bidding will be required for equipment and services worth more than US\$250,000 equivalent and for works over US\$1.5 million.

**EXCEPTIONS TO
BANK POLICY:**

None

**THE BANK'S
COUNTRY AND
SECTOR STRATEGY:**

The Bank's mandate under its Eighth General Increase in Resources accords priority to modernization of the public sector and integration. The Eighth Replenishment document establishes that the Bank can provide technical assistance and/or loans to: (i) promote private domestic and foreign investment; (ii) support national and regional efforts to build the necessary infrastructure in the energy and transportation sectors; and (iii) assist the governments in activities to modernize the public sector and strengthen its institutions. The regional programming paper for Central America (RP-CA) establishes closer sub-regional integration as a key objective. To attain it, greater intraregional free trade and an economic area with harmonized trade legislation and regulatory frameworks are necessary. The proposed project is consistent with the mandates for the region and the integration strategy.

**SPECIAL
CONTRACTUAL
CONDITIONS:**

Conditions precedent to signing of the loan contract and to the first disbursement of the infrastructure loan: See detailed description of specific conditions in Annex RE-1 hereto.

In view of the complexity of the reforms involved and the creation of electricity markets in Central America, as well as the dynamics of emerging trends in this area world-wide, fulfillment of all conditions precedent to contract signing and to disbursement of the investment loan will be presented to the Loan Committee for consideration and approval.

The respective contracts will also contain the Bank's standard clauses on maintenance, auditing, pricing, procurement, etc.

**SPECIAL
CONSIDERATIONS:**

1. Considerations as to governance of the grid proprietor (EPR)

One of the basic elements of a project of this type is the separation of ownership of the transmission system to ensure neutrality, free access and nondiscrimination for market agents. In restructuring competitive electricity markets, the ideal approach would be to create specialized, independent transmission companies. Under this ideal approach, the EPR shareholders should have an interest in electricity transmission only to achieve those objectives.

In the case of Central America, the structure of the electricity industry reflects a different vision of reform in each country, and the changes being made in structures within the electricity subsector vary widely. In the short term, two vertically integrated utilities (in Costa Rica and Nicaragua) are not expected to achieve a change in structure; in three countries (Panama, Guatemala and El Salvador), subsector activities are to be made entirely separate following consolidation of reforms; and in Honduras, only distribution is to be separated out. Even after implementation of the reforms under way, then, the resulting structure will be far from ideal.

The electricity industry world-wide is undergoing a process of far-reaching change that seeks greater economic efficiency by introducing competition in generation and opening up supply options for distribution. This model establishes transmission as an independently administered natural monopoly that offers nondiscriminatory access to the market of local distribution companies and major consumers for

all generators. The solutions proposed and implemented to date are not the only possible ones, and are still under discussion and observation as new approaches. Argentina is recognized as having one of the most well advanced and successful initiatives. Even in this case, however, the cross ownership regime is allowed, and transmission line owners are permitted to have investments in generation and distribution subject to specified ceilings.

With a view to achieving the best compromise solution, and considering the conditions prevailing in Central America, EPR governance will need to be established for the SIEPAC project in such a way as to ensure neutrality and free access to the grid based on the following three fundamental principles:

- a. Set limits on capital investments and voting power of shareholders.
- b. Set limits on participation of EPR shareholders in the electricity generating and distribution business in the form of regulations, and ensure that they are enforced.
- c. Handle operation and maintenance of the grid clearly and independently of EPR shareholders.

Based on the foregoing, the following conditions have been agreed upon:

- a. **Conditions precedent to signing of contracts for investment in infrastructure works**

Legal organization of the EPR. Present the borrower's articles of incorporation, which are to specify, *inter alia*: (1) that no EPR shareholder may have a direct or indirect interest in the regional electricity market, as a generator or distributor of electricity, in excess of the percentage of installed capacity approved and certified by the CRIE, the regional regulatory agency (see later); (2) that the EPR is created as a private corporation with a majority public interest in which no shareholder, directly or indirectly, holds more than a 15% share of the company's capital stock or of any class of voting shares; and (3) mechanisms for protecting minority shareholders.

b. Condition precedent to first disbursement

The borrower is to present evidence that the CRIE has issued an opinion on and approved the initial maximum percentages applicable to REM agents, and undertaken to review such amounts each year and establish the corresponding regulations.

2. Condition subject to dialogue prior to loan contract signing

Finally, since the conditions stipulated in subsections a and b above are not considered sufficient to ensure neutrality of the transmission line with respect to generators' and distributors' interests, the Bank has proposed an arrangement whereby the grid would be operated and maintained by a specialized firm, which would be hired under international competitive bidding. Since this or another solution satisfactory to the Bank will entail additional time to reach an agreement, the following has been agreed upon:

A proposal and a plan for its implementation, approved by its board of directors, are to be presented on operation and maintenance of the SIEPAC grid so as to ensure application of the principles of transparency, neutrality and nondiscrimination in access to the grid by market agents.

As in the case of conditions precedent to contract signing and to the first disbursement, the preceding clause is to be resolved to the Bank's satisfaction before the investment loan contract is signed, and presented to the Bank's Loan Committee for consideration and possible approval.

3. Guarantees

It is recommended that the arrangement whereby the six countries provide sovereign guarantees for this operation be structured on the basis of equitable distribution among the six countries, subject to the standard conditions applicable to the Bank's ordinary capital.

I. FRAME OF REFERENCE

A. General context

1. Economic developments in the region and implications for the project

- 1.1 Real average growth in GDP in the seven countries of Central America (including Belize) was 4.5% from 1990 to 1995, similar to the average from 1971 to 1980 (4.2%) prior to the external debt crisis. Growth was much slower in 1981-1985 (0.2%) and 1986-1989 (1.9%), which were difficult periods involving macroeconomic stabilization and structural adjustments in the internal and external balances of the countries' economies. One key to economic reactivation has been the end to various armed conflicts in the region. Despite considerable headway in economic restructuring, major economic weaknesses and vulnerability persist. The Central American economies have been affected by changes in the external economic environment, including the pace of growth in the industrialized countries, interest rates, international monetary policy, capital flows from abroad, and international prices for key products such as coffee, bananas, and oil, which have affected their terms of trade.
- 1.2 Thus far in the 1990s, Central American exports have begun to diversify somewhat, particularly with the growth of agroindustrial processing and other nontraditional exports. Also, the region is overcoming a series of weaknesses that leave it exposed to external shocks, by establishing more stable fiscal, monetary, trade, and exchange-rate policies, and bringing the deficits in the public sector and current balance of payments accounts down to more manageable levels. The consolidated fiscal deficits of the countries of the region fell from 8% of GDP in 1985 to under 1% in 1995. But in 1994 deficits of 8% or more had reemerged in Costa Rica, Honduras, and Nicaragua. In the region as a whole, there continues to be limited access to long-term external credit and the economies still depend on external savings to finance investments. One top priority is to introduce additional reforms in the financial intermediation systems and other incentives to stimulate domestic savings. Each of the governments faces a series of problems in controlling spending, increasing tax revenues, and setting priorities for public investments. If the problem of fiscal imbalances is not solved, it will be very difficult to avoid the recurrence of high inflation, over-expansion of imports, rises in the exchange rate, checks on exports, and dependence on unsustainable capital flows.
- 1.3 Given the fundamental forces that will shape the balancing of budgets in Central America and the high priority of obtaining long-term growth in social investments, institutional conditions must be established to promote private sector participation in building up

physical infrastructure, particularly electric power and telecommunications, where competitive market structures can feasibly be developed. Annex I-1, which is available in the Region 2 files, gives details on economic development in the region.

2. The integration process in Central America

- 1.4 Integration has led to vigorous trade since the crisis of the 1980s. Reciprocal trade in the region accounted for 20% of total exports in 1995 (and a much higher proportion of total exports within MERCOSUR and the Andean Pact), reaching an unprecedented level in excess of US\$1.5 billion. With the relaunching of the Central American Common Market after the crisis of the last decade, the integration process has entered a new stage of fortifying regional trade and steadily opening up to abroad. A gradual process of coordinated reduction in regional tariffs, which began in 1986, led to a common external tariff being established with a ceiling of 20% and a floor of 5% in 1993.
- 1.5 Today, the goal is "open regionalism", which seeks to achieve international productivity levels by lowering tariff and nontariff barriers to third countries and eliminating them altogether for subregional trade. This new approach stems from the need to become more competitive on nonregional as well as domestic markets.

3. Bank support for integration

- 1.6 The electric interconnection system for the countries of Central America (SIEPAC) is the most ambitious project that the Bank has backed in regional integration. In support of the program, the Bank approved a regional technical cooperation program in 1996 for US\$2.7 million to complete feasibility and institutional studies for SIEPAC. Other Bank efforts include a loan of US\$37.6 million in 1988 to the Central American Bank for Economic Integration (CABEI) for the rehabilitation of some 252 km of highways in El Salvador, Honduras, and Costa Rica. In 1984, under another loan to CABEI (US\$12.8 million), the Bank financed studies for the interconnection project between Guatemala and El Salvador. In 1994, the Bank approved energy projects for El Salvador and Honduras, both of which included components to complete the region's 230 kV interconnection that is expected to become operational in 2000.
- 1.7 As for infrastructural integration, the Bank is supporting a new regional initiative in multimodal transport, contributing to efforts to liberalize and harmonize national markets for petroleum products, and developing new regulatory agencies in the region in the context of reforms in the energy and telecommunications sectors. The Regional Technical Cooperation Consultative Group has made it a priority to review regulatory frameworks that affect the development of infrastructure services in the region.

B. Bank strategy in the region

- 1.8 The proposed project is consistent with the mandate of the Eighth General Increase in the Resources of the Bank, which calls for modernization of the public sector and integration as priorities. It establishes that the Bank can provide technical assistance and/or loans to: (i) promote private domestic and foreign investment; and (ii) support national and regional efforts to create the necessary infrastructure in the energy and transportation sectors. It will also support the governments in activities to modernize the public sector and strengthen its institutions.
- 1.9 SIEPAC is also consistent with the general strategy established in the regional programming paper for Central America (RP-CA). One of its key objectives is to promote closer subregional integration. To attain it, greater intraregional free trade and an economic area with harmonized trade legislation and regulatory frameworks are needed. It is also necessary to upgrade the physical infrastructure to enable the private sector to carry on normal activities, and to improve the positioning of Central America in the international context.

C. The electric subsectors in the region

1. General organization

- 1.10 The electric power industry in each country has been dominated by a semi-autonomous national agency, which carries out generating, transmission, and distribution activities with a high degree of vertical integration. At present, in the interconnected systems of Honduras, Nicaragua, and Panama, activities are controlled by a single public utility: the Empresa Nacional de Energía Eléctrica (ENEE), the Empresa Nicaragüense de Electricidad (ENEL) and the Instituto de Recursos Hidráulicos y Electrificación (IRHE), respectively, although Honduras also has three private generating companies and Nicaragua and Panama have signed contracts with private generators which are about to commence operations. In the interconnected grids of Costa Rica, El Salvador, and Guatemala, generation, transmission, and distribution are also performed by government-owned companies: the Instituto Costarricense de Electricidad (ICE), the Comisión Ejecutivo Hidroeléctrico del Río Lempa (CEL), and the Instituto Nacional de Electrificación (INDE). However these systems simultaneously operate distribution and generating companies: in Costa Rica, the Compañía Nacional de Fuerza y Luz (CNFL) and four private cooperatives; in El Salvador, four distribution companies; and in Guatemala, the Empresa Eléctrica de Guatemala (EEGSA) and various municipal companies. These three countries also have independent private generators. All the private generators have signed long-term contracts with state-owned electrical utilities.

2. Relevant characteristics of the electric power subsectors

- 1.11 The main technical and operating indicators of the region's electric systems and recent developments (1990-1995) are described below.
- 1.12 **Installed capacity versus reserves.** All the countries have mixed generating systems (i.e. hydraulic and thermal) although Costa Rica, Honduras, and Panama rely more heavily on their hydroelectric facilities. El Salvador, Nicaragua, and Costa Rica have considerable capacity in geothermal stations. At the end of December 1996, installed capacity in the six Central American countries was 5,240 MW, with the hydroelectric component continuing to account for the majority (53%), despite the recent program of thermal installations. The remaining generating structure is composed of gas turbines, 1/ internal combustion plants (31%), steam plants (11%), and geothermal plants (5%). The narrow margin between effective generating capacity and peak demand, plus high growth in demand in recent years, should be underlined. In mid-1995, generating capacity of 3,963 MW (actual available operating capacity) meant that the reserve margin had fallen to 9% of peak demand.
- 1.13 **Development of additional capacity.** From 1985 to 1990, just 198 MW were installed, but in the first half of the 1990s 1,119 MW were brought on line, 85% of which came from thermal plants. In that same five-year period (1991 to 1995), the program to add new generating stations underwent a radical change as compared to the preceding decade, when the largest hydroelectric plants were built after expansion plans had been postponed.
- 1.14 **Transmission systems and interconnections.** The highest voltage used in the region is 230 Kv. The grids are very longitudinal in their configuration. Generally they consist of a 230 Kv line with one or two circuits from Guatemala to Panama, except from the north to the center of Costa Rica. The grid has interruptions in voltage in El Salvador, where there are only 115 Kv lines and in San José in Costa Rica, where a 230 Kv system is being completed. In general, the grids in each country have few links and their configuration is virtually the same as it was over a decade ago. Maintenance leaves much to be desired as is apparent from poorer reliability and higher energy losses. In some countries, overloaded substations and pent-up demand are the result of a lack of capacity in grids and substations.

1/ Gas turbines and some internal combustion machinery (diesel engines) burn #2 diesel oil. There is no natural gas in the region.

- 1.15 Interconnections began in 1976, with the 230 Kv link between Honduras and Nicaragua, which operated provisionally at 138 Kv. In 1982 the interconnection between Costa Rica and Nicaragua came on stream and in 1986 the links between Costa Rica and Panama and between El Salvador and Guatemala, which formed two interconnected systems, became operational. Only the link between El Salvador and Honduras is missing to complete a single-circuit 230 Kv connection to join the six countries. The Bank has approved financing for construction of this last link.
- 1.16 **Electrification index.** The index rose from 50.5% in 1991 to 56% in 1995 as a consequence of the different electrification programs. It rose in all the countries of the region, although levels of coverage per country were very different in 1995. The levels were 95% in Costa Rica, 68% in El Salvador, 41% in Guatemala, 47% in Honduras, 50% in Nicaragua, and 66% in Panama. As the figures show, the region must make a major effort to expand coverage, since almost one half of the population has no access to electricity.
- 1.17 **Low per-capita electricity consumption.** Average annual electricity consumption in the region in 1995 was 500 Kwh/person, which is low in comparison with the Latin American average of almost 1,300 Kwh/person/year. The situation worsens when the figures are broken down by country: Costa Rica 1,290, El Salvador 490, Guatemala 287, Honduras 348, Nicaragua 256, and Panama 1,088 Kwh/per person per year.
- 1.18 **Structure of electricity consumption and sales.** The residential sector accounts for 37% and the industrial and commercial sectors for 27% and 23% respectively. Electric power sales in Central America rose by an average of 6.5% between 1990 and 1995, at a rate that outstripped both GDP and population growth. That rate was higher than in 1980-1984 and 1985-1989, which saw growth of 5%.
- 1.19 Taking account of limited imports and exports of energy from 1990-1995, growth in purchases from private generators, and average energy lost and unaccounted for of over 17%, net generation by national systems grew by 6.6% over the period. Peak generating demand grew by 6.7% over the same period. Overall, sales of 17,100 GWh, net generation of 20,600 Gwh, and maximum demand of 3,830 MW are forecast for 1996.
- 1.20 **Financial situation and rates.** Overall, the financial situation of the companies has been affected adversely by the impact of high electricity losses, delays in approving and implementing adequate rate structures and levels that reflect the cost of delivering the service, and backlogs in collections, which in some cases exceed three months of billing. Commitments to purchase energy from private generators, sometimes at prices that are higher than the selling price, combined with high foreign-currency debt and changes in the exchange rate have also had an impact. This has affected

the companies' ability to meet their financial requirements and means that electric utilities generally find themselves in difficult financial straits, to a greater or lesser degree.

- 1.21 **High energy losses.** Energy lost and unaccounted for in 1995 stood at 17.2%, which was similar to 1991. However the situation is critical in some countries. Honduras, Nicaragua, and Panama had losses of 27.2%, 29.6%, and 20.6% of total net energy available, while the figures for Costa Rica, El Salvador, and Guatemala were 10.5%, 12.9%, and 13.3%.
- 1.22 **Rates below long-run marginal cost.** With the exception of Panama, electricity rates in the other five countries are below the long-run marginal cost (between 60% and 90%), especially residential rates, which entail the highest service costs and account for most consumption. Further, major distortions in rates continue to exist, which are gradually being corrected.
- 1.23 **Coordination constraints.** One of the main obstacles is deemed to be the lack of autonomy and business orientation in operations by State-owned electricity companies. There are also a series of legal, economic, institutional, administrative and financial barriers to making use of opportunities for coordination. Public enterprises have required special authorization from the government to exceed budgetary limits on fuel purchases for electricity exports. There have also been problems with access to foreign exchange for imports. Inadequate payment mechanisms have hampered intercompany exchanges. Differences between countries in terms of domestic prices and taxes on petroleum products used in different generating technologies have distorted efficient operation of the regional generating pool through interconnection. Finally, the nationalist outlook of public enterprises has limited the potential of advantageous commercial exchanges. The enterprises have tended to cover domestic demand under the criterion of optimizing the dispatch of their own systems, exporting only surplus production and importing only in case of a national deficit, even when this has meant protecting inefficient domestic plants.
- 1.24 There are no standard systems or procedures among the countries for setting prices based on production and transmission costs (tolls) that would facilitate economic energy transactions. The results of the operational planning model (PARSEICA) are not accepted as reliable. They require more of a business orientation and strengthened human resource capacity at national dispatch centers. Payments are now made in advance, with the resulting overcharges. All of these issues will be addressed through the technical cooperation program.

3. Prospects for electricity supply and demand

a. Recent problems

- 1.25 Given the problems mentioned, the region's electric companies have been facing difficult challenges in covering growth in demand. Despite the situation, they have not taken full advantage of the opportunities for obtaining supplies through existing interconnections.
- 1.26 In addition to difficulties in meeting demand, the countries of the region have also suffered from periodic energy rationing. In 1994 there was general rationing throughout the region (3.7% in relation to real demand), particularly in Honduras and Nicaragua, where rationing was 17.8% and 6%, respectively. In Panama rationing was 2.4%, and less than 1% in the other countries. This energy crisis and the countries' concerns with covering their own demand acted as an additional brake on trade in electric power in the region. Considering the forecast rates of growth in demand described below, it is clear that the region will have to make large investments in electric power generation, first to overcome shortfalls in supply, and then to establish conditions under which an exchange market can flourish.

b. Demand projections

- 1.27 The feasibility study for this interconnection project was based on a series of future generating scenarios in the countries, assuming different degrees of regional coordination in operating the systems and planning their expansion. To develop these scenarios, the national electric companies prepared up-to-date projections of electricity demand in their countries.
- 1.28 For the purposes of designing the project, two scenarios for growth in demand were applied, covering a reasonably broad range: (i) the low scenario assumes moderate economic growth, electricity rates that cover economic costs, and national efforts for efficient energy use; (ii) the high scenario is based on more robust growth (reflecting optimistic expectations for the region's future) and lesser efforts in energy efficiency. For the subregion as a whole, projections in the low scenario for the period 1996-2015 suggest average growth in maximum demand and power of 4.4%. The high scenario predicts average growth in maximum demand and power on the regional level of 6.7%. Projected average demand of 5.6% was used to evaluate the economic returns from the project defined in chapter V, section A. This projection implies doubling the installed capacity of the region's electric systems every 12 or 13 years.

4. Investment requirements and private sector participation

- 1.29 The project feasibility study includes estimates of the investment requirements for electric power generation in the countries of the region for 1996-2015. The investment required for individual expansion of the six systems is approximately US\$700 million a year (1996 dollars). Through regional electric integration it will be possible to save on future investments in generation.
- 1.30 Given the limitations on future availability of funds for public investments in infrastructure, it is clear under any integration scenario that to mobilize such large amounts (plus the additional sums for investments in electric grids), economic and institutional conditions must be established to attract many new private investors. The main challenge for this project is to lay the groundwork for an efficient commercial environment open to new participants in the electric industry in order to finance the expansion of Central American systems.

5. Status of reforms

- 1.31 All the countries are in the process of introducing new regulatory frameworks for their power industries, but have made different degrees of headway. El Salvador, Guatemala, Honduras and Panama have already passed laws, and the Costa Rican and Nicaraguan legislatures are now debating bills. Some countries also have policy and regulatory agencies, which either existed prior to the reforms or were established as a result of them. 2/ Accordingly, Costa Rica, El Salvador, Honduras, Nicaragua, and Panama already have regulatory agencies for the power industry, and Costa Rica, Guatemala, Honduras, and Nicaragua have defined regulations for their agencies.
- 1.32 These reforms of the electric subsector, which seek to improve electricity services, generally call for a separation of policy, regulatory, and business functions, which were formerly concentrated in the hands of public electric utilities. A further goal is to establish an explicit regulatory framework. This situation does not apply in Costa Rica, since functions have already been separated, although the regulatory agency plays a secondary role, with the ICE playing the main one. To a greater or lesser extent, the reforms include changes in the vertical or horizontal structure of the industry and changes in the ownership system.

2/ The policy function refers to determining the macro-objectives for the sector in the context of government policy. The regulatory framework refers to the general context in which regulation takes place, including the structure of the industry and the nature of the regulatory agency.

- 1.33 The table below presents a summary of the main changes that the reforms would bring about if implemented as provided in the laws already passed and in the draft legislation. A summary of the most salient aspects of the reforms is given below.

SUMMARY OF REFORMS IN THE ELECTRIC INDUSTRY IN CENTRAL AMERICA ^{1/}

Country	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Panama
STRUCTURE AND OWNERSHIP						
Partial de-integration of main public utility (partial)	NO	TOTAL	TOTAL	PARTIAL	NO	NO
Partial de-integration of main public utility	NO	YES	YES	PARTIAL	NO	NO
Single public company	G/T/D	N/D ²	G,T,D	G/T	G/T/D	NO
Business orientation of resulting public company	YES	NO	YES	NO	YES	NO
Foreign investment permitted	G,T,D	G,T,D	G,T,D	G,D	G,D	NO
Transfer of assets	NO	D ²	G,D ³	G,D	NO	NO
Separation of distribution and sales	NO	YES	NO	NO	NO	NO
Unlimited generating capacity of distribution companies	Equal to demand	Free	5	To be applied for to the CNEE	10	15%
Availability of vertically integrated private companies	NO	YES	NO	NO	NO	NO
Dispatch center with transmission company	YES	NO	NO	YES	YES	NO
Operation of new generators through competition ⁴	YES	YES (Nat. res.)	YES (Nat. res.)	NO	NO	YES
Public utilities authorized for exchanges	YES	NO	NO	YES	NO	NO
REGULATION AND FINANCING						
Regulator responsible	MINAE	none	MEM	GE	CNE	MEM
Regulator for electricity subsystem	ICE	none	MEM	ENEE	CNE	MEM
Subsidies for low-income users	YES	NO	NO	YES	YES	NO
Government assures electricity supplies	YES	NO	YES	NO	YES	NO
REGULATION AND COMPETITION						
Regulatory agency	ARESEP	SIGET	MEM/CNEE	CNSSP/CNEE	INE	MEM
Autonomous	YES	YES	NO	NO	YES	NO
Minimum demand, unregulated consumers (kW)	1,000	0	Regulations	1,000	2,000	NO
Competition in the market	NO	YES	YES	NO	NO	NO
Economic promotion of energy and new sources	YES	NO	YES	YES	YES	NO

Laws passed in El Salvador, Guatemala, Honduras and Panama, and draft legislation in Costa Rica and Nicaragua.

Costa Rica does not establish any guidelines in this regard. The study on reorganization of the CEL and the Salvadoran government's decision will determine the final situation.

Guatemala: No specific information since the LGE of Guatemala does not establish an ownership system for the restructured electric power industry.

The regulatory frameworks of the six countries permit the entry of new generating companies.

a. Ownership structure

- 1.34 With the exceptions of Costa Rica and Nicaragua, existing public companies will be separated vertically. In Honduras the separation will be partial, since generation will continue to be tied to transmission. The Framework Agreement on the Energy Market in Central America signed on December 29, 1996, by the presidents of the six Central American countries establishes that in the event that vertical integration continues, separate accounts should be kept for each activity. Under Nicaragua's draft legislation, integration would continue for seven years.
- 1.35 Horizontal separation will take place in all the countries with the entry of new players. However the public utilities in Costa Rica and Nicaragua will remain horizontally integrated. Privatization of distribution is slated in El Salvador, Guatemala, Honduras, and Panama. In all the countries, power generation, which demands the largest investments, will be opened up to the private sector under different mechanisms.

b. Policies

- 1.36 All the countries, except for El Salvador, have established an energy policy agency. In Costa Rica, Nicaragua, and Panama, laws or draft legislation call for the government to assure the country's electric power supplies; the issue is not mentioned in the legislation of the other three countries.

c. Regulation and competition

- 1.37 In Guatemala and Honduras the regulatory agencies, which are only responsible for the electric subsector, report to ministries. In the other countries they have greater freedom, since they are not linked to a ministry. In Costa Rica, El Salvador, and Panama, the regulatory agencies are multisectoral, while the Nicaraguan agency is responsible for the whole energy sector.

d. Treatment of interconnections

- 1.38 In Costa Rica and Honduras, the public electric utility is exclusively responsible for international trade in electricity. All countries permit private generators to sell to agents in other countries, although Honduras establishes that energy may only be exported by generating companies after national requirements are covered.
- 1.39 As can be seen, all the reforms are attempting to establish favorable conditions for private participation in the sector. However in some cases there are obstacles for achieving the equality of conditions sought with the creation of a regional energy market. For example, some countries would give large users the option of buying on the

REM, but for others this would not be openly possible since they are captives of a vertically-integrated public utility.

D. General and institutional framework of the proposed project

1. Establishment of a regional energy market

1.40 Until now private generating projects have been established with a view to serving national energy markets. Except in the case of Costa Rica and, to a lesser extent, Guatemala, the projects have involved short lead times and have consisted of small internal combustion stations or gas turbines that use #2 diesel, which is expensive since it is a refined product. Further, the projects have taken the form of take-or-pay contracts with public electric utilities, which undermines flexibility in the operation of national and regional electric systems.

1.41 In 1996, Central America had a population of 32 million, maximum demand of 3,830 MW, and electric power requirements of 20,600 Gwh. By the year 2000, the population will be an estimated 35 million and, considering the scenario for average growth in demand, maximum demand will be 4,800 Kw and 26,000 Gwh of power, rising to 6,400 MW and 34,800 Gwh by the year 2005. Since this larger market will be more attractive for the construction of bigger stations than have been built so far, and in order to attract private generators under more reasonable prices and operating conditions than in the past, the countries are promoting the development of a regional energy market.

1.42 Coordination among vertically-integrated electric utilities (VIUs) has led in different parts of the world to the establishment of pools, which coordinated operations to a greater or lesser extent to achieve savings that were shared by the members of the pool. 3/ However, that structure did not allow for options to supply distribution companies or large consumers, i.e. it did not have competitive elements. In Central America, the VIUs have not been able to operate as a pool, chiefly owing to the absence of a business strategy in the administration of the companies.

3/ Examples include: (i) the New England Power Pool (NEPOOL) established by the electric companies of the six New England states (close to 100 companies), which is a "tight" pool; (ii) NORDEL which covers the Scandinavian countries and is a "loose" pool; (iii) the Mid-Continent Area Power Pool (MAPP) composed of some 44 electric companies mainly in Iowa, Nebraska, Montana, and Wisconsin, under voluntary coordination; and (iv) the institutional arrangements for interconnections among the countries of the southern part of Africa. They have all been restructuring with a view to competitive markets.

- 1.43 One of the main factors that have led the Central American countries to undertake reforms of their electric subsectors is the difficult financial situation faced by the VIUs, which prevents them from generating the income needed to expand the electric systems, compounded by the delicate fiscal situation of governments, which is why private participation is needed to develop additional capacity.
- 1.44 Owing to technological advances in communications, information systems, and electric power generating equipment, there is a world-wide initiative to steer the industry toward greater openness and competition. Throughout the world it has been recognized that to establish a competitive electricity market, open and nondiscriminatory access must be allowed to the transmission system and to marketing mechanisms (economic dispatching/spot market and bilateral transactions). To make the system neutral, it must not be controlled by either the generating or the distribution companies. Neither the owner nor the agency in charge of system operations and market management should have incentives for or the opportunity of discriminating among generators or distributors.
- 1.45 Because of the independent approach taken to reform of the electric industry in each Central American country, industry structures and national electricity markets are not homogenous. Four countries provide for the separation of generating, transmission, and distribution, while two maintain a vertical structure. In this situation, there will be possible conflicts of interest relating to vertical control that could distort the operation of an open and competitive market, in addition to unequal negotiating conditions for integrated and unintegrated companies.
- 1.46 The regional energy market will function as a permanent marketplace for commercial transactions in electricity freely entered into by the agents. One series of such transactions will originate from economic dispatching on the regional level by the regional operating agency (EOR) and another will originate from medium- and long-term contracts between market agents.
- 1.47 Given the importance of avoiding a closed club, with the consequent negative impact on economic efficiency in this key industry for the countries' economic development, the project team stressed during preparation of the treaty the importance of self-regulation and the need for the EOR to include representatives of generating, distribution, and transmission companies and large consumers, i.e. that it should be a private company. However, the treaty signed by the presidents continues to view the EOR as a public agency, with the governments empowered to appoint its members. Also, in the configuration and establishment of the grid proprietor (EPR) measures have been recommended to neutralize the possible conflicts of interest mentioned above and avoid the creation of dominant market positions.

2. Organizational and institutional plan of the regional energy market

- 1.48 Establishment of the regional energy market (REM) and development of its institutional base will be the pillars for promoting a larger electricity market in the region, which will make for major savings in operating and investment costs, since the systems will be managed according to economic criteria. It will also have a positive impact on better service and extension of coverage.
- 1.49 To provide an institutional and regulatory framework for the REM under the SIEPAC project, the countries have agreed in the treaty to establish its regulatory base and fundamental operating rules. The main players in the system will be the countries that signed the treaty. As a result of that accord, regional institutions will be established to regulate, operate, and administer the system, i.e.: (i) a regulatory agency, which is the Comisión Regional de Interconexión Eléctrica (CRIE) [regional electric interconnection commission]; and (ii) the organization responsible for the market's economic dispatch and transactions, which is the Ente Operador Regional (EOR) [regional operating agency]. The treaty authorizes governments to grant concessions to manage the development, construction, maintenance, and operation of the interconnected grid to a body known as Empresa Propietaria de la Red (EPR) [grid proprietor]. Chapter III describes the main features of the treaty and the regional institutions it provides for.

E. Lessons learned

1. Bank support for the electricity subsector

- 1.50 Apart from the strategy to support integration approved by the Bank in September 1995 and described above, the Bank has participated steadily in the electricity subsectors of Central American countries. Between 1986 and 1996, it has financed 12 energy projects, including geothermal energy, rural electrification, and power distribution. Bank loans for those operations totalled US\$1.5 billion, including sector adjustment operations.

2. Lack of coordination

- 1.51 Although the existing interconnections have limited capacity since they took place bilaterally without considering the interconnected grid as a whole, they offer considerable opportunities for savings through coordinated operation of national electric systems. Different studies have been conducted to quantify potential financial savings. They consistently indicate that potential savings will be about 10% of total variable operating costs. For example, the feasibility studies for SIEPAC evaluated the savings that could be obtained from 1996 to 1999 if operation of the interconnected grids were fully coordinated, without adding any new lines, and savings

were found to be on the order of US\$110 million. They have not materialized owing to lack of coordination between the countries.

- 1.52 There are several barriers to more effective coordination of systems operation, such as a lack of autonomy and business orientation within utilities, budget constraints, etc., as mentioned in previous paragraphs.
- 1.53 The greatest use of interconnection has taken place when there were surpluses of hydroelectric power, first in Costa Rica from 1982 to 1985 when the Arenal-Corobici project came on stream, and then in Honduras between 1985 and 1990, with the new El Cajón project. In both cases operations were intended to use surplus supply, since the other option was to release water. In fact, El Cajón wasted significant amounts of power because the interconnection between Honduras and Nicaragua continued to operate at 138 Kv until 1990, which meant that the capacity for exchanges was very small.
- 1.54 The main objective of the program of regional activities in the Central American electric subsector (PARSEICA) was to spur coordinated operation of the six electric systems in the Central America. The program's specific objectives were to: (i) boost the capacity of the electric companies to operate their systems in a reliable, economical, and coordinated manner; and (ii) promote coordinated operation of the electric utilities. ^{4/} Although the studies conducted under PARSEICA pointed to significant economic benefits if operations were coordinated among the countries, it was impossible to implement them on the regional level, even between two countries. In the project proposed here (see chapter III) it is recommended that targets be established for progress in the coordination of operations, which will be included in the project's conditions.

3. Delays in constructing lines

- 1.55 One of the main problems has been obtaining rights-of-way on a timely basis. In November 1987, the Bank approved a loan (535/OC-CR) for Costa Rica which included construction of 160 km of 230 Kv line. The line was expected to enter into service in 1992. However, the project was delayed for four years, with one of the contributing factors being that rights-of-way had not been obtained, and it did not begin to operate until the end of 1996. Major shortcomings are attributable to unforeseen adjustments that became necessary when certain rights-of-way could not be obtained and the route had to be changed.
- 1.56 In 1994 the Bank approved financing for the construction of a 230 Kv link between Honduras and El Salvador which was expected to come on

^{4/} PARSEICA is partly used for operational planning studies and analysis of national electric grids.

line in 1998. However, it is now expected to be delayed to the year 2000 owing, among other things, to the fact that decisions must be taken by consensus of the two countries.

4. Capitalizing on past experience

- 1.57 Since the flows of electric power and energy that would make the regional transmission system viable will come from coordinated operations under the REM, and in order to capitalize on the lessons learned in the past, the project team recommends that contractual conditions be established for disbursements once suitable institutional and contractual arrangements have been formalized (treaty, protocols, and establishment of regional institutions) to ensure the formation of the regional market, and concrete evidence has been furnished that the electric systems have begun to operate, tapping substantial levels of energy exchanges. The project team also recommends that disbursements for construction only begin when evidence is presented that the EPR has been given concessions by the governments and that the rights-of-way and land for all lines and substations in the SIEPAC project have been obtained prior to tendering for the works.

F. Justification of the Bank's role

- 1.58 The purpose of the project is to establish a regional energy market to reduce the cost of electricity as a result of the coordinated operation of national systems and their growth in an increasingly open and competitive environment. In the coming years, this market will attract the private investment needed to expand generating pools and distribution networks and will stimulate economic activity and intraregional trade. The idea is not simply to finance physical works for regional power transmission but, more importantly, to create market conditions to foster use of that system in a context in which no regional electric power market exists as yet in Central America. There are still no stable market rules and no regional coordination procedures have been implemented for the operation and expansion of power systems. Thus a period of transition and growth will be needed for their consolidation.
- 1.59 This is the type of regional undertaking in which long-term social returns could outstrip private returns. The use of scarce financial resources backed by government guarantees is justified owing to the scale and scope of the initiative. Although it is expected that minority private cofinancing will be included in the project, it is not clear that a comparable regional initiative could be mounted by the private sector alone.
- 1.60 Once market arrangements have been established and closer regional coordination has come about using the grid financed under this operation, future expansion of regional interconnection capacity through private initiative would be possible. Expansion of the system could stem from future regional agreements and contractual and

financial arrangements for the development of regional generating stations. However if no institution such as the Bank participates in the initial stage, it is unlikely that an initiative for thoroughgoing reform to establish a new institutional environment would take place. A private effort with commercial guarantees, even if backed by multilateral guarantees to cover political risks, would probably be too conservative to bring about decisive change in the institutional context or lay the foundations for a regional energy market. The Bank acts as a coordinator of regional initiatives and is in the best position to provide the financial support and intellectual leadership needed to assist the countries in designing and implementing this new market and steering it gradually in the direction of greater competition.

II. THE PROJECT

A. Project concept

- 2.1 The project has been conceived as a comprehensive program that entails an initial stage of support for creation of the REM, backed by technical cooperation for the development and establishment of conditions and rules required for growth in an open, competitive regional electricity market, together with subsequent implementation of an infrastructure project to expand regional electric interconnection capacity. In this sense, the proposed project incorporates the fulfillment of strict conditions precedent to disbursement of the infrastructure loan to ensure that targets are met in coordinated operation and in the creation of regional organizations and mechanisms needed for REM development, laying the institutional foundations for feasibility of the investment project.
- 2.2 Achievement of the technical cooperation objectives will generate the necessary conditions for functioning of the REM, consisting of transactions between many generating plants and distribution consumption points throughout the region and beginning with coordination of existing electricity systems. Development of the new interconnection line without making progress on this initial effort would fail to incorporate existing generating facilities in the coordinated and competitive regional process, producing an economically inefficient market with few participants, possibly dominated by three or four large new generating ventures. Also, without the infrastructure expansion project, it would be impossible to provide incentives for a comprehensive process of deep-seated change in electricity sectors to prepare an adequate context for their development.
- 2.3 The technical-cooperation program consists of two stages: one stage prior to ratification of the treaty in which the benefits of coordinated operation will materialize, and another stage after ratification when support will be provided for creation of regional organizations and the design and approval of major protocols for the commencement of full REM operations. Once both stages are complete, with satisfactory results, the investment loan would be declared eligible for disbursement (see Annex II-2). The cost of the technical cooperation program will be US\$16.4 million, and the direct cost of the infrastructure works US\$232.3 million.

B. Project objectives

- 2.4 The Central American electric interconnection project (SIEPAC) has the following objectives: (i) to support the gradual formation and consolidation of a regional energy market through the creation and establishment of appropriate legal, institutional, and technical mechanisms to promote private sector participation, particularly in

the development of additional generating capacity; and (ii) to provide electric interconnection infrastructure (transmission lines, connection to substations, and a regional coordination and transactions center) to promote exchanges of electric power among the members of the regional energy market.

C. Project description

1. Support for the establishment of the market (technical cooperation)

- 2.5 Due to the qualitative leap represented by the establishment of a regional energy market and the newness of the idea of introducing competition into the energy industry on the world level, the project team recommends that the Bank provide firm support for the countries in creating and consolidating a market of this kind in Central America by financing a technical cooperation program.
- 2.6 Since an electricity market cannot arise spontaneously, the program has been designed in two stages. Annex II-2 gives a detailed description of the scope of the technical cooperation program. The first stage consists of making concrete and measurable progress toward coordinated operation, and includes activities to identify and eliminate technical, legal, institutional and administrative barriers to economic energy transactions between current electricity companies, operations planning to make more precise calculations of savings, their origin, and the means necessary to obtain them (such as the use of procedures for operational planning, production and transmission costs, standardized tolls in all the countries, payment mechanisms, communications, metering, and control). It is recommended that disbursements for the technical cooperation program be streamlined in order to attain the targets that will serve to trigger disbursements of the investment loan and the significant economic benefits that will begin to accrue in the region.
- 2.7 As a key target in the first stage, it is recommended that at least 450 Gwh in cumulative economic energy exchanges 5/ have taken place between market agents in different countries over a period of 12 consecutive months, as a condition precedent to declaring the investment loan eligible for disbursement. At least 50% of these exchanges must be based on agreements to be signed by the region's electricity companies.
- 2.8 As part of the technical cooperation program, support will be provided for designing priority protocols to assure and expedite

5/ Economic energy transactions are defined as those motivated by differential production costs, whereby a producer or company is induced to reduce its own generation and import from another country where power is generated at a lower cost.

establishment of the market. A protocol for market operation and one for methodology and charges for connection to and use of the grid must be designed and approved by all six countries. Aside from establishing all the principles for dispatching, the spot market, bilateral contracts, and technological guidelines for the REM, the first protocol should also include mechanisms for ensuring competition (e.g. establishing minimum percentages of demand per country that should be freely supplied in the region). It is recommended that minimum percentages to be opened up within the REM be defined for a horizon of six years after the commencement of disbursements, and at least 12% of regional demand for the first year of disbursement be opened up to competitive supply in the region. In this connection, the countries will present evidence that they have authorized their distributing companies and major consumers to take part in competitive bidding for procurement in the aforesaid amount on a regional basis.

- 2.9 The second protocol should include forms of payment for interconnection and use of the grid, even for agents in the same country, which will ensure that the project pays for itself and that there are no cross subsidies between countries. It is recommended that both protocols be approved by all six governments as a condition precedent to the first disbursement of the investment loan. See contractual clause.

2. Transmission works and substations (US\$232.3 million)

- 2.10 The infrastructure component of the SIEPAC project consists of the design, engineering, and construction of 1,802 km of 230 Kv lines to be connected at the following substations: Guate Norte, Pepesca and Guate Este in Guatemala; Ahuachapán, Nejapa, and 15 de septiembre in El Salvador; Río Lindo, El Cajón, Pavana and Suyapa in Honduras; León and Ticuantepe in Nicaragua; Cañas, Parrita, and Río Claro in Costa Rica; and Veladero in Panama. Of these 16 substations, four do not yet exist and are to be built by the countries concerned. In the 12 remaining cases, the substations are to be expanded. Total length is distributed among the countries as follows: 135 km in Panama, 515 km in Costa Rica, 284 km in Nicaragua, 366 km in Honduras, 260 km in El Salvador, and 242 km in Guatemala.
- 2.11 The sections between substations Guate Norte-Pepesca-Río Lindo-El Cajón and Ahuachapán-Nejapa-15 de septiembre consist of two 230 Kv lines mounted on the same tower. Half of the cost of these sections will be allocated to SIEPAC and the other half as national projects. In all three countries concerned, plans called for installing transmission lines along the same route and at the same tension. The map included herein shows their approximate alignment and the location of the substations that will be connected.
- 2.12 The inclusion in the project of the section linking Guatemala and Honduras directly came about as an attractive option based on the

results of feasibility studies, given the lower losses and the higher reliability and stability that would be acquired by the electricity systems of Guatemala, El Salvador and Honduras. This interconnection would enable Honduras to undertake energy transactions with Guatemala and Mexico. However, the technical and economic rationale for this section will need to be confirmed by final feasibility studies. Confirmation of this option, and its justification overall, is subject to demonstration by the feasibility studies.

- 2.13 SIEPAC does not include transformers in the substations to which it is connected; only the bays (connect/disconnect, protection and control equipment) will be charged to the project, under one and a half breaker arrangements. Each country will be responsible for the land required to build the new substations or expand existing ones, as well as transforming and other equipment needed at existing and future substations.
- 2.14 The national transmission systems vary greatly in reliability and must be brought up to the same level so as not to hamper transactions between agents in the different countries. The transmission studies performed by a Power Technologies, Inc. consultant indicated that it would be necessary to build some priority upgrades in the short term, costing about US\$12 million. Over the medium and long term, once the SIEPAC line is put into service, it will also be necessary to make additional national upgrades.
- 2.15 The above lines do not include the internal upgrades that each country will be required to make to make its transmission systems compatible with the reliability criteria used in the SIEPAC planning studies. However, except for Nicaragua, financing is either available or will soon be arranged by the countries (Panama and Guatemala) for national transmission works. For Nicaragua, the Bank is planning an operation (NI-0069) which could be processed quickly so as not to hold up the regional project. So that SIEPAC will not be affected by delays in national transmission works, it is recommended as a condition precedent to the first disbursement of the investment loan, that construction plans for national upgrades, including new substations and any expansions needed in all countries, be presented to the Bank, as well as evidence that sufficient funds are available to finance them.

3. Centro Regional de Coordinación y Transacciones
(US\$3.5 million)

- 2.16 The Centro Regional de Coordinación y Transacciones (CRCT) [regional coordination and transactions center] will be the technical arm of the EOR, with responsibility for integrated and reliable management of the interconnected electric grid. It will also be in charge of optimizing generation on the regional level and for settling accounts among the agents in the REM. The CRCT will require software and hardware and communications equipment to

facilitate the exchange of information with national dispatch centers and the different agents. A small group of technicians specializing in the operation of interconnected electric systems will be trained in coordinating the operation of the regional system with the national control centers and in making calculations for the settlement of accounts between the agents.

- 2.17 As part of the technical cooperation program, a study will be made of the capacity of national control centers to interact with the EOR's CRCT. Detailed designs and specifications (bid documents) will also be produced for CRCT procurement, in keeping with the operating protocols of the REM. Further, and given the importance of quickly establishing the physical infrastructure of the CRCT, financing for that purpose will be included in the technical cooperation loan. Presentation of evidence of establishment of the CRCT and performance of the capacity analysis, and presentation to the Bank of designs and tender conditions for the CRCT in accordance with the REM protocols, will be conditions precedent to disbursement of the investment loan.

D. Project cost and financing

1. Project scale and cost

- 2.18 The total cost of the SIEPAC project, not including upgrades to the grids in each country, is an estimated US\$329.7 million equivalent. This includes engineering and administration costs, direct costs, contingencies, escalation, and concurrent and financial costs. Included in the direct costs are reactive power compensating equipment and equipment to improve stability, totaling US\$20 million. The breakdown is shown in table II-1.

Table II-1
Estimated costs and financing plan
(US\$ million equivalent)

Investment category	Financing plan				
	Bank	Quincen- tennial Fund	EPR cont.	Total cost	% of total cost
1. Engineering and administration	8.01	4.38	10.01	22.40	6.50
1.1 Administration and overhead	0	0	7.30	7.30	2.12
1.2 Engineering and supervision	8.01	4.38	2.71	15.10	4.38
2. Direct construction costs	127.13	51.83	64.04	243.00	70.54
2.1 Transmission lines	118.94	47.51	61.66	228.10	66.22
2.1.1 230 Kv single-circuit lines	97.05	35.41	18.84	151.30	43.92
2.1.2 50% 230 Kv dual-circuit lines	21.89	12.10	5.81	39.80	11.55
2.1.3 Reactive compensation	11.0	5.90	3.10	20.00	6.07
2.1.3 Land and right of way	0	0	37.00	37.00	10.74
2.2 Substations (230 Kv bays)	8.19	4.32	2.38	14.90	4.33
3. Concurrent costs	0.82	0.44	0.24	1.50	0.44
4. Unallocated	24.70	10.21	10.68	45.58	13.23
4.1 Contingencies	6.80	2.83	3.71	13.35	3.87
4.2 Escalation	17.90	7.37	6.96	32.23	9.36
5. Financial costs	20.65	3.15	8.19	31.99	9.29
5.1 IDB interest	18.83	3.15	3.29	25.27	7.34
5.2 IDB commitment fee	0	0	4.90	4.90	1.42
5.3 IDB inspection & supervision	1.81	0	0	1.81	0.48
PROJECT TOTAL	181.31	70.0	93.16	344.47	100.0
Percentage	52.7	20.3	27.0	100.0	

2. Financing plan (Table II-2)

Table II-2
Financial conditions of the loans

	IDB	Quincen- tennial Fund
Total term	25 years	35 years
Grace period	5 years	10 years
Disbursement period	5 years	5 years
Interest rate	variable	2% per annum
Inspection and supervision	1%	-
Credit fee	0.75% per annum	-
Currency	US\$	ECUs

- 2.19 Financing in foreign exchange from the potential Bank loan will cover 51.8% of the estimated total cost of the investment project. The guidelines set out in documents GN-1335 and GN-1335-2 establish that the rate of financing for integration projects will correspond to that of the most favored nations participating in the program. The project will cover the energy sectors in Honduras, El Salvador, Guatemala, and Nicaragua, which are classified as Group D countries, enabling the Bank to finance up to 80% of the project.

3. Cofinancing

- 2.20 The Spanish government will cofinance the project with concessional resources from the Quincentennial Fund. This financing, which is an estimated US\$70 million, accounts for 21.2% of the total project cost, as per the breakdown in Table II-1.

4. EPR contribution (US\$89,100,000)

- 2.21 The EPR's financial contribution to complete the project resources is an estimated US\$89.1 million, as per the breakdown in Table II-1. The feasibility of the local contribution will have to be demonstrated together with the project's financial feasibility, as indicated in chapters IV and V of this proposal.

E. Project preparation status

- 2.22 Preparation of the transmission and substation projects included in SIEPAC is at the technical and economic feasibility stage. The feasibility study is well advanced, although partial reports are available. The SIEPAC project will link 16 substations, of which 12 already exist and will only require expansion, while four will have to be built. Three of the existing substations do not use 230 Kv, so that expansion requirements of the countries will be greater. The preliminary partial information suggests that the project's voltage level will not change; however the final costs will have to be verified when the consultant's final report has been submitted and accepted by the countries.
- 2.23 Except for the section between the Guate Norte-Pepesca-Río Lindo-El Cajón substations, a preliminary route is available for the project's transmission lines, which will be in a 4-km wide corridor, and an initial environmental impact study has been prepared. No topographical survey is available for the sections in any of the countries. Since the route was determined when the project consisted of a 500 Kv transmission line, it will have to be confirmed by the countries after surveying the terrain for the line and crossing areas. Prior to the detailed topographical survey, environmental criteria must be established for the final route and national environment impact assessments must be approved. **As a condition precedent to the first disbursement of the investment loan, it will be necessary to present an environmental management plan for the project.**
- 2.24 Designs and detailed engineering (specifications) will be required for the transmission lines, substations, and the regional coordination and transactions center, as well as bid documents.
- 2.25 As yet no study has been conducted for the regional coordination and transactions center (CRCT), since its configuration will depend on how it is conceived in the REM treaty. The project team

recommends that drafts be prepared for the protocols for operating the regional interconnected system and the functions of the EOR, followed by an analysis of the national dispatch centers and a feasibility study for the regional center. Second, it is necessary to prepare designs and specifications for the CRCT and for the improvements that each country must make in its dispatch center and for communications on both levels; this has been provided for in the technical-cooperation program.

III. PROJECT EXECUTION

A. Organization for project execution

1. Legal framework

a. The Framework Treaty on the Central American Energy Market

- 3.1 The Framework Treaty on the Central American Energy Market (hereafter the "treaty"), is the highest ranking legal document supporting establishment of the regional energy market and the regional agencies to operate it. It is a general document that sets forth principles, while the regulatory base will be developed in detail through protocols to be agreed upon by the governments, and through procedures to be established by the CRIE.
- 3.2 The objectives of the treaty are the establishment and gradual expansion of a regional energy market (REM) and exchanges of electric power based on reciprocal and nondiscriminatory treatment. The treaty provides for regional agencies to regulate and administer the market, including the Comisión Regional de Interconexión Eléctrica (CRIE) (regulatory agency), the Ente Operador Regional (EOR) (regional market operator), and the Empresa Propietaria de la Red (EPR) (grid proprietor). The treaty seeks to encourage greater private sector participation and to foster the development of interconnection and generating infrastructure through the establishment of objective, transparent, and nondiscriminatory rules to regulate operation of the REM.
- 3.3 The main principles established in the treaty include: (i) market agents will have free access to the regional and national transmission systems; (ii) energy purchases and sales between market agents will take place with no discrimination of any kind; (iii) the market will evolve gradually into a broader, more open and competitive structure; (iv) generating plants can be built in any of the member countries; (v) the regional transmission companies will engage only in transmission; (vi) the treaty will be governed by the principles of competition, gradual implementation, and reciprocity; (vii) the governments will guarantee free transit of energy through their countries; (viii) the governments declare the infrastructure works necessary for regional market activities to be in the public interest; and (ix) the governments will sign the protocols required to facilitate application of the treaty.
- 3.4 The treaty is perpetual and will come into effect eight days after the second instrument of ratification is deposited with the Secretaría General del Sistema de Integración Centroamericana (SICA) [Central American Integration Secretariat]. To date, the treaty has been signed by the presidents of the six countries and steps are under way in each of them to obtain legislative approval.

- 3.5 Since all six member countries are to participate as guarantors of the two loans for the project, it is recommended that the treaty signed by the parties on December 29, 1996, be ratified by all six legislatures and the corresponding instruments deposited with SICA, as a condition precedent to the first disbursement of the construction loan.
- 3.6 The treaty's objective of establishing a regional energy market will be attained through a process that will gradually consolidate the institutional base and the structure of the national markets, introduce competition, and eliminate barriers in order to reap the benefits of the project. The treaty recognizes that the REM will have to evolve gradually from a limited situation at the outset to a broader, more open, and competitive structure. Also, by establishing that transactions under the REM will be carried out freely, through unrestricted access to the grid, and that dispatching will be done on the basis of economic criteria, the treaty has laid the groundwork for promoting market competition.
- 3.7 The treaty requires electric utilities in the region whose business structure continues to be vertically integrated (VIUs) to establish separate business units, which will be subject to auditing by the CRIE, to clearly identify the costs of each activity and avoid transfers of costs between activities. The treaty also establishes that market agents will be given free access to regional and national transmission lines. However, since VIUs are permitted to survive, this will impose greater regulatory requirements and create unequal conditions in negotiations between the participants. Since the treaty also allows for different treatment of certain charges for the use of the national and regional grids, this will be a permanent source of conflict, particularly since the accord does not provide for regional harmonization of structures or regulatory systems. For these reasons, presentation of evidence of separate accounting by segment of activity, and the creation of separate business units in the region's companies maintained as VIUs, as well as of the elimination of any cross subsidies between activities, is required as a condition precedent to the first disbursement of the construction loan.

b. The protocols

- 3.8 The protocols to the treaty and the regulations are highly important for smooth functioning of the REM. They will establish the commercial and operating rules to govern the REM, which must be observed by all participants and the regional agencies. The treaty states that the first protocol should be signed within three months after the treaty comes into effect. Parallel to approval and ratification of the treaty, with support from the technical cooperation, work will be done on the content of priority protocols and regulations, which will have to be approved by the governments once the treaty is ratified.

- 3.9 The main aspects to be defined and developed in the protocols and other legal instruments include: (i) articles of incorporation of the CRIE and the EOR; (ii) provisions governing concession of the grid to the EPR; (iii) mechanisms and methodology for payments for the network and procedures for calculating charges for connection to and use of the grid; (iv) provisions governing operation of the regional electric market, including coordinated operation; (v) mechanisms and goals to be achieved in developing the market and introducing competition; (vi) creation of business units; (vii) standards for developing regional generating projects; (viii) environmental standards; (ix) provisions governing the acquisition of rights to the land on which the project works will be built; and (x) provisions governing the procurement of goods and services. One of the initial activities of the technical cooperation project will be to prepare a detailed action plan defining the scope, priorities, and schedule for preparing and developing the tasks required to establish the REM and to strengthen its operation, including those mentioned above.

2. The treaty's regional agencies

a. Ente operador regional (EOR)

- 3.10 The EOR in charge of regional electricity dispatching must be established and operational within 12 months following the entry into effect of the treaty. It will be headquartered in one of the member countries. The technical cooperation program will include assistance for establishing it.
- 3.11 Financing for the EOR's activities will come from charges for the operating services approved by the CRIE, established in the protocols to the treaty, and paid for by the agents in the REM.
- 3.12 As mentioned earlier, major benefits will accrue to the countries from coordinated operation of their systems. In the short term they are on the order of US\$110 million from 1996 to 1999. This alone would justify establishing the EOR almost immediately. **It is recommended that the creation, location, articles of establishment and regulations of the EOR be established as a condition precedent to the first disbursement of the Bank's infrastructure loan.**
- 3.13 With respect to the makeup and corporate structure of the EOR, the treaty establishes that it will have two representatives appointed by each country on the proposal of their market agents. It will be established as a company under international public law. Although the treaty establishes the right to free access to the grid and dispatching under economic criteria, the neutrality of the system is essential to send out clear signals regarding competition and the absence of potential conflicts of interest in managing the REM. Therefore it is recommended that the EOR should not only be composed of existing, vertically-integrated electric utilities, but

should include equitable representation of all sectors of the energy business, including generating, transmission and distribution companies, large consumers and governments, in the form of a nonprofit corporation.

- 3.14 Although an acceptable temporary solution in the short term could be the structure included in the treaty, it is recommended that the structure move in the direction described, which should be reflected in the protocols to the treaty. A condition precedent to the first disbursement of the infrastructure loan will be presentation to the Bank of an approved plan that establishes a satisfactory mix for the EOR's board of directors to ensure that it includes equitable representation by associations of generators, distributors, transmission companies, major consumers and governments, in the form of a nonprofit company.

b. Comisión Regional de la Interconexión Eléctrica (CRIE)

- 3.15 The CRIE is the agency that regulates the REM. Its main objectives are to enforce the provisions of the treaty, ensure proper development and consolidation of the market, oversee its transparency and smooth operation, and promote competition among the members of the REM. This commission is composed of a commissioner appointed by each member country. It is an international public agency with its own legal status and will be headquartered in one of the member countries.
- 3.16 The CRIE will be established within six months after the treaty enters into effect. Its revenues will come from a charge for regulation established in the treaty protocols, to be paid by market agents.
- 3.17 The treaty has established general objectives and functions for the CRIE. Its composition, location, establishment, and regulations will be defined in detail in the corresponding protocols, which will be developed with support from the technical cooperation loan. Establishment, location, regulation and operation of the CRIE is a condition precedent to the first disbursement of the infrastructure loan.

c. Empresa Propietaria de la Red (EPR)

- 3.18 The governments have decided to establish the EPR to manage the development, construction, and maintenance of the interconnected grid. It will be a private company with public or joint public and private capital, as described in chapter IV of this proposal.

B. Land and rights-of-way

- 3.19 Owing to the increasing complexity of acquiring rights-of-way for transmission lines that applies in all the countries to a greater or

lesser extent, it was agreed during the analysis mission to include the cost of a strip of land wide enough to accommodate a future second line. Rights-of-way are likely the most problematic aspect of the construction works and could cause delays in execution.

- 3.20 The failure to obtain any given right-of-way could block completion of the regional interconnection project and cause large economic losses under contracts signed between the agents in the REM if the deadline for entry into service of the SIEPAC line that is missed. As mentioned under the section on lessons learned (chapter I), in the past there have been major delays in the entry into service of transmission projects for that reason. As yet no rights-of-way have been obtained in any country. **It is recommended that prior to calling an international tender, and unless the parties agree otherwise, evidence be presented to the Bank, in connection with properties where the project works are to be built, that the rights-of-way and other rights needed to undertake the infrastructure works have been acquired.**

C. Plan of execution

- 3.21 Owing to the complexity of the project, since it involves six countries with different legal frameworks, import procedures, etc, and to ensure uniformity in all equipment and minimize maintenance costs, a **turnkey** contract is recommended for the design and construction of the transmission works, **unless the parties agree otherwise based on technical and economic criteria.** The project will undoubtedly bring very attractive price offers because of its large size (1,802 km of 230 Kv lines). The cost would be likely be higher if the project were organized into independent packages for materials and assembly.
- 3.22 It is recommended that the Consejo de Electrificación de América Central (CEAC) [Central American Electricity Council], described in Annex II-1.

D. Investment and disbursement schedule

- 3.23 No detailed schedule is available as yet for investments and disbursements. However, prior to declaring the infrastructure loan eligible, the treaty will have to be ratified by the legislatures of all the six countries. Past experience with electricity legislation indicates that the process can take two years or more. The treaty must be in effect to establish the CRIE and the EOR. Once it is ratified, the EPR will have to be in possession of concessions from the six countries to construct the line, which implies that procedures for sharing the project's costs and benefits will have been designed and approved by consensus, and that the rules for operation of the REM will have been established. Rights-of-way and the designs for the works will also have been obtained. On this basis, an optimistic estimate is that

disbursements for construction of the works could begin in 2000. The construction period has been estimated as three years, and therefore the SIEPAC line could begin operating in 2003.

E. Procurement and contracting procedures

- 3.24 International competitive bidding will be required for equipment and services worth more than US\$250,000 equivalent and for works over US\$1.5 million. These levels have been recommended by the Procurement Policy and Coordination Office for energy projects in Central America. Bids will be subject to the Bank procedures set forth in Annex B to the loan contract. Selection of the main contractor to draw up the plans, supply the materials, and build the works will also require prequalification. Table III-1 below provides an initial indication of the procurement plan.

Table III-1 PROCUREMENT PLAN						
MAJOR PROJECT PROCUREMENT ITEMS	Financing (%)			Method	Prequali- fication (Yes/No)	Estimated date of GPN
	IDB	GOS	Local			Half/year
A. GOODS PROCUREMENT Turnkey contract for design, optimization, soil studies, foundations, supply of construction materials and equipment, and startup of transmission lines and connections to substations (US\$232.3 million)	51.8	21.2	27.0	ICB	Yes	2/98

Note:

ICB = International competitive bidding

F. Environmental impact evaluation

1. Background and action plan

- 3.25 A regional environmental study of the electric interconnection line was begun in 1993 and completed in October 1995. The evaluation was performed by the environmental units of the six countries' electric utilities, with technical assistance from the environmental units of the Empresa Nacional de Electricidad de España, S.A. (ENDESA) and the operator of the Spanish electric power transmission system (Red Eléctrica de España). The purpose of the environmental study was to determine the best route for the line from the environmental, technical, and economic standpoints.
- 3.26 The following actions have been carried out: (a) analysis of alternative routes and definition of a 4-km wide corridor for the

line; (b) inventory of the environmental and human settlements features of the corridor and preliminary evaluation of the environmental impact of constructing and operating the line; (c) publication of preliminary national assessments and a preliminary regional environmental impact assessment (EIA) of the project. The preliminary EIAs were discussed at a workshop held on January 14-17, 1997, attended by the agencies involved in impact evaluations and an action plan was prepared for each of the two stages of this operation:

- a. Technical cooperation loan. Complete the preliminary national EIAs, which will establish the final alignment for the line to be determined by the surveying teams as the first step in the construction stage; and
- b. Construction loan. Ensure the environmental quality of the project during design and construction, including the preparation of technical environmental specifications for surveying, design, and construction.

- 3.27 During the technical cooperation stage, the national teams will perform the following actions to finalize their EIAs: (i) verification in their countries of the most severe environmental impacts identified in the preliminary studies; (ii) environmental studies for variations in the line or corridor introduced to connect additional substations; (iii) detailed field studies of critical areas identified in the preliminary studies; and (iv) presentation of the final EIAs for review and approval by the respective environmental authorities. The final national reports will recommend concrete actions to prevent, correct, and mitigate the direct and indirect impacts of the interconnection line, as part of each country's environmental management plan, duly structured with a budget and definition of administrative actions for its implementation in the entity participating in the project.
- 3.28 The environmental management plans will conform to each country's environmental laws and regulations. They will contain the following, as a minimum: (i) technical details on the feasibility level; (ii) the costs of the necessary investments; (iii) mechanisms or procedures for consultations with affected groups; (iv) budget and sources of financing; (v) institutional structure for surveillance, coordination, and supervision; (vi) a monitoring plan and its cost; and (vii) an evaluation and environmental audit at the end of the construction stage and during operation of the interconnection lines.
- 3.29 The technical cooperation loan will include funds for planning environmental coordination activities within the regional project management agency. The technical cooperation loan document and the loan contract will contain contractual clauses to ensure compliance with the foregoing actions.

- 3.30 The project's budget includes an estimated US\$500,000 for activities as part of the technical cooperation and US\$1.5 million for environmental activities during execution of the investment project. The cost estimate for the latter activities includes strengthening of environmental management capacity in the national partners in the system.

2. Measures and safeguards against natural disasters

- 3.31 The geology of the countries of Central America is marked by intense tectonic activity and the presence of several active volcanos. Tremors and earthquakes occur with a certain frequency, as do volcanic eruptions and ground instability. In selecting the preliminary alignment for the line, which is 4 km wide, detailed studies have been conducted of seismic records and of the presence of active faults in the vicinity. In all events, the design of the works will have to take the proximity of geological faults into consideration in order to adopt appropriate acceleration coefficients and modern techniques for antiseismic design. Towers and transmission line supports will not be constructed on unstable slopes.
- 3.32 The possibility of natural phenomena that could affect the program works will be taken into account in the designs to avoid adverse effects as far as possible.

G. Operation and maintenance

- 3.33 Once construction is completed, the projects will continue to be supervised to detect any changes that may occur during operation including, but not limited to, potential deterioration in the different components. A multidisciplinary evaluation team from the EPR, which will have participated in the design and construction of the works, will be responsible for compiling as-built plans and aides-memoirs on the project design. The EPR undertakes to present the results of the analysis of the operation of all project components within two years after construction is completed, comparing them to the studies and designs. In the event that adverse conditions or major deviations from the initial design parameters are detected, the EPR must plan corrective measures and a work program to implement them.
- 3.34 In accordance with the Bank's general practice in projects of this type, the potential infrastructure loan contract will include the Bank's standard clauses in this connection.

H. Inspection and supervision

- 3.35 Apart from the above actions by the EPR, the Bank will conduct project inspections and supervision through its Country Offices in all six countries.

I. Project monitoring meetings

- 3.36 In view of the complexity of the project, monitoring in conjunction with the project authorities will be required to periodically evaluate overall progress on the technical cooperation and infrastructure construction projects, during implementation. A contractual condition will establish that review meetings are to be held at least once a year. The evaluations will consider institutional, financial, technical, economic, and environmental aspects defined on the basis of the project conditionality. As a condition precedent to the first disbursement in the case of the contract for infrastructure works, progress on the project and technical cooperation and the status of fulfillment of loan conditionality and project activity programming will be assessed.

IV. THE BORROWER AND THE EXECUTING AGENCY

A. Borrowers and executing agencies

- 4.1 The program is a comprehensive operation that will be financed under separate loan contracts: (i) a loan to the Consejo de Electrificación de América Central (CEAC) to finance a reimbursable technical cooperation program, accompanied by nonreimbursable technical cooperation funding; and (ii) approval of financing for the Empresa Propietaria de la Red, Sociedad Anónima (EPR), now being formed, to finance the works in the SIEPAC project. These same entities will also be the executing agencies.

B. Consejo de Electrificación de América Central

- 4.2 CEAC is a regional institution for cooperation, coordination, and integration, established in 1985 for the main purpose of making better use of the energy resources of the member countries. A more detailed description of the CEAC and the technical cooperation components is included in the plan of operations in Annex II-2.

C. Empresa Propietaria de la Red (EPR)

1. Establishment

- 4.3 The countries have submitted a proposal to the Bank to create the EPR, which indicates that it will be a company in one of the six countries, still to be decided. The EPR's initial capital will be subscribed by the six public utilities and by ENDESA of Spain. The initial capital will have two types of shares: 340 common shares with a face value of US\$150 each; and 360 class "A" shares with the same face value, for a total of 700. The shares will have equal voting rights. Each of the seven initial shareholders will have 100 shares. Class "A" shares, which will account for just over 51% of the initial capital, will be held equally by the six electric utilities and may only be traded among them or to another public company. The common shares will be held by the six companies with 40 shares each, and by ENDESA which will have 100 shares. No shareholder may own more than 15% of the EPR's total capital. In addition, with a view to achieving the best compromise solution and in view of conditions prevailing in Central America, in the case of the SIEPAC project it will be necessary to establish EPR governance such that neutrality and free access to the grid are guaranteed based on the following three basic principles: (i) place limits on equity investments and voting rights of shareholders; (ii) limit participation by EPR shareholders in electricity generation and distribution business and monitor compliance through regulation; and (iii) manage grid operation and maintenance clearly and independently of EPR shareholders. These three principles are reflected in the conditions recommended in paragraphs 4.4 and 4.8.

- 4.4 As a condition precedent to signing and formalizing the loan contracts, it is recommended that evidence be provided to the Bank of legal organization of the company giving it legal personality and legal representation, as well as the borrower's bylaws. The bylaws are to specify, inter alia: (1) that no EPR shareholder may hold a direct or indirect interest in the REM as a generator or distributor of electricity in excess of the percentage of installed capacity approved and certified for it by the CRIE; (2) that the EPR is created as a private corporation with a majority public interest in which no shareholder owns, directly or indirectly, more than 15% of the total capital stock or of any class of voting shares; and (3) the mechanisms for protecting minority shareholders. Also to be presented to the Bank's satisfaction is a proposal and form of implementation thereof, approved by its board of directors, as to operation and maintenance of the SIEPAC grid, ensuring the application of the principles of transparency, neutrality and nondiscrimination in access to the grid by market agents.
- 4.5 As headway is made in establishing regional market mechanisms, the countries will work out the details of the agreements relating to the capital structure and business plan for the EPR, which will be consistent with the project financing plan. It will be necessary to reach agreement with the Bank on the EPR's business plan, which will define the company's operating efficiency and financial parameters during project execution. As a condition precedent to the first disbursement of the investment loan, the administrative structure of the EPR, is to be defined to the Bank's satisfaction and the company's financial feasibility demonstrated. A business plan defining the parameters for measuring the EPR's operating and financial efficiency must also be submitted, including mechanisms provided for charging for its services.

2. Corporate structure

- 4.6 The corporate structure of the EPR, in which national VIUs from each of the countries plus nonregional partners will participate, could act as an impediment to the neutrality of the system and create potential conflicts of interest if those companies continue to be shareholders in the EPR. It is hoped that, as headway is made in establishing a regional market and reform continues in the electric subsectors in each of the countries (as described in chapter I), these potential conflicts of interest will be reduced. However, the reform processes in the subsectors are not homogenous and are moving at different paces, which means that it will not be feasible to correct the situation in the short or medium terms. It is therefore necessary to take additional steps to attenuate those effects, such as ensuring that all the agents in the market are represented in the Ente Operador de la Red (EOR), as outlined in chapter III.
- 4.7 As existing VIUs are dismantled and transmission companies are established in the countries as part of the process, the latter ought

to become the natural shareholders in the EPR, to which the VIUs should transfer their shares. In the context of current reforms and processes under way, two VIUs (in Costa Rica and Nicaragua) are not expected to achieve a change in structure; in three countries (Panama, Guatemala and El Salvador), sector activities are to be fully de-integrated and separate transmission companies formed; and in Honduras, distribution is to be separated out.

- 4.8 It is also recommended that participation by the shareholders of the EPR in activities other than the transmission business be limited, for which purpose caps could be placed on their involvement in generating and distribution, which would be consistent with the current nature of the market and its future development, and with the process of establishing the regional market itself. In view of the foregoing, it is recommended, as a condition precedent to first disbursement, that the borrower present evidence that the CRIE has issued an opinion on and approved the initial maximum percentages applicable to the REM agents, and taken on the obligation to review such percentages yearly and establish the applicable regulations.

3. Concessions to the EPR

- 4.9 The treaty establishes that when it is ratified by the respective countries, they will each grant a concession to the EPR to build and operate the interconnection system. The process must be completed if the EPR is to be viable as executing agency and borrower. Granting of the concessions by each of the countries will be a condition precedent to disbursement of the investment loan, as reflected in presentation of copies of the concession agreements signed with each one of the Central American countries participating in the project.

4. Paying for the EPR and financial viability

- 4.10 The financial viability of the EPR requires the regulatory agency (CRIE) to have developed and approved the methodology and bases for paying for the system and the form in which they will be applied to the market agents. Guidelines governing payment methodology and formulas are to be agreed upon in advance in a protocol to be approved by the governments of all six Central American countries.
- 4.11 The methodology for determining variable charges and charges for capacity and access to the interconnected grid are tasks that will be performed in detail under the technical cooperation project. As established in the treaty, the mechanisms must be approved by the CRIE and the rate base should provide sufficient income to cover the costs of operating and maintaining the line, servicing the debt, plus a reasonable return on the shareholders' investments, based on a program of investments in the line that reflects the optimum solution from the technical and economic standpoints. As a condition precedent to disbursements under the investment loan, it will be necessary to demonstrate to the Bank that the bases and methodology

for paying for the transmission line have been established and approved by the CRIE, in accordance with the principles contained in the protocols to the treaty.

- 4.12 The preliminary financial feasibility of the project has been established on the basis of an investment program in a 230 Kv single-circuit transmission line, which is recommended as the optimum solution from the technical and economic standpoints. The analysis is presented in chapter V.

5. External auditing

- 4.13 The audited financial statements of the project during execution, of the EPR during the life of the loan, and of CEAC during the technical cooperation project are to be presented to the Bank within 90 days following the end of each calendar year, in accordance with Bank procedures. In view of the nature of the project and because the EPR is a recently created company, it is also recommended that it present unaudited quarterly statements during the project. It is recommended that the Bank's standard contractual clauses be included to that effect.

6. Guarantees

- 4.14 As for the investment loan for SIEPAC project works, the six countries have agreed to invest equally in the equity capital of the company and have also agreed that the debt to the Bank will be shared equally among them. They will issue sovereign guarantees in equal amounts, totalling the equivalent of the Bank loan. The same criterion will be applied to the resources and sovereign guarantees in respect of the reimbursable technical-cooperation component.

V. FEASIBILITY AND RISKS

A. Economic feasibility 6/

- 5.1 The economic benefits described below were taken into account to gauge the project's economic feasibility. For the situation without the interconnection lines: (i) savings in investments and in fixed operating/maintenance costs in the power stations; and (ii) savings in operating costs (mainly fuel), variable maintenance costs, and the value of undelivered energy.
- 5.2 The costs of the project are the costs of investment, operation, and fixed maintenance of the interconnection lines and connections to the associated substations.

1. Minimum cost solution

- 5.3 To determine the minimum economic cost or maximum net benefit, two major sources of uncertainty that affect the scale and programming of the regional interconnection were considered: (i) the extent to which operations are coordinated and the rate of expansion of the Central American electric systems; and (ii) the rate of growth in demand.
- 5.4 Eight scenarios were designed during definition of the project, each representing a higher degree of operational coordination and expansion of generating capacity, plus a reference scenario based on individual expansion of the six electric systems and the level of coordinated operation permitted under the restrictions imposed by existing transmission lines and lines committed to be built up to the year 2000. The minimum cost generating plan was analyzed for each of these scenarios, based in one case on low growth in demand for power and energy (regional average of 4.4% between 1996 and 2015) and on

6/ This economic analysis is based on preliminary information provided by consultants. Still needed is information on additional benefits associated with the possibility of extending the SIEPAC line along a route that would provide a direct connection between the electricity grids of Honduras and Guatemala to the north, in addition to the connection between those two countries through El Salvador, which is already included in the project. This 318 km stretch between the El Cajón substation in Honduras and Guatemala City would not affect the most desirable specification of capacity or programming of investment throughout the region (section V.A.1). A sensitivity analysis (see section V.A.3) confirms that the additional cost of the proposed stretch does not alter the conclusions of the cost-benefit analysis for the project (section V.A.2). This economic analysis will be completed and validated shortly, once final information is received.

high growth in the other (6.7%). After reviewing the results, the subsequent analysis focused on six scenarios for coordination/demand, covering a broad range of possibilities for regional electric integration in comparison with the high and low demand reference scenarios. Annex V-1, containing a description of the scenarios in support of this analysis, is available in Region 2 files.

- 5.5 A series of investment options for the regional transmission system was considered: one or more lines or circuits at 230 Kv (strengthening existing systems operating on that voltage) and at higher voltages such as 500 Kv, and a combination of the two, simultaneously installing all the capacity required for the long-term, or postponing part of it to a future date. Heterogeneous options involving differences in transmission capacity in different parts of the region were also considered.
- 5.6 Decision under uncertainty criteria were taken into account, since none of the investment options that were analyzed minimizes the economic costs (they maximize the results in terms of net benefits), for all the coordination/demand scenarios (also considering the risks of delays in building large new generating projects). 7/
- 5.7 The analysis of net economic savings attributable to each option for the system under each of the coordination/demand scenarios points to the advantage of building transmission infrastructure that anticipates demand for interconnection capacity as closely as possible. This demand depends on the scenario, but the specification of appropriate capacity for different levels of demand for interconnection can be separated out over time. A certain transmission capacity (financed under this operation) could meet the requirements for electric system coordination in the coming years, since the larger regional generating stations, which could possibly require additional transmission capacity, would not come into service until 2008 or later, under more ambitious coordination scenarios. Therefore, a general strategy of flexible investment was adopted that would capture the benefits of electric integration in the extent to which the progressive stages of coordination materialize. It was concluded that the opposite strategy of simultaneously installing all the regional transmission capacity required over the long term does not respond to the need to manage the major risks of developing the interconnected system in a sufficiently flexible way and, moreover, it is not economically profitable (under the most conservative coordination scenarios).

7/ The decision under uncertainty criteria considered were: (i) minimizing the maximum regret (Savage criterion); (ii) maximizing the minimum result; (iii) maximizing the average of the maximum and minimum results (Hurwicz criterion) or the average of all results (Bayes criterion); and (iv) maximizing the maximum result. The risk aversion effect on decisions was also considered.

- 5.8 Annex V-1 contains the final list of options for investing in the regional grid, to be taken into account in project definition. All these options involve 230 Kv transmission installed in a circuit by the year 2000, and some options include the possibility of adding one and even two more circuits in 2008 (the first circuit expands the region's transfer capacity by 300 MW and each of the others by 200 MW). Based on simulations of the production of the region's electric systems, it was concluded that only minor economic savings could be obtained by boosting transfer capacity to over 500 MW. Therefore, the options involving voltages over that limit were abandoned.
- 5.9 The aforesaid annex shows the net economic savings for each scenario that can be attributed to each investment option in the regional grid. Given each of the six coordination scenarios and their fixed investment costs in regional generation, the net savings consist of the reduction in operating costs produced by each option in comparison to operating costs under existing restrictions on transmission, less the corresponding cost of investing in new transmission capacity. The option that produces the maximum incremental net savings is thus defined for each scenario. To obtain the maximum incremental net savings, no scenario requires an investment option that raises transfer capacity above 500 MW.
- 5.10 As part of the analysis of decision making under uncertainty, the criterion of minimizing maximum regret was applied. It is calculated that the regret linked to each operation in relation to the maximum incremental net savings that could have been obtained if the best option for the grid corresponding to each coordination scenario had been chosen. The investment option that minimizes maximum regret in each of the six coordination scenarios was found to be construction of a single 230 Kv line in the year 2000, with the possibility of building a second single 230 Kv line later (2008), but only if advanced coordination of planning for additional regional generating capacity materializes (in scenarios 5 and 6). If no coordinated planning materializes in the coming years (scenario 1) or if the degree of coordination is moderate (scenarios 2, 3, and 4), it would not be necessary to build the second line.
- 5.11 In scenarios 2, 3, and 4, maximum incremental net savings can be obtained with the option of only constructing the first 230 Kv line. Under scenarios 5 and 6, the second line in 2008 could capture additional savings and this grid option would provide the maximum incremental net savings. The regret of not having the option of adding the second line if advanced coordination materialized is more significant than the regret of having built the project (just the first line) in the event that no coordination in expanding regional generating capacity materializes (scenario 1). This conclusion is strengthened by the fact that it would not be necessary to add the second line everywhere in the region to be able to capture a high

percentage of the additional savings available. 8/ (To provide the six countries with the same opportunities for entering into commercial activities on the regional electric market it seems reasonable to start with homogeneous transfer capacity throughout the whole region for the first investment stage.)

- 5.12 The only decision currently required is the decision to build the first line. But the results of the analysis suggest the advisability of following a farsighted strategy by acquiring the rights-of-way necessary for the possible future construction of a second line parallel to the first.
- 5.13 The risk of significant delays in constructing the main regional generating projects that would justify installation of a second 230 Kv circuit supports this investment option in comparison to the alternative of mounting the first 230 Kv circuit on towers that are strong enough to support a future second 230 Kv circuit. But the advantages of this alternative diminish as the period between the two investment stages lengthens. 9/ This alternative is significantly more expensive in terms of current investment requirements, a point that should not be brushed aside, given the fiscal constraints on the countries of the region at this time. The development in stages of a dual circuit in Central America also suffers from the disadvantage that there could be simultaneous failures in both circuits caused by environmental conditions (lightning for example) or sabotage. However, there is the advantage of slightly less environmental impact for two parallel lines and protection against the possibility of environmental objections to construction of a second line, even if the rights-of-way have already been obtained. Combining all these strategic considerations, the option of constructing a single 230 Kv line with the possibility of adding a second line in future if the degree of regional coordination so warrants, appears to be best for the project.

2. Cost-benefit analysis

- 5.14 For this project specification, in which the second line would only be constructed in scenarios 5 and 6, the total economic benefits of coordination (savings in investments in generating capacity plus

8/ The application of other criteria for decisions under uncertainty considered in this analysis confirms this conclusion: the same option is preferred under all criteria, except for the very conservative criterion of maximizing the minimum result, under which this option ranks second after the option of not making any new investments.

9/ Although the possibility that large regional generating projects could come on line early should also be taken into account; considerations of risk aversion in decisions imply that more weight should be placed on each dollar of net savings than on the effect of delays.

operational savings) were quantified in relation to the reference case of individual investments by the countries and coordination of operations limited by the existing transmission system, without the new interconnection grid. The project was shown to have positive economic rates of return under all the regional coordination scenarios, except for scenario 1 which is the most conservative of the six.

- 5.15 For the profitable scenarios (2 to 6) the present value of the net benefits of the project ranges from US\$57 million to US\$993 million, with an economic internal rate of return between 14.9% and 33.1%. Based on the average of the annual net economic benefits for all six scenarios, a center-line estimate of project returns would be 25.1%, with a present net value of benefits of US\$381 million.

3. Sensitivity analysis

- 5.16 A sensitivity analysis was performed of the economic feasibility of the project, considering a 20% increase in investment costs. The project's returns remain above the minimum of 12% for scenarios 2 to 6, as they also do when based on the average annual net benefits for all six scenarios. The project continues to yield acceptable returns even under conditions of slow growth in electricity demand, such as in scenario 2, which is the most conservative of the five scenarios that involve coordinated planning, even when this scenario is combined with a project cost overrun of 20%. 10/

4. Investment timing

- 5.17 The timing of the investment clearly depends on when a process of substantial coordination of operations in the existing electric systems begins. If the process has been implemented by the year 2000, there is no justification for delaying project execution. But if the institutional arrangements for the regional energy market have not laid the groundwork for effective coordination that would considerably boost the level of exchanges between the countries when compared to recent levels, there would be justification for delaying the project until such conditions exist.

10/ Project returns are also maintained when adding the additional cost of approximately US\$39 million (half the cost of a new double circuit, the other half being considered a national project) for the proposed route connecting Honduras and Guatemala directly. In the worst case, the effect of this route can be assumed not to reduce the benefits for a regionally coordinated operation under each of the coordination/demand scenarios (and very possibly would generate significant additional benefits, to be confirmed in the final analysis). This means that the conclusions as to project returns are sustained: the net benefits of the scenario with the most marginal returns (scenario 2) remain positive though they are reduced by US\$39 million.

5. Distributional impact

- 5.18 It is expected that development of a Central American energy market will produce substantial economic benefits for low-income groups in the region, stemming from a reduction in the cost of electricity for the general public, an increase in reliability, and greater competitiveness in relation to other less convenient sources of energy. The reduction in the cost of purchasing block power would increase the economic feasibility of rural electrification projects, partially offsetting the high cost of investments in distribution systems. However, like all general physical infrastructure projects, this project is not **specifically targeted** to poverty alleviation or to improving the economic status of low-income groups. Although it is expected that the project will produce substantial benefits for women in Central America, it is not specifically targeted to them either.

B. Technical feasibility

- 5.19 The voltage level and transfer capacity of the interconnected grid were determined by combining the feasibility studies for the expansion of generating capacity and the expansion of transmission. The different coordination scenarios were used to obtain potential exchanges of power and energy among the countries.
- 5.20 Representatives of the countries, consultants, and the Bank established the minimum reliability criteria to be met by the regional interconnected system for the purpose of determining firm contracts for supply, under the transfer capacity of the grids, between market agents in the different countries. The electro-technical studies were made using computer tools recognized around the world as proven and suitable for studies of this kind.
- 5.21 To ensure that the grid would be consistent with long-term development strategy, the advisability of using a voltage higher than 230 Kv was studied, even if the system were to operate initially at 230 Kv. The conclusion was that a higher voltage was not justified for the future development of regional interconnection.
- 5.22 All the countries already have 230 Kv and therefore are familiar with the construction, operation, and maintenance of such systems. Further, the grid to be built under the project will also serve to strengthen national systems.
- 5.23 On the above basis and since potential impact on existing equipment was considered during the designs (for example of failure levels), coordination of insulation and equipment specifications in general, the studies have shown that the project is technically feasible.

C. Institutional and financial feasibility

1. Institutional feasibility

- 5.24 The legal and institutional framework for the project has been established in the interconnection treaty, which is a legal document that supports the creation of a regional energy market. Considerable progress had been made in the legal framework, with the signature of the treaty by the Central American presidents on December 29, 1996, and it must now be ratified by the legislatures of all six countries. The treaty, in turn, provides for the creation of regional agencies (CRIE, EOR, and EPR) which, when built up, will provide the legal and organizational platform for managing the REM.
- 5.25 Development of the institutional base and the regional agencies requires a maturation period and support for their creation and startup. To provide that support, the proposed operation attaches priority to carrying out a reimbursable technical cooperation project prior to constructing the line, which includes the necessary strengthening components for the regional agencies, and for the development of market regulations and regional transmission, through protocols and regulations, accompanied by a training component. Once the planned headway has been made in the technical cooperation and its targets reached, a reasonable legal and institutional structure will exist for operating the market and implementing the project.
- 5.26 As for the institutional viability of the EPR, it will be developed gradually as progress is made in defining the details of its makeup and financing, as described in chapter IV. The necessary contractual provisions have been included to ensure that prior to releasing disbursements of the infrastructure loan, a report will be submitted to the Loan Committee demonstrating satisfactory progress in the institutional, corporate, and financial development of the EPR and its business plan.

2. Financial feasibility

- 5.27 The financial feasibility of the EPR requires the regulatory agency (CRIE) to develop and approve the methodology and basis for paying for the system and the way in which the rules will be applied to the market agents. It is also necessary for the countries, once they have ratified the treaty, to grant the EPR the respective concessions to carry out the project. A business plan that demonstrates its financial feasibility, on the above basis and the basis of the project's financial plan, is also required. **These steps have been established as conditions precedent to disbursements of the investment component, to ensure that they are implemented in a timely fashion.**
- 5.28 The methodological basis for determining the variable charge and charges for capacity and access to the interconnected grid are tasks

that will be performed in detail under the technical cooperation project.

- 5.29 The financial plan for the project and the EPR is based on the technological and economic definition set forth in this proposal of a single-circuit 230 Kv transmission line and its costs. For comparative purposes, the plan also considers the results of the economic evaluation of the most conservative of all the scenarios that include coordination of planning for the expansion of generating plants.
- 5.30 Based on these guidelines, the annual average level of operating income to cover operating and maintenance costs, debt service, and returns on the capital put up by the shareholders of 12% in nominal terms is about US\$22 million (1996). The present value of this annual income is less than the present value of the economic benefits generated more conservatively under coordination scenario 2. The present value of the benefits in that scenario would provide maximum equalized annual income of some US\$47 million, which would allow for a broad sensitivity margin. This fully justifies the project's financial feasibility. Considering that the grace period lasts until 2002, the annual economic benefits starting in 2003 would cover requirements in almost every year. In other words, even if the coordination conditions of conservative scenario 2 apply, it is still feasible for the market agents to general sufficient annual income for the EPR to cover its financial requirements. However, the financial viability of the EPR must be verified once agreements have been reached with the shareholders on its capitalization, the company's business plan has been defined, and the CRIE has established and approved the mechanisms and procedures for paying for the interconnected grid.

D. Environmental feasibility

- 5.31 The environmental report for this operation was approved by the Committee on Environmental and Social Impact at its February 4, 1997, meeting. The report contains a matrix of environmental conditions to be complied with prior to disbursement of the technical cooperation and investment loans.
- 5.32 In view of: (i) the results of the preliminary environmental assessments (regional EIAs); (ii) the process of reviewing and supplementing the environmental studies and detailed formulation of an environmental management plan which is a contractual clause under the technical cooperation loan; (iii) conditioning of the construction loan to compliance with the targets set for the technical cooperation stage; (iv) installed environmental capacity which will be boosted under the institutional strengthening component in the construction loan budget and as a contractual condition; and (v) the very nature of a project of this kind, which is of relatively low environmental impact, this program is considered feasible from the environmental standpoint.

E. Benefits and risks of the operation

5.33 This section summarizes the main benefits and risks of the operation.

1. Benefits

5.34 This project gives a decisive impetus to the electrical integration of Central America. The combination of institutional arrangements to develop a regional energy market and installation of sufficient transmission capacity to allow for a substantial increase in the level of exchanges will encourage a growing process of coordination and competition in the region which will lead to large economic benefits related to savings in operating and investment costs. The development of more open, competitive, and sophisticated market mechanisms and future coordination of large regional generating projects will make for progressive growth in the benefits of energy integration.

5.35 It is anticipated that Bank approval of the loan will be seen by the international community as sending a signal that will inspire confidence among private investors so that they undertake regional initiatives in electricity generation and distribution. Another benefit that is not quantified in detail in the project rationale is that national electricity transmission systems will be reinforced, bringing greater reliability and quality of supply, diminished losses, and accordingly lower costs at the national level. It is expected that a market of 35 million people with significant demand, and clear rules for the entry and competition of new players, will attract the necessary investments under the right conditions so that additions to generating capacity will materialize.

5.36 The economic benefits of this energy integration project include savings in consumption of petroleum products used in generating electricity. In addition to lowering electricity costs, this could help to lessen the region's exposure to international oil shocks and improve the terms of trade. Project savings will lead to significant changes in financial flows abroad, linked to the oil bill and also to the investments required for growth in the electric sector. The project also establishes a fresh source of financial flows among the countries of the region.

5.37 The project also has implications for Central American trade integration and policies for more open trade. The expected reduction in the cost of electricity service as a result of coordinated operation and system expansion will stimulate the Central American productive apparatus and intraregional trade. It will also contribute to the process of efficient structural adjustment in the economies and productive activities in light of the challenge of opening up to trade outside the region. The harmonization of fuel prices and taxes for power generation, the removal of taxes on regional trade in electricity, possible future harmonization of charges for the grid and throughout the region, development of

payment mechanisms that address past shortcomings in the guarantee and settlement systems applicable to regional trade in electricity, 11/ and the removal of other legal, economic, and financial barriers will boost the efficiency of the new regional energy market and will be encouraging precedents for comparable initiatives for liberalizing and promoting regional trade in other industries. As part of the technical cooperation program, solutions will be designed to surmount these barriers and attain the above objectives, and **conditionalities will be defined** for inclusion in the Bank's loan contracts.

2. Risks

- 5.38 The main risks of the operation are possible constraints on the development of the energy market as a result of leftover traditional market structures in national electric sectors, possible restrictions or disincentives for participation by new investors in the sector, and the potential barriers to regional trade mentioned above. If these liabilities materialize, the benefits of coordinated operation and expansion of electric systems under competitive conditions could be lessened. The conditions precedent to the first disbursement of the investment loan are intended to minimize these risks by requiring that an institutional structure to govern the regional system and a capital structure be established which are consistent with the gradual development of an increasingly open and competitive market.
- 5.39 One of the main risks lies in the lack of independence and business outlook among public electric utilities. Unless national electric industries are reformed and a new vision is developed regarding the role of the companies that remain in public hands, it will be very difficult to establish a competitive electricity market. One of the main challenges of this project is how to encourage an increasingly competitive regional market in the context of a joint ownership structure that includes public companies and new private companies.
- 5.40 To bring about electricity exchanges under this operation, a radical shift in approach will have to be taken to cost allocation and rate design, which must be based on economic efficiency criteria and not on politics. To be able to establish the REM and reap the project's benefits, the vision of the existing VIUs must be reformed. The conditions precedent to the first disbursement include compliance

11/ There have been problems in the past related to payments for electric power purchases in the region (Nicaragua's difficult experience is the best known). The development of guarantee and settlement mechanisms consistent with general arrangements for exchange rate liberalization will help to streamline this trade. At this time the World Bank is exploring the possible implementation of a guarantee system for energy transactions in the region.

with important targets related to the separation of accounting for the different business areas in the VIUs, the introduction of competitive elements, the elimination of cross subsidies (in the case of the VIUs), and efficient rate setting.

- 5.41 Another significant risk in making the REM operate successfully has to do with the heterogeneity of structures in the electric industry that will stem from the national reforms and the application of the principle of reciprocity established in the treaty. That principle could mean that the country with the market that is most tightly closed sets the pace, which would therefore miscarry the REM. The project team insisted on including the concept of nondiscrimination in the treaty. The conditions precedent to the first disbursement also call for approval of a treaty protocol to foster the business orientation of the EOR.
- 5.42 Given the possible constraints on the development of coordinated operation of the existing systems under competitive conditions, a further significant risk is that the market will be dominated by exchanges of energy and power from large new generating stations, while existing plants in the national systems continue to be protected from competition. The result could be an economically inefficient regional market with few participants and the potential for the establishment of dominant positions. It could even be questioned whether the region ought to establish any payment arrangements if the project's capacity and timing depended wholly on the entry into service of a few new generating projects, whose exports could drop after the early years as a result of growth in domestic demand, increasing the need to turn to high supplementary charges not related to the use of interconnection to cover the financial costs. Therefore the conditionality and Bank support relating to the development of a sustainable market based on the coordination of existing electricity systems, and the incorporation of all the new agents in it, are vital.

SUMMARY OF SPECIAL CONTRACTUAL CONDITIONS

Special conditions precedent to contract signing

- a. The EPR articles of incorporation are to specify, *inter alia*:
(1) that no EPR shareholder may own a direct or indirect interest in the regional electricity market (REM), as a generator or distributor of electricity, in excess of the percentage of installed capacity, as certified by the Regional Electric Interconnection Commission (CRIE), established by the latter to that end; (2) that the EPR is organized as a private corporation with a majority public interest, in which no shareholder, either directly or indirectly, owns more than 15% of the total capital stock of the company or of any class of voting shares; and (3) the mechanisms for protecting minority shareholders.
- b. A proposal and a plan for its implementation, approved by its board of directors, are to be presented on operation and maintenance of the SIEPAC grid so as to ensure application of the principles of transparency, neutrality and nondiscrimination in access to the grid by market agents.

Special conditions precedent to disbursement

Release of the first disbursement is to be subject to fulfillment, to the Loan Committee's satisfaction, of the following requirements in respect of the technical cooperation benchmarks for establishment and commencement of operations of the REM:

- a. The borrower has presented to the Bank:
 - (i) Evidence that the benchmarks set forth below in respect of coordinated operation have been met:
 - (A) Any barriers to further coordination of operations have been identified and a strategy designed to eliminate them gradually, including a transitional stage to make progress on coordinated operation, and a protocol has been formalized setting forth guidelines and steps to eliminate such barriers.
 - (B) Procedures and instruments (measurement, communications, simulation models) as required to implement coordinated operation of the electricity grids of all six participating countries have been identified, designed or acquired, and placed into operation.

- (C) The Electric Interconnection Committee (CIE) has been set up and is coordinating operation of the region's interconnected grids.
 - (D) Cumulative exchanges in respect of economic energy transactions over a period of 12 consecutive months between agents located in different countries are at least 450 GWh. At least 50% of these exchanges are to be based on agreements signed by the region's electricity companies.
- (ii) Evidence, including the applicable articles of incorporation, that the CRIE and the regional operating agency (EOR) have been created and provided with premises and regulations and placed in operation. In the case of the EOR, the proposed membership of the board of directors is also to be presented, to the Bank's satisfaction, to ensure that associations of generators, distributors, transmission companies, major consumers and governments are equitably represented, under a nonprofit company arrangement.
 - (iii) Evidence that the participating countries have approved and are applying the protocol or protocols on REM functioning and the introduction of competition, establishing all the principles of dispatch, spot market, bilateral contracts and technical guidelines for the REM. The aforesaid protocol(s) is also to include:
 - (A) A definition of the minimum percentages to be opened in the REM with time targets for supplying demand in each country, for a horizon of at least six years from the commencement of disbursements. The percentage for the first year of disbursements will be at least 12%. The countries will present evidence to the Bank that they have authorized their distributors and major consumers to tender regional participation in the acquisition of that amount.
 - (B) Evidence that separate accounts are being kept for each segment of activity, and that separate business units have been created in all Central American electricity companies structured as vertically integrated utilities (VIUs), and evidence that any cross subsidies between activities have been eliminated.
 - (iv) Evidence that the participating countries have approved and are applying the protocol of methodology and charges for connection and use of the grid, to ensure that the project is financially self-sustaining and that no cross

subsidies exist between countries, including the form of payment by agents for connection and use of the grid within a single country.

- (v) Evidence that the Regional Coordination and Transactions Center (CRCT) of the EOR has been legally set up.
- (vi) Designs and tender conditions for the CRCT, approved by the Bank and drawn up in accordance with REM operating protocols.
- (vii) Evidence that the following instruments or documents have been duly adopted and placed in effect:
 - (A) Regulations governing the grid concession granted to the borrower by the six participating countries, and regulations applicable to the REM on the acquisition of rights to the land where the project works are to be built, including the contracting procedure for operation and maintenance of the SIEPAC grid.
 - (B) Regulations governing regional generating projects.
 - (C) Regulations applicable to the REM on the procurement of goods and services.
- (viii) Evidence of approval by the CRIE of grid payment methodology and formulas and how they are to be applied to the REM agents, and procedures for calculating charges for grid connection and use.
- (ix) Evidence that the CRIE has: (A) issued an opinion and approved the initial maximum percentages of installed capacity for REM agents, certified by the CRIE, representing the maximum permissible level of its direct or indirect interests in the REM as a generator or distributor of electricity; and (B) undertaken to review such amounts yearly and establish the applicable regulations.

Special conditions for project execution

- a. Owing to the complexity of the project, and to ensure uniformity in all equipment, a **turnkey** contract is recommended for the design and construction of the transmission works, to be awarded under an international competitive bidding process as established in this clause, unless the parties agree otherwise based on technical and economic criteria.

- b. The borrower undertakes to present to the Bank, within two years after completion of grid construction, the results of the analysis of operations under all project components, comparing them to the study plans and designs. If adverse conditions or major deviations from initial design parameters are detected, the borrower is to specify any corrective measures and the program for their implementation.
- c. Meetings are to be held each year during project execution with participation by the Bank, the CRIE, the EOR, the EPR and any other participants required under the agenda agreed upon by the parties, to assess the project results obtained during the previous year based on the initial report and progress reports, and to review the programming of project activities for the following year. If any of the targets or actions has not been fulfilled, causes will be examined and the necessary corrective measures recommended, and the EPR will undertake to take steps to implement such recommendations during the following year.
- d. In addition to the annual evaluation meetings mentioned in subsection (c) above, progress made on execution will be assessed at the end of the second year, as well as proposals derived from project-financed studies and mechanisms proposed to ensure the project's self-sustainability.
- e. Within a period of 12 months, the borrower is to present a preliminary version of the national environmental impact assessments (EIAs) submitted to the competent environmental authorities for review and to the general public for discussion and comments.
- f. Within a period of 18 months, the borrower is to present final versions of the national EIAs, including the applicable environmental management plans. The latter are to contain at least the following components: (i) plans for creation and/or consolidation of environmental management capacity of electricity agencies at the national level to monitor the SIEPAC project; (ii) plans to mitigate direct impact; (iii) plans to mitigate indirect impact and impact on protected or environmentally fragile areas; (iv) a contingency and emergency plan; (v) relocation and resettlement plans when necessary; and (vi) an environmental monitoring plan covering the construction and operation stage.

CENTRAL AMERICAN ELECTRIC INTERCONNECTION SYSTEM (SIEPAC)
ESTABLISHMENT OF A REGIONAL ENERGY MARKET TO JUSTIFY CONSTRUCTION OF SIEPAC

LOGICAL FRAMEWORK

	Indicators	Means of verification/institution or individual responsible for verification	Main assumption
the creation, organization, and a regional energy market (REM) in ca. To establish the minimum necessary for development of that mit the decision to be reached to the construction of SIEPAC.	Information demonstrating progress in the development of the REM. Quantitative and qualitative information, including statistics on operation of the electric systems, description of methods and procedures, and physical measurements of indicators of the extent to which the systems are coordinated.	Information showing compliance with the conditions of the loan for constructing SIEPAC, furnished by the executing agency of the regional technical cooperation loan to support establishment of the and by the regional agencies to be created.	Execution of regional technical cooperation startup of is the first priority activity a prerequisite for developing
in the development of the regional of Central America have made limited ng opportunities to coordinate their ems. The largest past exchanges countries of the region were the ess hydroelectric power in the early he construction of large projects 1 and El Cajón. Although planning ort coordination of the operation of systems were transferred to the the PARSEICA program, they have not . There are 230 links between El Salvador in the north, and aragua, Costa Rica, and Panama in the re to take advantage of the for electric coordination is the existence of institutional, ic, and financial barriers that must through the technical cooperation to start up the REM.	<p>There are four general categories of progress indicators in Central America for the establishment, organization, and operation of the:</p> <ol style="list-style-type: none"> Indicators for development of the rules, procedures, and methods needed from the physical and commercial standpoints to start up and eliminate legal, economic and financial barriers; Indicators of the establishment of the institutions needed to operate and regulate the; Indicators of competency, of efficient development of the REM, and of electricity sectors and national utilities; Indicators of development of the company to operate the grid, the grid proprietor (EPR), the borrower of funds to build the SIEPAC line. 	The executing agency will submit information to the Bank (supplemented by information presented by regional agencies to operate, regulate and develop the grid) to verify each category of progress indicators through regular reports and a final justification of compliance with the conditions for the first disbursement of the SIEPAC infrastructure loan. The contract for that loan will specify the Bank's right to determine whether the conditions have been complied with satisfactorily in form and substance.	The execution of the technical cooperation will have to demonstrate in each of categories satisfaction Bank's Loan Committee.

	Indicators	Means of verification/institution or individual responsible for verification	Main assumption
<p>in developing rules, procedures and for initiating coordinated operation of eliminating legal, economic and barriers.</p> <p>on lifting barriers:</p> <p>monization of prices and taxes on used in generating electricity;</p> <p>mination of taxes on regional electricity transfers;</p> <p>velopment of payment mechanisms to overcome shortcomings in security and aring systems for regional trade in electricity;</p> <p>axation of requirements for ernment permits to purchase fuel, eign exchange access, etc. limiting changes between state enterprises.</p> <p>ntation of new procedures and cations systems between national h centers and new systems for g exchanges between the countries, culation tools.</p> <p>ation by the electric companies and of the temporary operations center porary interconnection committee to short-term coordination of ons prior to establishing the l operator (EOR) and regional c interconnection commission (CRIE).</p> <p>shment of rules for the certification et agents.</p> <p>shment of rules for sanctioning agents and for dispute settlement.</p> <p>zed plans for establishing generating nsmission costs in all the countries region as the basis for developing ional dispatch system.</p> <p>res for regional energy dispatching n audited costs or price offers for ts and settlements.</p>	<p>Prior to first loan disbursement, present to the Loan Committee:</p> <ol style="list-style-type: none"> 1. Evidence that legal, economic and financial barriers to further coordination have been identified, and that a protocol setting forth rules and measures to eliminate them has been formalized. 2. Evidence that procedures and tools (metering, communications, simulation models) have been identified, designed, acquired and placed into operation as needed to implement coordinated operation of the electricity grids of the six participating countries. 3. Evidence that the temporary operations center and the temporary interconnection committee have been created. 4. Quantitative information showing changes in physical exchanges between the region's countries, specifically, that cumulative exchanges in respect of transactions in economic energy of at least 450 Gwh have taken place between agents located in different countries over a period of 12 consecutive months. At least 50% of these exchanges are to have been based on agreements between the region's electricity utilities. 	<p>Progress and final reports by the executing agency of the regional technical cooperation loan to demonstrate compliance with specific conditions in these areas.</p>	<p>Development rules, methods and reforms critical for achieving the goals necessary for launching the regional coordination process will also help establish procedures for the operation of financial, commercial of REM institution and arrangements</p>

	Indicators	Means of verification/institution or individual responsible for verification	Main assu
to coordinate the temporary connection committee (and subsequently) and national dispatch centers; al procedures for dispatching by ors and hydrothermal coordination; l arrangements for maintaining margins and the reliability, ity, and quality of electric service, coordinated operations; and cy/power regulation. ment of a mechanism for remunerating ents in the interconnected grid, n variable charges and charges for ed capacity and availability, ble with charges for national grids.			

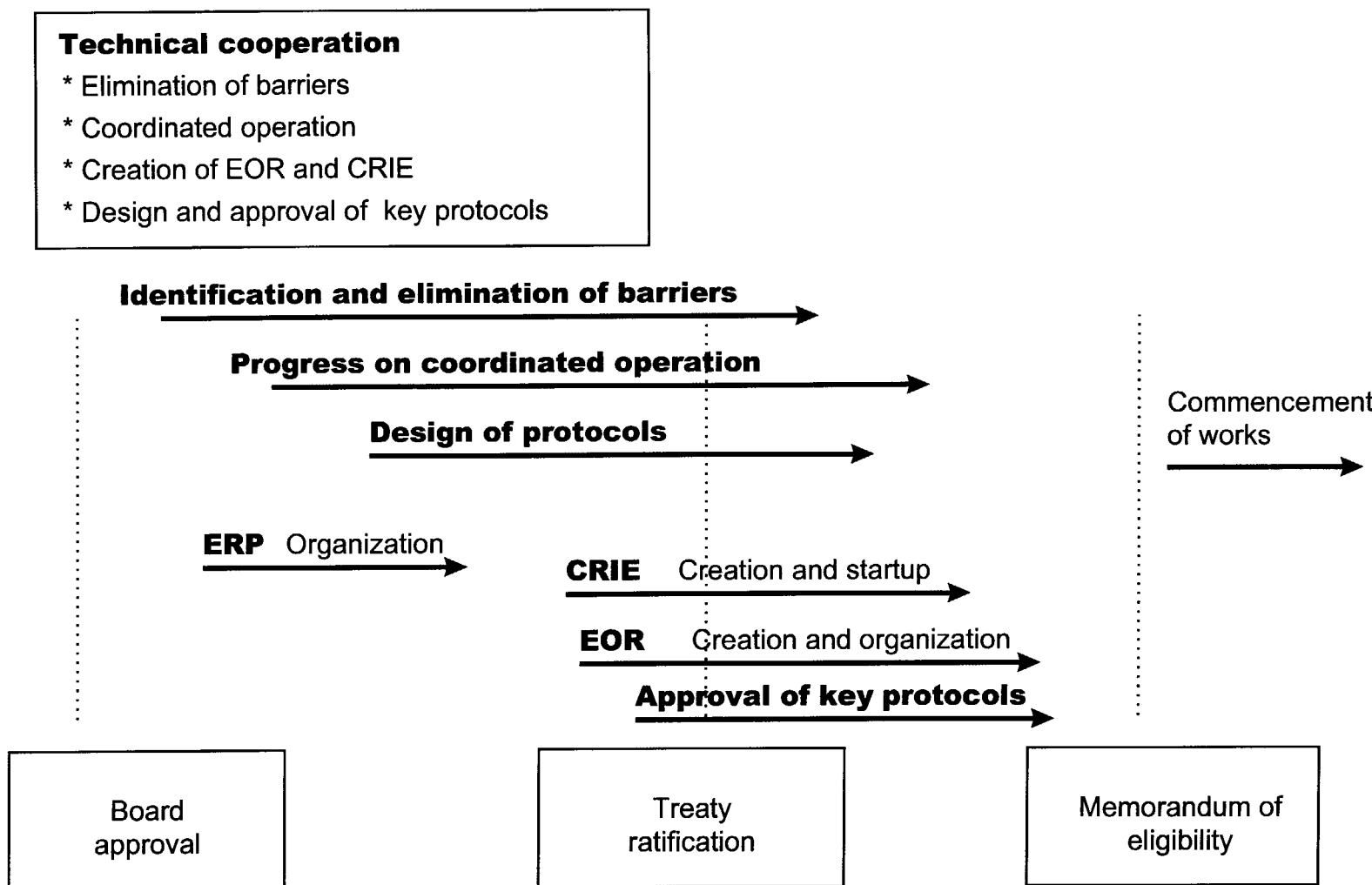
	Indicators	Means of verification/institution or individual responsible for verification	Main assumption
<p>ment of institutions to operate and the REM</p> <p>ment of the articles of incorporation EOR; membership and appointment of board of directors; organization, functions, relationship with national centers; location of the EOR and regional coordination and transactions (CRIE); establishment of the EOR six months after ratification of the Central American Free Trade Agreement (the treaty).</p> <p>ment of infrastructure for regional planning and indicative planning and legal and commercial information systems (hardware and software); training for EOR employees.</p> <p>ment of the articles of incorporation CRIE: appointment of the board of directors, organization, financing, functions, powers to curb monopolies and foster competition; relations with national regulatory agencies; location; procedures for public hearings. Establishment of the EOR six months after the treaty is signed.</p> <p>ing for CRIE employees and attention to infrastructural and information systems</p>	<p>Prior to first loan disbursement, present to the Loan Committee:</p> <ol style="list-style-type: none"> 1. Evidence that the legislature of each of the participating countries has ratified the treaty signed by the countries on December 29, 1996, and that the appropriate instruments have been deposited with the Secretary General of the Central American Integration system (SICA). 2. Evidence, including the appropriate articles of incorporation, that the EOR and CRIE have been created, provided with premises and regulations, and placed in operation. In the case of the EOR, a board membership plan is also to be presented, satisfactory to the Bank, to ensure that it includes equitable representation by associations of generators, distributors, transmission companies, major consumers and governments, in the form of a nonprofit company. 3. Evidence that the CRCT of SIEPAC has been legally created, and presentation of designs and tender conditions in accordance with the protocols governing REM operation, as described below. 	<p>Progress reports (supplemented by information from the EOR and CRIE) and final reports by the executing agency of the regional technical cooperation loan to demonstrate compliance with specific conditions in these areas.</p>	<p>Appropriate and established the EOR, the CRIE and the CRCT as keys to the success of the REM.</p>

	Indicators	Means of verification/institution or individual responsible for verification	Main assumption
<p>t of the REM and competition, and n reform of electricity sectors and ilities</p> <p>s on opening up direct energy ting opportunities in the regional for distributors and major consumers.</p> <p>shment of systems to separate s for generation, transmission and ution in integrated electric es.</p> <p>entation of arrangements to lize electric rates based on economic d elimination of cross subsidies.</p> <p>s on harmonizing charges applicable lectricity grids in the region.</p> <p>s on business reorientation or tization of electric utilities.</p> <p>and implementation of structural reforms to separate transmission, ion and distribution activities.</p>	<p>Prior to first loan disbursement, present to Loan Committee:</p> <ol style="list-style-type: none"> 1. Evidence that the participating countries have approved and are applying the protocol or protocols on REM functioning, and introduction elements of competition including all principles of dispatch, spot market, bilateral agreements and REM technical guidelines. Protocol(s) also to include: <ol style="list-style-type: none"> (a) A definition of the minimum percentages to open in the REM with time targets for supplying demand in each country, for a horizon of at least six years from the commencement of disbursements for the SIEPAC line. The percentage for the first year of disbursements will be at least 12%. The countries will authorize their distributors and major consumers to bid on such percentages in the region. (b) Evidence that separate accounts are being kept for each segment of activity, and that separate business units have been created in all Central American electric utilities structured as vertically integrated utilities (VIUs), and evidence that any cross subsidies between activities have been eliminated. 2. Evidence that the countries in the region have approved and are applying the protocol establishing methodology and charges for connection and use of the grid to ensure that the SIEPAC line is financially self-sustaining and that no cross subsidies exist between countries, including payment by agents for connection and use of the grid within a single country. 3. Regulations governing regional generating projects. 	<p>Progress reports and final report by CTR executing agency, demonstrating compliance with conditionality in these areas.</p>	<p>Certain minimum progress will be required on developing competition within the region and on reforming electricity and electric utilities, as a precedent to disbursement of loan for infrastructure. Subsequent development of all these activities will contribute to the REM's competitive development.</p>

	Indicators	Means of verification/institution or individual responsible for verification	Main assumption
<p>t of the company to develop the grid</p> <p>ment of financial and administrative re of EPR, borrower of funds to build PAC grid, initial and future share- structure, types of shares, rules ng creation of new shares and sale of voting rights of shareholders and f directors, EPR operating regula- concession mechanisms for some or all grid construction activities, l operation and maintenance, progress sferring EPR shares to transmission es or other public enterprises, ment procedures for goods and s under international competitive</p>	<p>Prior to signing of contracts for SIEPAC grid, present to Loan Committee:</p> <ol style="list-style-type: none"> 1. Articles of incorporation of borrower (legal representation) specifying that no shareholder may hold a direct or indirect interest in the REM, as a generator or distributor, in excess of the percentage of installed capacity approved for it by CRIE; that the EPR is organized as a private corporation with a majority public interest, in which no shareholder, either directly or indirectly, holds more than a 15% share of the total capital stock of the company or of any class of voting shares; and the mechanisms for protecting minority shareholders. 2. A proposal and a plan for its implementation are to be presented on operation and maintenance of the SIEPAC grid (transfer of EPR shares to transmission companies or contracting of operation and maintenance, or other measures) so as to ensure application of the principles of transparency, neutrality and nondiscrimination in access to the grid by market agents. <p>Prior to first disbursement of loan for the grid, present to Loan Committee:</p> <ol style="list-style-type: none"> 1. Evidence that CRIE has set initial maximum percentages for REM agents. 2. Granting by each country of concession to EPR for grid construction and operation and corresponding provisions. 3. Evidence defining, to the Bank's satisfaction, the EPR administrative structure, demonstrating financial viability and presenting a business plan with operating and financial efficiency parameters and detailing mechanisms for charges. 4. Evidence of CRIE approval of basis of grid remuneration and procedures to calculate charges for connection and use. 	<p>Evidence presented by EPR and progress reports and final report by CTR executing agency demonstrating compliance with conditionality in these areas.</p>	<p>Progress on development ensure nondiscrimi access to S grid and to electricity</p>

	Indicators	Means of verification/institution or individual responsible for verification	Main assu
	5. Provisions governing acquisition by EPR of rights to land for construction of works. 6. Provisions applicable to EPR in procurement of goods and services.		

Sequencing and benchmarks



SUPPORT FOR CENTRAL AMERICAN ELECTRIC INTERCONNECTION SYSTEM

(CA-0007)
(TC-97-02-18-6)

EXECUTIVE SUMMARY

BORROWER: Consejo de Electrificación de América Central (CEAC)

GUARANTOR: The six countries of Central America: Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama.

EXECUTING AGENCY: CEAC

FINANCING:

IDB: Loan	US\$ 9.9 million (OC)
IDB: Nonreimbursable	US\$ 5.0 million (FSO)
Local counterpart funding:	<u>US\$ 1.5 million</u>
Total:	US\$16.4 million

FINANCIAL TERMS AND CONDITIONS REIMBURSABLE TC:

IDB: Ordinary capital	US\$ 9.9 million
Amortization period:	25 years
Disbursement period:	5 years
Interest rate:	Variable
Inspection and supervision:	1%
Credit fee:	0.75%
Currency:	U.S. dollars, under the Single-Currency Facility

FINANCIAL TERMS AND CONDITIONS NONREIMBURSABLE TC:

Execution period:	36 months
Disbursement period:	42 months

OBJECTIVES: The objective of the technical cooperation is to support the development and consolidation of a regional electricity market (REM) for Central America by setting up the appropriate legal mechanisms, institutions and techniques and promoting private-sector participation, particularly in developing additions to generation.

DESCRIPTION: The operation has been structured for execution in two stages: (A) The first stage, covering the short term, will essentially seek coordinated operation of national electricity systems, involving the elimination of barriers and the creation of a transitional

regional agency to carry out coordinated operation of the regional electricity system and the installation of methodologies and equipment. This stage encompasses the following components: (i) general advisory assistance during organization of the REM and SIEPAC, (ii) coordinated operation, (iii) production and transport costs, (iv) payment mechanism for transfers, and (v) training and information seminars; (B) The second stage covers a series of activities in support of the creation of regional market organizations, especially the regional operating agency (EOR) and the regional commission on electric interconnection (CRIE), and design and approval by the governments of key protocols for REM functioning. This stage includes the following components: (vi) organization of economic operations: coordinated operation and dispatch methods: EOR; (vii) market regulation: CRIE; (viii) regional coordination and transactions center; and (ix) advisory assistance on environmental issues.

**ENVIRONMENTAL
CLASSIFICATION:**

The Committee on Environment and Social Impact, at its meeting of February 4, 1997, approved the environmental brief.

BENEFITS:

This operation will help effect an orderly, gradual and effective transition from a system of quasi-independent markets with no significant commercial exchanges to a regional market with a sufficient degree of interconnection to exchange large amounts of energy. Also to be placed in operation in the short term are those commercial transactions which are feasible using current transmission resources, in order to evolve toward the integrated regional market once the SIEPAC interconnection line is in service.

RISKS:

The main risks of the operation are possible constraints on the development of the energy market as a result of the survival of traditional market structures in national electric sectors, a lack of business orientation on the part of public enterprises, possible restrictions or disincentives affecting participation by new investors in the sector, and potential barriers to regional trade. If these liabilities materialize, the benefits of coordinated operation and expansion of electric systems under competitive conditions could be lessened. However, these risks are mitigated by separating accounts by segment of activity undertaken by those utilities that remain vertically integrated, subject to audits by the regional regulatory agency,

to avoid cost transfers between activity segments, as well as the percentages of demand that distribution companies and major consumers bid on competitively in the regional market, progress on implementing reforms in national electricity sectors, and the elimination of legal, economic and financial barriers to exchanges between countries.

**THE BANK'S
COUNTRY STRATEGY:**

The Bank's mandate under its Eighth General Increase in Resources accords priority to modernization of the public sector and integration. The regional programming paper for Central America (RP-CA) establishes closer subregional integration as a key objective. To attain it, greater intraregional free trade and an economic area with harmonized trade legislation and regulatory frameworks are necessary. The proposed project is consistent with the mandates for the region and the integration strategy.

**SPECIAL
CONTRACTUAL
CONDITIONS:**

Prior to disbursement of the technical-cooperation funds, evidence will be required that:

- a. The borrower has presented the agreements signed with each of the electric utilities in the six countries participating in the project that are CEAC members, on the use of savings derived from coordinated operation in repaying the loan and the commitment of each of those companies to contribute, in a timely manner, the additional resources required for project execution;
- b. The borrower has set up the steering group composed of representatives of each country's energy ministry, economic authorities, and electric utilities; and from the programming and evaluation committee made up of two government-appointed representatives from each country's electricity sector and representatives of the Bank; and
- c. An action plan has been developed with the appropriate budget for the activities required to finalize environmental studies for each country and to implement environmental management and monitoring capacity at the REM level.

Special conditions for execution of the technical cooperation program

(a) Within six months after the effective date of the technical cooperation agreement, the borrower is to

present a plan for contracting and execution of a photogrammetric survey of critical points in the line according to national plans, and of a videograph of the entire interconnection line and connections;

(b) Once the CRIE and EOR have been set up, the participating countries are to establish a protocol including, *inter alia*, a mechanism for levying a regulatory surcharge on market agents to make available funds necessary to repay the debt to the Bank. Also, the executing agency is to present to the Bank the payment agreements signed with the CRIE and EOR.

(c) The semiannual reports on project execution are to include an evaluation of compliance with the work schedule agreed upon with the Bank. Based on these reports, the executing agency and the Bank will agree upon any needed adjustments to the schedule and the executing agency will take steps as necessary to comply with the new schedule.

I. BACKGROUND AND OBJECTIVES

- 1.1 One of the major objectives of the SIEPAC project is to support the creation and gradual consolidation of a regional electricity market (REM) by setting up the appropriate legal mechanisms, institutions and techniques and promoting private-sector participation, particularly in developing additional generating capacity. Given the qualitative leap involved in creating a regional market for electricity and the newness of the phenomenon of competition in the electricity industry world-wide, the project team has recommended that the Bank provide determined support to the countries in creating and consolidating the REM in Central America under a technical cooperation program.
- 1.2 The general objective of the technical-cooperation program is based on the need to ensure proper use of the proposed interconnection line by developing a regional energy market. The effectiveness of that market depends chiefly on institutional factors, some of which are dealt with in the treaty but will require further development before they can be included in regulatory agreements to ensure functioning of the market.
- 1.3 The institutional difficulties faced by the market come largely from lack of experience, even on the world level, in operating markets such as the one proposed for the Central American interconnection. Therefore the basic approach is to implement, in the short term, those commercial transactions that are feasible with existing transmission resources, and then to move toward an integrated regional market, once the interconnection line built under SIEPAC comes into service.

II. PROGRAM DESCRIPTION

- 2.1 In order to achieve the proposed objectives, the operation includes nine components:
 - a. General advisory services during the SIEPAC project
 - b. Coordinated operation: temporary operating center
 - c. Production and transmission costs
 - d. Payment mechanism for transfers
 - e. Training and information seminars

- f. Organization of economic operation: coordinated operation and dispatch methods: Ente Operador Regional [regional operating agency] (EOR)
 - g. Market regulation: Comisión Regional de Interconexión Eléctrica (CRIE)
 - h. Centro Regional de Coordinación y Transacciones (CRCT)
 - i. Advisory services on environmental issues
- 2.2 The technical cooperation program is designed to carry out an orderly, gradual, and efficient transition from a system of quasi-independent markets with no significant commercial exchanges to a regional market with sufficient interconnection capacity to transfer large amounts of power. The following targets are intended to identify project progress and will serve to measure compliance with contractual commitments for loan disbursements:
- a. Identification and elimination of legal, institutional, administrative and technical barriers to achieving savings derived from coordinated operations;
 - b. Identification of feasibility, type, and size of economic exchanges under existing interconnections;
 - c. Organization of a temporary operations center and an electric interconnection committee;
 - d. Start of coordinated operation of the electric systems and materialization of benefits from interconnection equivalent to transactions between electricity companies in the form of exchanges of at least a cumulative 450 GWh in 12 consecutive months;
 - e. Entry into effect of the framework treaty for the regional energy market;
 - f. Organization of the regulatory agency (CRIE);
 - g. Organization of the EOR and the CRCT;
 - h. Design and approval of basic REM protocols and of charges for connection and use of the SIEPAC grid;
 - i. Operation of the regional interconnected system.
- 2.3 Since an electricity market cannot emerge spontaneously, the technical cooperation program has been designed in stages. The first stage consists of making concrete and measurable progress on coordinated operation. This stage of technical cooperation

includes carrying out activities to eliminate barriers, operations planning to more accurately quantify savings, their origins, and measures needed for them to materialize. The second stage calls for a series of activities to strengthen regional market structures, in particular the EOR and the CRIE, and to reinforce coordinated operations.

A. Stage I: Short term

2.4 The main objectives in this stage are to attain coordinated operation of the national electric systems, which requires the establishment of a temporary regional agency for coordinated operation of the regional electric grid.

2.5 It includes a series of actions to permit immediate introduction of coordinated operation of the region's electric systems, through provisional operating regulations, assignment of the task of coordinating operation of the grid to one of the national dispatch centers, establishment of a payment mechanism for transactions, and the startup of the electric interconnection committee (CIE).

1. Component 1. General advisory services during organization of SIEPAC

2.6 **Objective.** This activity will involve high-level advisory services during the entire process of organizing SIEPAC's commercial and regulatory activities. A specialized consulting firm with experience in structuring competitive electricity markets would support the comprehensive design of activities, including quantifying counterpart human resources and preparing terms of reference for all subsequent activities. A steering committee (SC), a programming and evaluation committee (PEC), and an executing unit, composed of representatives of the different countries, will be responsible for those activities, with ongoing advisory services provided by a small panel of experts whose function will be to guide the decisions to be made with regard to regulation, organization of dispatch and operations, and in general the structuring of the REM.

2.7 In addition to the small core of permanent consultants, a number of consultants will be hired for specific tasks, to provide proposals and specialized information for the executing unit and for the SC and PEC. This group will also advise on organization of the EPR, to ensure that the decisions taken for its establishment do not turn into future obstacles to materialization of the expected benefits of SIEPAC.

2.8 The proposed advisory group (firm and panel) will have the following functions:

- a. To provide support for the decisions of the steering committee and the executing unit, based on the experience of other countries or international interconnections. In particular, the specialized firm will prepare a comprehensive strategy paper for the REM, taking prevailing conditions and constraints into account. This paper is to consider alternative models for REM development and the introduction of competition given the market structures that could materialize in each country, especially future development of integrated grids. The problem of dominant market positions and how to mitigate them is to be examined. The firm will also design a specific proposal as to REM governance guaranteeing the principles of transparency, neutrality and nondiscrimination in access to the SIEPAC grid by REM agents. The firm is to analyze alternate general arrangements for organizing regional dispatch based on audited costs or price offers, to organize the long-term contracting system and to effect the settlement of accounts. This analysis is to take into account the efficiency incentives generated by every possible market model and the degree to which savings are passed on to final consumers.
 - b. To establish targets for coordination of commercial interchanges in the short term.
 - c. To design detailed terms of reference for the consulting activities necessary to organize the market.
 - d. To advise the management groups on evaluating proposals and awarding contracts.
 - e. To advise the executing unit on terms of reference for the consulting services needed for the control center and the communications systems.
 - f. To advise the executing unit and the PEC on the establishment of a training plan tailored to progress in the project, which will cover members of the group and personnel in the different agencies in the countries (dispatch staff and officials from regulatory agencies).
- 2.9 **Duration and cost.** The proposed advisory services should begin as soon as possible after the countries have appointed their representatives to the supervisory groups and the executing unit has been established. The duration will be five years in order to assist the groups throughout the entire project. The services will be provided by a specialized firm and individual consultants at a rate of approximately 150 person/months including the advisory group, at an estimated cost of US\$1 million, and about 20 person/months for specific advisory services, in addition to the costs of the technical director and two experts assigned to the executing unit,

at an estimated cost of US\$0.8 million, for a total of about US\$1.8 million.

2. Component 2. Coordinated operation

- 2.10 **Objective.** Preparation of a series of basic rules to permit coordinated operation of the electric systems and an increase in the volume of commercial transactions in electric power among the countries, making use of existing interconnections, possibly with strengthening of the means of communications, metering, and control.
- 2.11 The activities are:
- a. Establishment of preliminary rules for operation and management of the regional energy market in 1998.
 - b. Selection of a mathematical model for operational planning of the region's electric systems in the short, medium and long term (five years) under different coordination scenarios. The model will allow for optimization of the entire generating pool (thermal and hydraulic plants) and determination of hourly and semiannual prices at different nodes.
 - c. Development of procedures for designing and approving dispatch programming over the short, medium and long term (five years) based on information on the availability of generating units, maintenance programs for generators and transmission lines, operating costs of the generators, and other variables.
 - d. Establishment of measures to ensure the reliability of the system: (i) automatic load disconnection plan; (ii) distribution of rolling reserve; (iii) protection systems; and (iv) evaluation of expansion plans to detect possible critical points in the system.
 - e. Rules for (i) operation, selection, load, control, protection, and supervision of the common installations for transmission, transformation, and operation; (ii) approval of the maintenance plans of power stations and transmission lines; (iii) equitable distribution of the costs and benefits of coordinated operation; (iv) to ensure free access to transmission systems and power circulation in regional and national grids.
 - f. Evaluation of national dispatch centers from the standpoints of equipment and personnel capacity and experience in order to select one to act as the temporary operations center.

- g. Development of rules for defining the relations between the temporary operations center and the national load dispatch centers for coordinated operation of the system.
 - h. Identification of the strengthening required for all supervisory control and data acquisition (SCADA) installations to enable the temporary operations center and the national dispatch centers to:
 - (i) receive information on the output generated by each power plant in the region;
 - (ii) have access to fast and reliable communications between the operators of the electric systems; and
 - (iii) take action rapidly for coordinated operations.
 - i. Identification of reporting requirements, frequency, and form.
 - j. Preparation of technical specifications for communications and computer equipment to improve communications, operations, and data processing at the operations centers.
 - k. Provision of assistance in evaluating and awarding bids, certification of factory and field tests of equipment, and startup.
 - l. Establishment of procedures to facilitate the transmission of written information via the Internet, telex, facsimile, or an exclusive communications system via satellite, carrier waves, or optic fiber.
- 2.12 **Duration and cost.** The project will be executed by a consulting company and will last for 12 months at a cost of US\$800,000, including the specified mathematical models. Some US\$2.5 million have been included for the procurement of metering, communications, and control equipment to allow for interaction between the temporary operations center and the national dispatch centers. Regional equipment will be transferred to the CRCT of the EOR when it becomes operational.
3. Component 3. Production and transmission costs
- 2.13 **Objective.** To develop a common procedure or methodology for the countries to determine their production and transmission costs, and to set the cost of tolls for the use and availability of regional and national transmission systems.
- 2.14 **Activities to be carried out:**
- a. Methodology for determining the cost of operating the power stations and transmission lines.
 - b. Methodology for assigning the opportunity cost of the water used by hydroelectric stations, considering alternative uses,

and including the selection and supply of a mathematical model to perform the calculations.

- c. Methodology for calculating the node values, including the selection and supply of a mathematical model to perform the calculations.
 - d. Analysis of fuel taxes in the operating costs of power stations and their impact on power purchase and sale transactions.
 - e. Definition of a common method for calculating tolls for the use of existing regional and national grids, including the selection of a mathematical model to perform the calculations.
 - f. Methodology for calculating power losses in international exchanges, including selection of the corresponding mathematical model.
 - g. Methodology for measuring the efficiency of power plants.
 - h. Specifications for the equipment needed to measure efficiency.
 - i. Training in the use of metering equipment, through measurements in two countries.
- 2.15 **Duration and cost.** This component will be carried out by a specialized consulting firm and will last for 12 months, at an estimated cost of US\$790,000, including US\$100,000 for the mathematical models and about US\$150,000 for equipment to measure power plant efficiency.

4. Component 4. Payment mechanism for transfers

- 2.16 **Objective.** Establishment of a mechanism to pay for transfers of power which will assure the companies that they will receive more expeditious payment for their sales.
- 2.17 The following actions are planned:
- a. Specifications for a transactions clearinghouse to be established in the temporary operations center coordinating operations by the region's electricity systems.
 - b. Design and implementation of an automated system for recording and keeping the accounts of transactions between agents or companies for the purchase and sale of power.
 - c. Design and implementation of a billing system for power purchasers and a payment system for suppliers.

- d. Establishment of sanctions for nonpayment of power purchased.
 - e. Financial requirements for settling transactions, including a study of the feasibility of establishing a fund administered by a regional banking institution to pay vendors when instructed by the temporary operations center. The possibility will be studied of establishing the initial fund with a loan granted to the countries in equal parts by a multilateral institution.
- 2.18 **Duration and cost.** The study will be performed by individual consultants and will require six person/months at a cost of US\$110,000. The study should begin immediately and be executed over a maximum term of nine months.

5. Component 5. Training

- 2.19 **Objective.** To train personnel from the region in the different activities required for the operation of SIEPAC and promote a knowledge of project scope and importance among political and economic decision-making levels in the countries (legislatures and private sector):
- Information seminars
 - Dispatching and operating methods
 - Regulation
 - Operation of the control center and training for operators
 - Organization of competitive electricity markets
- 2.20 **Training concept.** Since this component covers virtually all project activities, it will be coordinated by the executing unit, with support in its design by the consultants (component 1). Training in specific areas will be the responsibility of the different project executing agencies.
- a. Dispatch and operation: The training will be the responsibility of the consultants carrying out component 2 and will be supplemented by seminars and visits to organizations with similar market structures.
 - b. Regulation: Will be organized as above, under the responsibility of the consultants in charge of this area. It will include visits to regulatory agencies in other regions.
 - c. Control center: Software training is the responsibility of the consultants in charge of producing the specifications for the control center, and training for dispatchers will be included as an item in the contracts for the supply of hardware and software.

- 2.21 **Duration and cost.** The training program will be implemented over three years. Training will be provided on site and abroad and will require some 150 person/months at a cost of US\$1 million.

B. Stage II. Medium and long term

- 2.22 The second stage includes a series of activities to strengthen regional market structures, particularly the EOR and the CRIE, and to entrench coordinated operation. This stage will begin after components 2, 3, 4 (actions 1 to 6), and 5 of stage 1 have been completed, by which time the treaty should have entered into effect.

1. Component 6. Organization of economic operation (coordinated operation and dispatch)

- 2.23 **Objective.** The purpose of this activity is to identify principles and design a procedure for minimum-cost operation of SIEPAC, and is targeted chiefly to the EOR.
- 2.24 The component requires close coordination with the market regulation component. The two activities will be carried out in parallel, with periods of greater and lesser intensity as the different regulatory procedures are designed.
- 2.25 The following tasks are planned for this activity:
- a. Dispatch procedures: Analysis of suitable alternatives for SIEPAC; evaluation of the advantages and disadvantages of the different alternatives in terms of achieving economic operation, taking account of experience in coordinated operation.
 - b. Design of contracts and startup of exchanges between electric systems under bilateral contracts between agents in different countries.
 - c. Review of operational planning models in the short, medium and long term (5 years) for the region's electric systems, and recommendations on necessary improvements to adapt them to the new market conditions.
 - d. Identification of models for coordinated planning.
 - e. Volume, allocation, and initial contract prices.
 - f. In accordance with dispatch procedures, a review and updating of the common procedure for calculating tolls for the use of regional and national transmission grids.

- g. Information requirements for the proposed alternatives.
 - h. Review and updating of procedures for the settlement of transactions in the system, based on the experience obtained using the procedure established in component 4.
 - i. Review and updating of financial requirements for settling transactions.
 - j. Organization of the EOR: staffing, regulations, obligations, which will also include the specifications for the permanent transaction control and clearing centers.
 - k. Design of transmission standards.
 - l. Implementation plan and transitional stages.
 - m. General design of the pool formed by the interconnection, in conjunction with the economic operation component.
 - n. Methods of coordinating expansion.
- 2.26 **Duration and cost.** This activity will be carried out by a consulting firm and will last for about one year, as a continuation to component 2 of stage 1. It will coincide with the establishment of regulations and advisory services for the regulatory agency, and will require some 80 person/months at a cost of US\$800,000.
2. Component 7. CRIE and market regulation
- 2.27 **Objectives:** (i) To start up the CRIE, based on the experience gained in stage 1; (ii) to define the scope of the regulations required to ensure that the generating market will be competitive under an international arrangement such as SIEPAC; and (iii) to define mechanisms for coordination on the planning level in order to reap the benefits of interconnection linked to long-term investment savings.
- 2.28 The actions to attain the above objectives include:
- a. Plan of the regulatory institution; staffing, regulations, and obligations.
 - b. Identification of regulatory controls.
 - c. Articles of association. Government. Members of the council.
 - d. Organization and rules. Staff. Internal procedures.
 - e. Regulatory powers. Scope. Mechanisms for introducing and amending regulations.

- f. Plan to establish the CRIE.
 - g. Compatibility of the domestic regulations of the interconnected countries with the regulatory authority of the CRIE.
 - h. Information requirements and systems for regulation.
 - i. Regulatory implementation plan.
 - j. Advisory services for preparing regulatory statutes.
- 2.29 **Duration and cost.** This component will be carried out by individual consultants in parallel to the economic operation component and will last for about two years. Depending on the complexity of the regulatory system, some 80 person/months will be required, costing an estimated US\$900,000.
3. Component 8. Regional coordination and transactions center
- 2.30 **Objective.** This component of the technical-cooperation program will produce procurement and installation specifications for a control center to coordinate operations and settle SIEPAC's commercial transactions. It will be targeted to assistance in the final stage of the system and does not include specifications for initial equipment, which will be part of component 2.
- 2.31 The activities planned under this component are:
- a. Identification of information requirements on the basis of the dispatch procedures designed under component 6.
 - b. Identification of coordination procedures and equipment to interact with the national control centers.
 - c. Identification of computer requirements for the system.
 - d. Preparation of specifications for the CRCT, which will include communications and computer equipment and data processing programs.
 - e. Preparation of the bid documents, including advisory services for the steering committee and the EOR regarding bid evaluation, factory and field tests of equipment, and startup and initial operation.
 - f. Procurement of equipment and physical installations for the CRCT.

2.32 **Duration and cost.** This component is to be carried out by a consulting firm. It is expected to require three years, from 80 to 100 person/months, at a cost of US\$800,000.

2.33 **Equipment.** A tentative budget of US\$3.5 million has been established for the startup of the CRCT, which would include physical infrastructure, computer and communications equipment, and debugged and expanded software based on the software developed in stage I. The budget for the CRCT may appear to be low, but the results of some of the other consulting services, particularly component 2, will be drawn upon.

4. Component 9. Environmental advisory services

2.34 The environmental component was discussed during the analysis mission in January 1997. A regional environmental impact assessment (EIA) is expected to be ready in February 1997.

2.35 **Objective.** The short-term objective consists of consolidating the project's environmental management capacity to deal with problems that may arise during the construction stage.

2.36 This component contains the following activities:

- a. Completion of the national EIAs; use of information from the regional report in the preliminary national reports; detailed studies for the project; risk analysis; formulation of the environmental management plan; consultations with official institutions.
- b. Presentation and approval of the national EIAs.
- c. Consolidation of the project's environmental management capacity; establishment of an environmental unit in SIEPAC's management agency; creation or strengthening of environmental units in the national companies.
- d. Project environmental management plan to ensure its environmental quality and compliance with national laws and regulations.
- e. Bid documents: technical specifications contained in the environmental management plan.
- f. Supervision and monitoring during construction.
- g. Supervision and monitoring during operation and maintenance.

2.37 **Duration and cost.** The first stage should be completed by April or May 1998; the second will last until 2002 when project construction will be completed. The cost is US\$550,000 for stage one, which

will be carried out by individual consultants and financed under the technical-cooperation loan; the second stage will cost US\$1.5 million and will be financed under the investment project.

C. Program organization and execution

- 2.38 The Central American Electrification Council (CEAC) will be the executing agency for the project. The CEAC is a regional organization for cooperation, coordination and integration, founded in 1985, whose principal objective is to achieve a better use of energy resources in the member countries. It is an agency under international law with legal personality and its own assets, and with full capacity to exercise rights and undertake obligations. All six Central American utilities belong to the CEAC and would participate in the SIEPAC interconnection project. Annex I describes the Bank's experience with the CEAC.
- 2.39 The six countries participating in the project will form a steering group made up of representatives of the energy and economics affairs ministries of each country and of electricity companies in each country concerned. The steering group will bear final responsibility for development of the REM and for making decisions as needed to achieve the overall project objectives.
- 2.40 The steering group will be assisted by a specialized firm with experience in organizing and implementing competitive electricity markets and a small group of consultants (the advisory group) whose task will be to provide guidance for decisions on regulations, dispatch organization, operation, and structuring and efficient development of the REM. The individual consultants, sitting on a panel of experts, will monitor the process throughout project execution.
- 2.41 The project will be carried out by the executing agency, acting in all cases through an executing unit. The executing unit members will be appointed by the steering group with PEC approval and hired by the executing agency. The executing unit will be composed of three full-time staff: a general manager and two specialized technical experts.
- 2.42 The executing agency will, with PEC consent, hire the consulting firm and the individual consultants making up the advisory group and the executing unit will be responsible for programming and coordination of the advisory group's activities (the details of execution are provided in Appendix II).

D. Monitoring

- 2.43 A programming and evaluation committee (PEC) will be set up with two electricity sector representatives from each country, appointed by their governments, and representatives of the Bank. The PEC

will perform independent project supervision and evaluation by means of semiannual and special meetings as needed. The PEC will be authorized to ensure that the terms of reference for contracts with consulting firms and individual consultants are appropriate, that the work done by the advisory group and the executing unit is satisfactory and, generally, that the project is bringing about the desired effect and that progress is being made on the establishment of the REM. The executing agency undertakes to provide the PEC with any necessary information to this end, and the PEC will have free access to all project documentation. The PEC will advise the steering group of its opinion as to the project status, and will be authorized to request the steering group to take steps as needed to solve any problems or overcome any obstacles encountered.

E. Cost and financing

- 2.44 The total cost of the technical cooperation program is US\$16.4 million, including a technical cooperation loan (US\$9.9 million from the ordinary capital) and nonreimbursable technical cooperation funding (US\$5 million from the FSO).
- 2.45 The loan will be denominated in U.S. dollars, granted under the Single-Currency Facility, with a five-year disbursement period.
- 2.46 The local counterpart resources will be provided in the form of financing of counterpart staff for each component.

SUMMARY OF TECHNICAL COOPERATION PROGRAM COMPONENTS
(US\$ 000 equivalent)

Components	IDB loan	IDB FSO	Local contribution	Total
STAGE I				
1. General advisory assistance during SIEPAC organization		1,800	200	2,000
2. Coordinated operation (US\$2.2 million for equipment)	2,100	900	300	3,300
3. Production and transport costs		700	90	790
4. Payment mechanism for transfers		100	10	110
5. Training	500	500	200	1,200
STAGE II				
6. Organization of economic operations	300	500	100	900
7. Market regulation: CRIE	300	500	100	900
8. Control and communications center (US\$3.5 million, CRCT infrastructure and equipment)	4,300		450	4,750
9. Advisory assistance on environmental issues	500		50	550
SUBTOTAL	8,000	5,000	1,500	14,500
10. Contingencies	700			700
11. Finance charges	1,252			1,252
Inspection and supervision	87			87
Interest	1,015			1,015
Credit fee	150			150
TOTAL	9,952	5,000	1,500	16,452

III. RISKS

- 3.1 The main risks of the operation are possible constraints on the development of the energy market as a result of the survival of traditional market structures in national electric sectors, possible restrictions or disincentives affecting participation by new investors in the sector, and potential barriers to regional trade. If these liabilities materialize, the benefits of coordinated operation and expansion of electric systems under competitive conditions could be lessened. However, these risks are mitigated by separating accounts by segment of activity undertaken by the companies remaining vertically integrated, subject to audits by the regional regulatory agency, to avoid transfers of costs between activity segments, as well as the percentages of demand for which distributing companies and major consumers will be competing in the regional market.

BACKGROUND AND EVALUATION OF THE EXECUTING AGENCY

Consejo de Electrificación de América Central

- 1.1 CEAC is a regional institution for cooperation, coordination, and integration, established in 1985 for the main purpose of making better use of the energy resources of the member countries. It is an entity under international law, with legal status and its own assets, and full capacity to exercise rights and contract obligations. The six Central American electric utilities that will participate in the SIEPAC interconnection project are members of CEAC.
- 1.2 The agreement establishing the council was approved in 1985 and subsequently ratified by the legislatures of the six Central American countries. The protocol was deposited with the United Nations and the Organization of American States, which makes it an autonomous international agency, with its own legal status. Owing to the financial difficulties of the electric companies, they agreed that the CEAC secretariat would be financed by the host country. They decided to have one of their permanent officials head the executive secretariat and agreed that its headquarters would rotate every two years among the six countries. Since August 1, 1995, CEAC has been the responsibility of the Empresa Nacional de Energía Eléctrica (ENEE) of Honduras.
- 1.3 CEAC has formulated, executed, or coordinated various regional technical-cooperation projects, with good results to date. They include projects sponsored by the GCR-CA and those financed by NORDEL, as well as execution of a Bank technical-cooperation project for supplementary SIEPAC feasibility studies, in conjunction with the SIEPAC executive secretariat. To enhance its effectiveness, in March 1994 CEAC adopted an organization structure based on subcommittees with full delegation and participation in the six electric utilities. However, its capacity to execute operations such as the one proposed here is limited, owing to its shortage of personnel and administrative resources. Therefore it is recommended that a small executing unit operating on a full-time basis execute the technical-cooperation project.

STAGES OF EXECUTION OF TECHNICAL COOPERATION PROGRAM COMPONENTS

Component 2: Coordinated operation

Execution. The project will be executed by a consulting company in four stages:

Stage 1. The operations planning model will be selected, and rules and regulations will be prepared to govern relations between the **temporary operations center** and the national load dispatch centers.

Stage 2. National dispatch centers will be evaluated from the standpoints of equipment and personnel capacity for the purpose of recommending the one best able to act as the **temporary operations center** to direct coordinated operations.

Stage 3. Will begin with analyses to identify the equipment, programs, and models required by the national dispatch centers and conclude with the evaluation of proposals to supply the equipment identified. Measures will also be identified and proposed to improve communications between dispatch centers that do not require new equipment in order to immediately implement coordinated operation.

Stage 4. Will begin with certification of the equipment and conclude with the start up of each of the dispatch centers, including the **temporary operations center**.

Stage 5. This stage will introduce commercial power exchanges among the Central American countries. It will be necessary to identify the main impediments to exchanges among the countries and propose short-term solutions, which will cover commercial measures (including the delegation of operating and financial autonomy to the companies) and technical measures (necessary additions to existing metering and communications equipment). The culmination of this stage is the first target among the project goals established by the supervisory group and the project's general advisors.

Component 3: Production and transport costs

Execution. The component will last for 12 months and will be executed in two stages.

Stage 1. All the analyses and studies, selection of calculation methods, etc., will be performed in this stage, which will last for 12 months. However the procedure for measuring the efficiency of power plants must be completed in three months.

Stage 2. Efficiency measurements in the countries' generating plants will be formed in this stage, and will require nine months. This stage will begin once the methodology is ready and the necessary equipment procured, which should be done during the first three months of the study.

Component 4. Payment mechanism for transfers

Execution. Based on the analysis and studies already conducted on this subject and his/her own investigations, the consultant will propose an adequate mechanism for guaranteeing payment to suppliers on the regional energy market.

Component 6. Organization of economic operations

Execution stages. The following subsets of activities have been defined for this component:

Stage 1. This stage is intended to activate commercial exchanges of power among the Central American countries. To do so, it will be necessary to identify the main obstacles to exchanges and propose short-term solutions covering commercial measures (including the delegation of operating and financial autonomy to the companies) and technical measures (indispensable additions to existing metering and communications equipment). The culmination of this stage is the first target among the project goals established by the executing agency and the project's general advisors.

Stage 2. Focus will be on defining contractual arrangements for the purchase and sale of block power. The different categories of users of the interconnected grid, the dispatch procedures to be used (including short- and medium-term operational planning tools), and information requirements will be defined in this stage. This stage should be completed prior to the entry into service of the interconnection line, but the initial contracts and dispatch procedures will then have to be tested. This stage will conclude when the procedures are approved.

Stage 3. Detailed work for implementation of the agreements signed in stage 2 will be carried out, including the preparation of documents such as the operating code and the system code. This stage will conclude roughly at the same time as the interconnection line enters into service.

Stage 4. The consultants will monitor introduction of the new procedures and will advise dispatch personnel for a prudent length of time.

Component 7: Market regulation (CRIE)

Execution stages. The process carried out by the consultants will have the following stages:

Stage 1. The lessons learned in regulation in stage I will be evaluated and taken into account in designing all the regulations and agreements for the proposal regarding the detailed organization, functions, and scope of the CRIE.

Stage 2. Focus will be placed on identifying the agreements needed to establish the bilateral exchanges which have been set as the first project target.

Stage 3. In parallel with component 1, the regulatory instruments needed to support the agreed operations planning and dispatching procedures will be designed. In this stage, planning procedures and coordination mechanisms will be analyzed to obtain the benefits of integration. They will be submitted for approval to the steering committee of the technical-cooperation program.

Stage 3. Using the proposals defined and approved, final regulatory provisions will be designed and CRIE staffing and funding requirements will be identified, which will be used as the basis for organizing the regulatory agency, which will begin to function when the interconnection line comes into service.

Stage 4. The consultants will assist CRIE officials during the initial stage of operating the interconnection. This stage may last longer than component 1, since situations may arise in which CRIE will require support for specific aspects not provided for in the regulations designed in stage I.

Component 8: Control and communications center

Execution. This component will be carried out by a consulting firm and will begin when the procedures for dispatching and settlement provided for in components 2 and 4 have been completed, and will end once the control center has started up and commercial operations have begun.

Component 9: Advisory assistance on environmental issues

Stages. Two stages have been planned for this component: the first corresponds to project preparation (national EIAs, consolidation of environmental management capacity) and the second to the construction stage, including the environmental management plan and supervision and monitoring activities.

PROPOSED RESOLUTION

REGIONAL. LOAN ____/OC-CA TO THE EMPRESA PROPIETARIA DE
LA RED -EPR-, S.A.
(Electrical Interconnection System for the
Central American Countries -SIEPAC-)

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 Empresa Propietaria de la Red, S.A, as Borrower, and the Repúblicas de Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica y Panamá, as Guarantors, for the purpose of granting the former a financing to cooperate in the execution of the Electrical Interconnection System for the Central American Countries. Such financing will be for the amount of up to US\$170,610,000 from the Single Currency Facility of the Ordinary Capital resources of the Bank, and will be subject to the "Special Contractual Conditions" and the "Terms and Financial Conditions" of the Executive Summary of the Loan Proposal.

PROPOSED RESOLUTION

REGIONAL. TECHNICAL COOPERATION LOAN FOR THE ELECTRICAL
INTERCONNECTION SYSTEM FOR THE CENTRAL AMERICAN
COUNTRIES -SIEPAC-

The Board of Executive Directors

RESOLVES:

1. 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 agreements as may be necessary with the Consejo de Electrificación de América Central -CEAC-, as Borrower, and the Repúblicas de Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica y Panamá, as Guarantors, and to adopt such other measures as may be pertinent for the execution of the program of technical cooperation described in Document _____ (the "Program"), to support the creation of the Electrical Interconnection System for the Central American Countries.

2. That up to the sum of US\$9,900,000, is authorized for the purposes of this resolution, chargeable to the Single Currency Facility of the Ordinary Capital resources of the Bank.

3. That the above-mentioned sum shall be provided on a reimbursable basis, in accordance with the respective conditions which shall be set forth in the agreement to be signed for this operation.

PROPOSED RESOLUTION

REGIONAL. LOAN ____/SPQ-CA TO THE EMPRESA PROPIETARIA DE
LA RED -EPR-, S.A.
(Electrical Interconnection System for the
Central American Countries -SIEPAC-)

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, as administrator of the Government of Spain's Quincentennial Fund, to enter into such contract or contracts as may be necessary with the Empresa Propietaria de la Red, S.A, as Borrower, and the Repúblicas de Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica y Panamá, as Guarantors, for the purpose of granting the former a financing to cooperate in the execution of the Electrical Interconnection System for the Central American Countries. Such financing will be for the amount of up to 60,000,000 ECUs from the above-mentioned fund, and will be subject to the "Special Contractual Conditions" and the "Terms and Financial Conditions" of the Executive Summary of the Loan Proposal.

PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR SUPPORTING THE
ELECTRICAL INTERCONNECTION SYSTEM FOR THE CENTRAL AMERICAN
COUNTRIES -SIEPAC- PROJECT

The Board of Executive Directors

RESOLVES:

1. 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 agreements as may be necessary with the Consejo de Electrificación de América Central -CEAC- and to adopt such measures as may be pertinent for the execution of the plan of operations referred to in Document PR-_____ with respect to a nonreimbursable technical cooperation for supporting the Electrical Interconnection System for the Central American Countries project.
2. That up to the sum of US\$5,000,000 or its equivalent in other convertible currencies, is authorized for the purposes of this resolution, chargeable to the net income of the Fund for Special Operations.
3. That the above-mentioned sum is to be provided on a nonreimbursable basis.