

**COLOMBIA: TECHNICAL COOPERATION LOAN  
TO SUPPORT THE ENERGY EFFICIENCY PROGRAM**

(CO-0163)

**EXECUTIVE SUMMARY**

**BORROWER AND  
GUARANTOR:** Republic of Colombia

**EXECUTING AGENCY:** Ministry of Mines and Energy (MME), through the  
Energy and Mining Planning Unit (UPME).

**AMOUNT AND SOURCE:** IDB: US\$10 million (OC)  
Local counterpart funding: US\$ 2 million  
Total: US\$12 million

**FINANCIAL  
TERMS AND  
CONDITIONS:** Amortization period: 20 years  
Disbursement period: 4 years  
Interest rate: variable  
Inspection and supervision: 1%  
Credit fee: 0.75%  
Currency: U.S. dollars from the  
Single Currency Facility

**OBJECTIVES:** The goal of the proposed technical cooperation loan is to help the Colombian government introduce a sector strategy to promote energy efficiency and rational energy consumption. The purpose of the strategy is to optimize the cost of the service and the sector's financial needs, encourage greater private participation, ease the environmental impact caused by energy production and consumption, match the supply of the country's energy resources with demand, including use of alternative energy sources.

**DESCRIPTION:** This operation is the Bank's first project devoted solely to energy conservation and rational energy consumption. Activities will focus on the following outputs from the government's strategy: orchestrating demand; optimizing generation; fuel substitution, and supporting activities.

These activities are divided into three areas: (i) policy, relating to the creation of a market in which measures to ensure rational and efficient energy use may be financially attractive; (ii) a legal, regulatory, and institutional framework, delineating the policy framework mentioned in point (i), that broadens participation by the private sector and identifies agencies that are able to carry

out these activities; and (iii) specific studies to implement and identify activities, projects, financial plans and incentives to attain the objectives being sought as well as to identify contacts in the private and public sectors responsible for implementing them.

To this end, the proposed operation will finance consulting services for **research**, to create know-how on specific topics; **evaluation**, to conduct the diagnostic studies and prepare recommendations in specific areas; and **design**, for detailed preparation of policies, programs, strategies and businesses, among other things. It will also finance management activities, including projects to introduce policies and/or strategies.

Consulting services will be hired to provide support in organizing the processes by preparing rules and regulations, bidding documents and terms of reference, evaluating proposals and bids, promoting the processes, assisting with establishment of energy management firms, developing a plan for rational energy consumption programs to finance themselves, and other activities. Training activities and promotional campaigns will also be financed and technical, economic, financial and environmental feasibility studies will be conducted for cogeneration projects.

Given the diversity of the proposed objectives, the program must be flexible enough to respond to any needs that might arise while it is in progress. Therefore, the program will be carried out on the basis of plans of operations, which will include the activities to be conducted and the specific goals and objectives to be achieved, while retaining the necessary flexibility to modify the categories and costs. An activity must meet eligibility requirements (paragraph 3.55) before it can be included in a plan of operations.

The program beneficiaries will be: the UPME, DNP, and MME, the ministries of the environment, education and transportation, the CREG, ECOPETROL, state-owned mining companies, ICONTEC, and companies in the electrical sector. If the beneficiary is a private company, the financing will be reimbursable. Because this is a multisector loan, other sector agencies might eventually benefit from the program as well.

**ENVIRONMENTAL  
CLASSIFICATION:**

The Environment Committee, at its meeting of November 5, 1996 (37/96), classified this as a Category II operation noting that the present document was submitted to the Committee through the short procedure. The Committee approved the document on December 27, 1996. The background information and the environmental activities proposed are described in chapters I and III of this document.

**PROCEDURE FOR  
APPROVAL:**

In accordance with the rules approved by the Board of Executive Directors (documents GN-1838-1 and DR-398-2), this operation will be submitted to the Committee of the Whole through the simplified procedure.

**POVERTY TARGETING:** Not applicable.

**EXCEPTIONS TO  
BANK POLICY:**

In view of the technical and institutional advantages it enjoys from its involvement in similar projects, it is recommended that the UNDP be contracted directly to provide administrative services for the proposed operation (paragraphs 3.65-3.68).

In order to speed up the procedures for awarding contracts and to streamline processing by the Bank, it is recommended that contracts for activities valued at up to US\$50,000 be awarded by the executing agency through the UNDP, without the need to present terms of reference or short lists for approval by the Bank. It is further recommended that the Bank's evaluation and approval of these contracts be done ex post rather than ex ante. While the program is in progress, the actual outcome of this arrangement will be evaluated in order to determine whether it should be continued (paragraphs 3.71 and 3.72).

**CONDITION  
PRECEDENT  
TO THE FIRST  
DISBURSEMENT:**

The agreement with the UNDP to provide administrative services must be signed (paragraph 3.70).

**PROCUREMENT  
THRESHOLDS:**

The threshold above which international competitive bidding will be required is US\$200,000 for consulting services (paragraph 3.74) and US\$350,000 for the procurement of goods (paragraph 3.75).

**THE BANK'S  
COUNTRY  
STRATEGY:**

The proposed loan, which is listed in the country paper, is part of the Bank's strategy for Colombia as it would help develop market mechanisms for energy efficiency and rational energy consumption, by encouraging the private sector to participate in a restructured energy sector, and eventually make it possible to save on energy investments, the resources

for which could be used in other priority sectors. It is also consistent with the mandates of the Eighth General Increase in the Resources of the Bank in that it encourages energy conservation and efficiency through the adoption of environmentally sustainable energy development strategies.

**BENEFITS:**

With the proposed technical cooperation, electric power authorities will have information, tools and concrete plans with which to introduce energy-efficiency measures that will help slow the growth rate of energy demand and consumption and thus have a positive effect on the sector economy by slowing down the investment program and lowering fuel consumption.

The decline in fuel consumption and the use of cleaner fuels will be healthy for the environment. By reducing the consumption of heavy fuel oils and partially replacing them with natural gas, less nitrogen oxide and sulphur will be emitted into the atmosphere and carbon dioxide emissions and their effect on global warming will be lessened.

**RISKS:**

A steering committee will coordinate the program and thus help ensure that it is carried out properly and on schedule. The committee will establish priorities and goals and coordinate the various agencies participating, thereby substantially reducing the problems of inter-agency coordination that could arise with a multi-sector program of this kind. Given the innovative nature of these mechanisms and the ongoing technical advances, the proposed operation has the flexibility to be adjusted as necessary during the implementation phase.

Effective participation and commitment on the part of the counterpart agencies and program beneficiaries will be essential if the objectives are to be fully realized and if the recommendations resulting from the work carried out are to be put into practice. To reduce possible risks, the beneficiaries and the steering committee will agree upon the objectives, characteristics and scope of the respective activities and to become actively involved in its implementation.

Furthermore, determining what financing is needed and identifying possible sources of financing will reduce the risk that funding might not be available to implement recommendations resulting from the program.

## I. BACKGROUND

### A. Introduction

- 1.1 Traditionally, energy-sector planning has focused on developing the supply needed to meet a given demand. The country's sustained economic development has kept energy demand high, although the funds to finance sector expansion are very limited. Therefore, a new approach is needed in the energy sector. The guidelines for developing this new approach are set out in the National Energy Plan. Among the plan's objectives are to have a full and efficient energy supply, with adequate infrastructure and the optimum allocation of resources, to promote rational energy consumption and efficient management of demand, to improve and preserve the quality of the environment and to strengthen institutional modernization with greater private-sector participation.
- 1.2 The purpose of this document is to propose a technical cooperation loan to assist Colombia's energy efficiency program. This chapter briefly summarizes the recent economic situation and provides background information on the proposed program. Chapter II summarizes the program objectives, while chapter III describes its components and matters related to the operation's organization and execution. Chapters IV and V respectively discuss the benefits and risks of the program and the program evaluation.

### B. Recent economic picture

- 1.3 The growth rate of the Colombian economy slowed to 3.5 per cent in 1996, dropping below the average for the last three years, but still higher than the average growth rate for Latin America as a whole. The political crisis and cyclical economic trends have affected the growth rate.
- 1.4 Fiscal policy has been expansive in recent years, due to policy measures (increased spending on social sectors) and legal measures (new mandates relating to decentralization and social security reform). As a result, monetary policy has been restrictive so as to lower inflation, although the results have not been entirely satisfactory since it has been difficult to overcome that element of inflationary inertia. Because of the monetary contraction, lending rates are close to 20 per cent in real terms, while inflation refuses to drop below 19 per cent.
- 1.5 The chief macroeconomic challenge is to reduce the central government deficit, which amounted to four per cent of GDP in 1996. A significant portion of public spending is predetermined, which means that to curb its growth laws have to be amended and political consensus built. Faced with this complicated fiscal situation, the government has proposed a number of measures aimed at reducing the

central government deficit. 1/ These measures include divestiture of public enterprises, modernization of the State and an increase in nominal wages in the public sector below the rate of inflation. More recently the Government of Colombia announced a fiscal emergency program, which includes measures designed to increase income and reduce national spending.

C. Principal characteristics of the energy sector

- 1.6 The energy sector in Colombia consists of a large number of public and, more recently, private institutions in the electric power, hydrocarbon, coal and alternative fuel subsectors. The electric power subsector is currently being reorganized. Under the new structure, separate businesses generate, transmit and distribute electric power; competition is keen among power generating companies; a wholesale energy market has been established; and access to transmission and distribution networks is now open. 2/
- 1.7 Enactment of household public utilities law and electric power law in 1994 established a legal framework and set in motion the sector reform process. The Ministry of Mines and Energy [Ministerio de Minas y Energía] (MME), which governs the sector, establishes sector policies and coordinates execution of the National Energy Plan. As part of the sector's reorganization, an energy and gas regulation commission [Comisión de Regulación de Energía y Gas] (CREG) was created to regulate activities in the sector, encourage competition and protect consumers, as was an office of the superintendent of public utilities to monitor compliance with the law and CREG regulations.
- 1.8 The energy and mining planning unit (UPME), which is part of the MME, is responsible for developing national plans for energy and mining. As for sector operations, the government is encouraging greater private participation by placing more emphasis on market mechanisms and divesting itself of the State's holdings in sector companies.
- 1.9 In the electric power subsector, losses are high in the regional transmission and distribution systems; the efficiency of the existing thermal park is low; energy consumption during peak hours is much higher than the average; too much electricity is used for cooking and heating; devices that use electricity are not energy efficient; and available technologies are unknown and unused. Firewood accounts for too large a share of the country's energy

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1/ CONPES Document 2863, July 1996.

2/ The electric power supply is concentrated in the State-owned utilities of Medellín, the Bogota Energy Company, the Pacific Energy Company, the Atlantic Coast Electric Power Corporation, ISAGEN, the Municipal Companies of Cali, the Colombian Electric Power Authority and the Betania Hydroelectric power plant.

sources and more economical, efficient and cleaner fuels are not being used in the transportation sector.

- 1.10 The reorganization of other subsectors has been less ambitious, largely because there is little private-sector involvement. The hydrocarbons subsector is the responsibility of the Empresa Colombiana de Petróleos [Colombian Petroleum Company] (ECOPETROL), a vertically integrated public entity, with the private sector participating in the production of crude oil and in the distribution of petroleum byproducts and gas. The Empresa Colombiana de Carbón [Colombia Coal Company] (ECOCARBON) is the principal entity with responsibility in the coal subsector.

D. Energy efficiency and conservation in Colombia

- 1.11 **Background.** Residential demand in Colombia has been met with costly energy projects or natural resources, but there are opportunities for energy savings and energy efficiency. And while the economy's energy-intensity indicators are relatively low, more efficient and resourceful use of the country's energy resources can be promoted. To maximize energy efficiency and rational energy consumption, the government has conducted studies, instituted institutional reforms and conducted public awareness campaigns to encourage energy efficiency. In the formulation of strategies for energy efficiency and rational energy consumption. The alternatives have been examined from both the supply side and the demand side, and priorities were established according to the major impediments to greater efficiency detected.
- 1.12 **The government's strategy.** The concern for energy efficiency and rational consumption increases as demand surges, financing becomes tighter, people become more aware of the importance of environmental protection and the roles of the public and private sectors in the development process are redefined. The Colombian government has decided upon a strategy 3/ to create the market conditions that will encourage energy efficiency and rational energy consumption in the country and the measures that must be carried out to achieve this objective, while preserving users' standard of living and mitigating the environmental impact of energy use.
- 1.13 The rational energy consumption strategy consists of the following: (i) orchestrating demand for power; (ii) optimizing electric power

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3/ The strategy is based on the findings of the following studies: study on energy efficiency in the residential, business and government sectors; proposal for a rational energy consumption strategy, 1993-1995; diagnosis and proposals for a program to promote rational energy consumption in the transportation sector; and a study on electric load management.

generation, distribution and use; (iii) fuel substitution; and (iv) supporting activities. In Colombia, rational energy consumption is understood as the universe of activities designed to reduce the use of primary and secondary fuels to satisfy the needs of the public, industry and commerce without limiting their growth and development. There are demand-related and supply-related issues involved. The proposed loan would finance specific activities under each component. The background information, objectives and activities of the program are described in chapter III.

E. Environmental considerations

- 1.14 Enacted in late 1993, Law 99 established the Ministry of the Environment [Ministerio del Medio Ambiente] (MINAMBIENTE), reorganized the regional autonomous corporations, established environmental authorities in cities with over one million inhabitants and created environmental research institutes and new mechanisms for citizen participation.
- 1.15 Under this new institutional configuration, MINAMBIENTE is in charge of issuing national environmental standards and policies and monitoring the consistency of environmental management by the various environmental authorities at the regional level. The Bank has provided support (774/OC-CO and 910/SF-CO) to strengthen and consolidate this new system, called the national environmental system. Among these programs' objectives are to help MINAMBIENTE prepare environmental policies and develop manuals for granting environmental permits. Before MINAMBIENTE was created, there were programs like the national code for renewable natural resources and environmental protection (1974).
- 1.16 Policies promoting energy efficiency and rational energy consumption are among the most effective means of reducing carbon dioxide emissions and thereby mitigating the adverse impact of the energy sector on both the supply and demand sides. The effects of a policy advocating rational energy consumption can be measured in environmental terms 4/. Colombia's energy sector has started to include environmental concerns in planning, as a way to improve the overall efficiency of the sector and to achieve a holistic approach.
- 1.17 The Environment Committee, at its meeting of November 5, 1996 (37/96), classified this as a Category II operation, indicating that this document had been submitted to it through the short procedure. The Committee approved the environmental aspects of this program on December 27, 1996.

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4/ Environmental Implications of Fuel Substitution and Thermal Efficiency, Energy Policy. January 1991.



F. Technical assistance needs

- 1.18 Given the broad agenda of activities planned, in a communication dated September 25, 1996, the government requested a US\$10 million loan from the Bank to support its energy efficiency program. Since the early 1997 announcement of emergency economic measures, the Colombian authorities have reconfirmed the priority assigned to this technical cooperation loan and have pledged to ensure timely allocation of the necessary budget appropriations.

G. The Bank's strategy

- 1.19 In August 1995, the Bank's Board of Executive Directors examined the country paper for Colombia (GN-1886), setting forth the Bank's country strategy for the 1995-1997 period. A three-fold strategy was proposed: first, support direct investments in the social sectors in order to relieve poverty and raise the standard of living; second, reinforce the managerial capacity of public institutions to make public spending more efficient; and lastly, promote greater private-sector participation through a series of measures designed to increase the economy's productivity.
- 1.20 The proposed operation, which appears in the country paper, is consistent with that strategy as it would promote the development of market mechanisms for rational energy consumption and energy efficiency by encouraging the private sector to take part in a restructured energy sector. The investment resources thus saved could be used in other priority sectors. It is also consistent with the mandates of the IDB's Eighth General Increase in Resources in terms of promoting rational energy consumption and energy efficiency by adopting environmentally sustainable energy development strategies. As an adjunct, the Bank is supporting the process of privatization and infrastructure concessions under a technical cooperation loan (927/OC-CO; PR-2121, April 1996), now under way. This parallel operation includes activities to consolidate participation by the private sector in the energy sector.

H. The Bank's experience with energy efficiency projects

- 1.21 Since the start of this decade, the IDB has devoted more attention to the growing demand from its member countries for support to energy efficiency. Despite its advantages, energy efficiency has not been extensively embraced because the market structures are not well suited to introducing programs of this type in an equitable fashion. Salient among the chief obstacles to such projects are price subsidies, an underdeveloped market for energy efficiency services, and the lack of information, appropriate equipment and sources of financing. Nonetheless, the new opening of markets and reform of the energy sector in a drive to seek efficiency through private sector participation, competition, and regulation of

monopolistic practices presents opportunities for establishing a lasting market for these measures.

- 1.22 The Bank's participation in this area has been confined to studies, pilot projects and demonstration projects in investment programs in the electric power sector in Jamaica, Costa Rica, El Salvador, and Colombia. The progress of these programs has been impeded, however, by the hurdles noted earlier as well as problems in design. These projects have targeted electrical utility companies without effectively promoting the creation of a self-sufficient market or identifying the public and private agents. The efforts of multilateral and bilateral agencies have run into much the same situation. The technical cooperation for sustainable energy markets (AT-1098, October 1996) is a recent initiative in support of efficient energy consumption and renewable energy.

## II. OBJECTIVES

- 2.1 The purpose of the proposed technical cooperation loan is to help the Government of Colombia implement a sector strategy to promote energy efficiency and rational energy consumption. The strategy's objectives are to optimize the cost of the service and the sector's financial needs, promote increased private-sector participation, mitigate the adverse environmental impact of the production and use of energy, and match the country's supply of energy resources with demand.

### III. DESCRIPTION

#### A. Activities

- 3.1 This operation constitutes the first project of its kind that the Bank has undertaken in the area of energy conservation and rational energy consumption. The activities will focus on the following components of the government's strategy: orchestrating energy demand, optimizing the processes by which energy is generated, fuel substitution and supporting activities for a restructured energy market.
- 3.2 These activities are divided into three areas: (i) policy, relating to the creation of a market in which measures to ensure rational and efficient energy use may be financially attractive; (ii) a legal, regulatory, and institutional framework, delineating the policy framework mentioned in point (i), that broadens participation by the private sector and identifies agencies that are able to carry out these activities; and (iii) specific studies, to implement and identify activities, projects, financial plans and incentives to attain the objectives being sought as well as to identify contacts in the private and public sectors responsible for implementing them.
- 3.3 The proposed operation will finance consulting services in: (i) research, to create know-how on specific subjects; (ii) evaluation, to perform diagnostic studies and make recommendations in specific areas; and (iii) design, for detailed preparation of policies, programs, strategies, businesses, etc. It will also provide support for management processes, including projects to introduce policies and/or strategies. Management consultants will be hired to help organize the processes by preparing rules and regulations, bidding documents and terms of reference, evaluating proposals or bids, promoting the processes and assisting with the establishment of energy management businesses, among other activities.
- 3.4 The background, objectives and activities of each component of the proposed operation are described below. These components are being restructured in accordance with the breakdown of activities in the national policy paper in this field (CONPES, July 1996). The logical framework for the program appears in Annex III-1.

#### 1. Orchestrating demand

- 3.5 This component of the strategy involves a set of measures to get consumers to improve their consumption patterns, to invest in energy efficient processes and equipment, and to use the existing infrastructure to optimum advantage. Orchestrating demand thus

constitutes a more economical alternative to building electric power plants or stepping up the capacity of the existing park.

- 3.6 The measures taken will be accompanied by recommendations on hourly and seasonal rate schedules for large-scale consumers, so that they can lower the cost of their electric power service by redistributing their hours of consumption; advice and encouragement for users in the proper use of electric-power substitutes, and promotion of energy efficiency in processes and equipment.
- 3.7 The specific activities will include the design of incentive schemes that encourage rational energy consumption, identification of the market potential for generating energy savings, and support for human resources training and public awareness campaigns promoting energy efficiency.

#### **1.1 Incentive schemes that promote rational energy consumption**

- 3.8 The typical daily load curve of the national interconnected system shows two peak demand periods, heavily influenced by residential consumption for cooking at midday and for lighting and cooking at night. Daily industrial demand is relatively constant because of the incentive offered in the form of a two-tiered rate schedule, to maintain a high load factor, i.e., a relatively constant pattern of consumption.
- 3.9 The program will evaluate and design measures to encourage users of the electric power service, particularly residential and commercial consumers, to reduce electric power consumption during peak demand hours. The options that will be considered will include rates, replacing electric cooking appliances with gas appliances, and improving the energy efficiency of household appliances.

#### **1.2 Identification of the market potential to generate energy savings**

- 3.10 The MME's Energy and Mining Information Unit has been conducting an industry survey on energy uses and consumption that has measured the overall energy status of Colombian industrial facilities. Likewise, agencies such as the National Association of Industrialists and the National Office of Statistics keep an annual record of industrial production. These sources of data can be tapped to estimate the rates of energy consumption in Colombian industry, to then compare them with those of other countries to evaluate the potential for energy savings in the industrial sector. The results obtained in this way are gross figures and are not broken down in such a way that the projects able to achieve these potentials can be identified.
- 3.11 A careful diagnostic study of some small samples has been conducted in an attempt to determine the potential for energy savings. One such initiative is the plan for energy audits, devised with support

from Medellín Public Enterprises. However, the studies have been on a regional scale and the examples in the sample selected mainly on the basis of geography and not energy intensity or how representative the examples were of the industrial processes in industries nationwide.

- 3.12 To determine the market potential for generating energy savings, the proposed consulting services will help quantify the potential energy savings in Colombian industry by singling out processes that can be improved or replaced in the consumer sectors, and establishing the total savings potential and the strategies to realize it.

### **1.3 Rational energy consumption training programs**

- 3.13 In Colombia, the training in energy efficiency has been either temporary arrangements or training of staff in charge of developing energy efficiency programs. These have been specific programs conducted either by power companies or institutions of higher learning. A nationwide or institutionalized training plan has never been conducted in this area.
- 3.14 The purpose of this activity is to assist government and private-sector personnel working in rational energy consumption. National and international seminars on energy efficiency will also be organized, as will promotional seminars targeting specific sectors. The activities must be organized in such a way that their beneficiaries are people associated with this issue in both private industry and the electric power companies.

### **1.4 Campaigns to promote energy efficiency**

- 3.15 In Colombia, the first campaigns promoting rational energy consumption began in the 1970s, when ECOPETROL encouraged the public to make efficient use of gasoline and the ISA launched a campaign promoting rational electric power consumption, supported by the companies in the sector. Both the MME and the ISA have continued to coordinate campaigns for saving power ("Mejor, úsala mejor" [Better, use it better] and "Para que Colombia no se apague" [So Colombia's lights don't go out] via the mass media (television and radio). Some electric power companies are conducting similar campaigns.
- 3.16 Over a three-year period, the proposed operation would support public information campaigns about rational energy consumption programs, with the electric power companies and the government participating and targeting the various sectors of the country. The program will be coordinated and continue uninterrupted and its results will be assessed periodically.

## 2. Optimizing generation processes

- 3.17 This component of the government strategy consists of activities for generating electric power through more effective use of less polluting resources and conversion technologies. The activities included in the proposed loan focus on generation processes, since the scale of the activities to optimize the electric power distribution systems would require a separate loan, which is presently under review (program to rationalize electric power distribution companies, CO-0202).
- 3.18 The purpose of this component is to identify specific projects, evaluate their feasibility, and put in place a realistic financing plan, to bring these projects to fruition. Specifically, the activities include identification of co-generation projects that could be conducted in industrial parks, hospitals and business centers; feasibility studies on specific cogeneration projects; an evaluation of the potential for reconversion of clean coal-burning technologies in the industrial sector; and an evaluation of alternatives for the institution of a plan that would make rational energy consumption programs in the various sectors financially self-sufficient. Projects in which entities generate their own power will also be identified. The activities under this component are directly related to the development of energy management businesses (paragraphs 3.43-3.44).

### 2.1 Identification of cogeneration projects in industrial parks, hospitals and business centers

- 3.19 Since 1990, a number of institutions and companies have been working to identify opportunities to build industrial cogenerating facilities. The most recent study 5/ found that 420 MW could be installed through individual projects conducted by the host industries. Thus far, none of the projects studied has materialized owing to a lack of financing and until recently the absence of a regulatory framework to govern technical and commercial operation of cogeneration facilities in the national interconnected system. These two factors have caused international investors and developers to shy away from cogeneration projects, since such projects are less likely to be able to generate the proper cash flow.
- 3.20 The CREG has passed resolutions 6/ instituting regulations on self-generation, cogeneration and generation with smaller plants. Now that regulations governing cogeneration have been instituted, systems have to be devised for third parties to carry out projects.

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5/ Estudio sobre el Desarrollo del Potencial de Cogeneración en Colombia [Study on Development of the Potential for Cogeneration in Colombia]. UPME. Bogota, April 1996.

6/ Resolutions 85 and 86 of 1996.

Some studies have identified a number of projects to meet industries' individual needs. Studies have also been conducted on cogeneration projects with partnerships of industries in industrial parks as the host users, designed to optimize the production cycles thermically and take advantage of the economies of scale. However, only a portion of the opportunities available in the country for cogeneration projects in industrial parks have been covered; such projects may be more attractive alternatives for private investors. The consulting services will help identify the potential for cogeneration projects in industrial parks, hospitals and centers of business nationwide.

## **2.2 Studies on the technical, financial, economic and environmental feasibility of specific cogeneration projects in the industrial sector**

- 3.21 At the same time, given the government's interest in promoting projects of this type, specific cogeneration projects will be identified and undergo technical, economic, financial and environmental evaluation. With support from private investors and international developers of cogeneration projects, strategies for developing these projects will be evaluated and defined. In addition, alternative sources of financing for such projects will be identified, with emphasis on promoting private-sector participation. Finally, the financing needed to carry out specific projects effectively and on time will be determined and possible sources of financing identified.
- 3.22 Companies that would stand to benefit will be encouraged to help finance the feasibility studies. At all events, funds for these studies will be granted on a contingent recovery basis, if the projects are found to be feasible and are undertaken by the company.

## **2.3 Identification of opportunities to increase efficiency in coal-burning industrial processes and evaluation of the environmental benefits**

- 3.23 One of the action plans that the national environmental policy 7/ has adopted is to promote clean production, providing for, among other things, industrial reconversion plans to guarantee the adoption of sustainable methods of production. Promotion of clean production means getting productive sectors to include environmental concerns and shift away from unsustainable production techniques in favor of managed production and the use of environmentally safe and clean technologies, so that the trend in the use of energy and water resources is optimized and the output of the processes by which energy is produced and raw materials transformed is improved.

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7/ CONPES Document-2750, December 1994.



- 3.24 Based on an analysis of the potential for converting to clean technologies in the coal-burning industries, including the attendant environmental problems, pilot programs will be designed for the industrial sector. These pilot programs will introduce processes that significantly reduce the amount of nonuseable waste produced, and lessen or altogether eliminate the threat to the environment and the need for pollution control. One function of these consulting services will be to evaluate the introduction of international procedures for total quality control and environmental management.

**2.4 Design and introduction of a financial system that enables rational energy consumption programs to sustain themselves**

- 3.25 One of the international precedents for financial systems is Mexico's Energy Investment Fund, which has considerable experience in assisting rational energy consumption programs. Spain's Energy Diversification and Savings Institute and the Basque Energy Agency have done important work in the area of energy savings.
- 3.26 The activities will include consulting services to design and put together a finance system that makes the energy efficiency programs self-supporting, and thereby enables them to grow. The consulting services will include preparation of an organizational and financial proposal for institutionalizing the system and of regulations to govern incentives for energy efficiency programs.

**3. Fuel substitution**

- 3.27 Among the chief activities under this component are to replace electricity with natural gas or liquefied petroleum gas (LPG) in the residential and commercial sectors; replace gasoline and diesel fuel with alternative fuels like LPG or liquefied natural gas (LNG) as a public transportation alternative, and substitute firewood with LPG in rural areas.
- 3.28 The activities conducted with the technical cooperation loan will include the design of a plan to replace heavy crudes like industrial fuel, pilot programs based on the use of heavy crudes as asphalt binders to pave the country's roads, analysis of options for marketing and using charcoal briquettes in pilot communities and evaluation of the use of fuel gases in urban public transportation.

**3.1 Alternatives to heavy crudes as industrial fuel**

- 3.29 Since the properties of the crude oil reserves in Colombia do not lend themselves well to refining and since those properties are similar to those of fuel oil, the technologies used to make these crudes viable substitutes for high-cost fuels without generating high pollution levels need to be evaluated.

- 3.30 The consulting services will include thermodynamic, environmental, economic and financial evaluations of this fuel option in the industrial sector. Any necessary adjustments to the combustion systems will be recommended on the basis of this comprehensive analysis. If found to be viable, a fuel substitution proposal will be prepared, with strategies for penetrating the fuel market in the industrial sector.

### **3.2 Use of heavy crudes as asphalt binders for pavement**

- 3.31 The properties of Castilla crude did not make it suitable for refining. Since they were similar to those of fuel oil, a study was done of the idea of using this compound as a substitute for fuel oil in furnaces, dryers and boilers. When the results of the industrial-scale testing done in certain businesses were successful, Castilla crude began to be marketed as a fuel, mainly as a substitute for fuel oil (similar to what happened on the Atlantic Coast with natural gas), in view of the technical and economic incentives that use of Castilla crude offered to industry.
- 3.32 The demand for this fuel gradually increased in the central and western areas of the country. Today, some 17,000 barrels of Castilla crude are consumed daily which, at 10% of industry's total energy consumption, is its largest market share to date. Moreover, studies 8/ have shown that the use of this fuel has improved road performance, which also cuts down on consumption of gasoline and automotive diesel fuel. The foregoing has demonstrated that this crude has special features that make it very attractive as a means to achieve significant savings on gasoline and diesel consumption by improving roads carrying average traffic.
- 3.33 An evaluation of the country's reserves of heavy crude will be the basis for an evaluation of construction materials and methods and for conducting pilot projects in laboratories and on experimental stretches of road. If necessary, specific measures will be devised to adapt highway construction standards to the new conditions and materials.

### **3.3 Options for marketing and use of charcoal briquettes in pilot communities**

- 3.34 Of the primary fuels in Colombia, firewood accounted for 18.5% in 1980 and 15.7% in 1995. This is some 13.4% above the consumption mean for Latin America as a whole. Colombia has energy sources that can replace firewood, which is basically used for heating and cooking in rural residential areas (81.7%). A plan for the use of charcoal briquettes is intended to reduce the consumption of

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8/ Studies conducted by various institutions, among them the Colombian Petroleum Institute, the National Highway Institute and international organizations.

firewood and thereby reconfigure the country's energy consumption pattern.

- 3.35 The proposed loan will finance the design and startup of pilot projects in rural areas. Ex post evaluations will be conducted to determine the impact of the projects on reducing the consumption of firewood, the competitiveness of charcoal, and any improvement in the quality of life. These projects will supplement the pilot programs that ECOCARBON has in progress at the present time.

#### **3.4 Fuel gas options for urban public transportation**

- 3.36 Presently, urban public transportation uses mainly gasoline and diesel as fuels. But the country has ample reserves of natural gas and, to a lesser extent, liquefied petroleum gas, which are economically and environmentally advantageous alternatives that could replace the fuels now being used.
- 3.37 However, vehicle owners do not always have the resources for the investment needed up front to convert the vehicles to such alternatives. In addition, there would have to be guarantees that these fuels are safe to use. Therefore, the incentives would basically be in the form of credit made available to finance the cost of converting the vehicles to use fuel gases and the establishment of proper standards to guarantee safety.
- 3.38 The activities that the proposed loan will finance include a technical, economic, financial and environmental evaluation of the use of fuel gases in urban public transportation and preparation of safety standards. If feasible, a plan of action will be devised for introducing these fuels in the sector.

#### **4. Supporting activities**

- 3.39 The proposed loan will finance strengthening of the standards, certification and labeling program, development of construction codes, development of energy management businesses and institutional strengthening in rational energy use.

##### **4.1 Strengthening of the standards, certification and labeling program**

- 3.40 This work began in Colombia with the first phase of the project on standards, certification and labeling of household appliances, the purpose of which was to establish the minimum energy efficiency standards for household appliances, with advisory assistance from Mexico's Electric Research Institute. Thanks to that assistance, technical energy-efficiency standards were proposed for six household appliances and nine types of household light bulbs, an initial diagnostic study was conducted on the equipment and staffing of the laboratories needed to conduct energy efficiency

tests, and energy-efficiency testing was performed on stoves, ovens, water heaters, refrigerators and air conditioners.

- 3.41 To continue the work presently being done by the Colombian Technical Standards Institute (ICONTEC), the proposed standards will be submitted to ICONTEC's technical committees for approval and then to the Office of the Superintendent of Industry and Commerce to make them required features. Inasmuch as the standards program is for the residential, industrial, commercial and public sectors, the activities conducted must involve these sectors and the various stakeholders (such as consumer groups and industrial associations) that participate.
- 3.42 The activities will include development of additional standards for the residential, industrial, commercial, government, and street lighting sectors. For development of the standards, the laboratories that certify the appliances will be given advisory assistance. National laboratories (university-associated and private) will be given support to evaluate the energy efficiency of end-use equipment for the industrial sector for its certification. A standardization project will also be carried out for end-use energy equipment for industry, as will a public lighting equipment standards project.
- 3.43 As part of the loan, technical support will also be provided to businesses that manufacture equipment to promote the use of technological innovation in business. Lastly, national training, education and information campaigns will be conducted, targeting industrialists, experts and the general public.

#### **4.2 Development of a building code**

- 3.44 Building codes are one of the most efficient means to reduce energy consumption. Preparation and enactment of these standards will fill the current void, as there are no building codes in the country at the present time.
- 3.45 The proposed loan will finance development of construction standards for new housing, which include guidelines for energy efficiency and rational energy consumption. Builders will be encouraged to participate in pilot programs to apply these standards.

#### **4.3 Development of energy management businesses**

- 3.46 Energy management businesses have cropped up worldwide in recent years. They conduct comprehensive programs with organizations of all types, to realize financial savings through better use of energy resources. These savings directly benefit both users and the businesses. In Colombia, energy management has been a private-sector initiative. One particular case where a similar system has

been developed is that of public lighting, a service that can be outsourced by municipal governments.

- 3.47 The activities will include identification of energy-efficiency business management services that can ascertain what technologies are now available nationally and internationally for energy saving, conversion and substitution. The obstacles, risks and preconditions for use of technologies for rational energy consumption and strategies and economic and financial alternatives for developing market mechanisms to encourage such projects will be examined. Concrete proposals will also be prepared for developing energy management businesses, including institutional and financial plans for their establishment. Lastly, the financing needed for timely implementation of the recommendations and potential sources of financing will be ascertained.

#### 4.4 Institutional strengthening of the UPME

- 3.48 At present, a national rational energy consumption plan (PLANURE) for the next five years is being drawn up to ensure continuity, so that the measures taken in this area are permanent rather than temporary.
- 3.49 The operating strategy for PLANURE's development implementation of the plan is by way of the various committees for rational energy consumption, advisory assistance for the various agencies in the sector and development of rational energy consumption projects in differing sectors. Specifically, work is being done to make street lighting more energy efficient. Although progress is being made on these fronts, there are other needs in terms of technical and financial support. The proposed operation will finance a diagnostic study to determine concrete institution-strengthening measures and the design and application of a strategic plan to strengthen rational energy consumption at the institutional level.

#### 5. Environmental activities

- 3.50 For the feasibility studies and estimate of the environmental benefits for pilot programs conducted under the program, the terms of reference are to include specific criteria for evaluating environmental feasibility, based on the environmental standards and policies in force. The advisory assistance provided will supplement the activities for institutional strengthening of the national environmental protection system, currently being carried out with an IDB loan.
- 3.51 The decline in fuel consumption and the use of cleaner fuels will have a favorable impact on the environment. Reducing the consumption of heavy fuels and partially replacing them with natural gas will lower the total volume of nitrogen oxide and sulphur (NOx and SOx, respectively) emitted into the atmosphere and

will reduce carbon dioxide (CO<sub>2</sub>) emissions and their effect on global warming.

B. Organization and execution

1. Borrower and executor

- 3.52 The borrower of the loan will be the Republic of Colombia. The executing agency will be the Ministry of Mines and Energy, through the UPME. Strategic oversight, activity planning and budgeting and devising plans of execution with the beneficiary agencies will be the responsibility of a steering committee recently created for this purpose. The committee is made up of the director general of the UPME, and the chief of the infrastructure unit of the National Planning Office [Departamento Nacional de Planeación] (DNP).

2. Beneficiaries

- 3.53 Because the program will cover a wide range of activities in the infrastructure sectors, the program beneficiaries will be as follows: the UPME, and DNP, the Ministries of Mines and Energy, the Environment, Education and Transportation, the CREG, ECOPETROL, state-owned mining companies, ICONTEC, and companies in the electrical sector. Because this is a multisector program, other sector agencies might eventually benefit from the program as well. If the beneficiary is a private company, the funding will be provided on a reimbursable basis.

3. Technical aspects of execution

- 3.54 The program will be carried out over a three-year period and, given the range of objectives planned, must be designed to be flexible enough to respond to any needs that may arise while the program is in progress. Therefore, annual plans of operation will be prepared by the steering committee and reviewed by the IDB technical team, based on the conditions agreed upon as part of the program. For an activity to be included in the plan of operations it must meet the eligibility criteria.
- 3.55 **Eligibility criteria.** To be eligible to be financed with resources from the proposed loan, the proposed activities must: (i) be consistent with the proposed program's objectives; (ii) be concrete proposals that can be successfully carried out; and (iii) have the support of the potential beneficiaries for implementation of the activities and the recommendations.
- 3.56 As regulation in the energy sector is indispensable for the success of the program, a regulatory framework for the sector that promotes energy efficiency will be kept in force throughout program execution. The specific activities will be structured according to the general guidelines for implementation of a pricing and rate

policy for the sector that is based on principles of financial self-sufficiency and economic efficiency, which are essential to in promote rational energy consumption; the national policy on promoting private participation in the sector; and Law 142 (household utilities law) and Law 143 (electric power law). In addition they complement other activities already in progress.

- 3.57 The plans of operation will include information on the following: (i) the activities to be carried out during the period when the program's measures are being implemented; (ii) the planned sequence of activities; (iii) the expenditures for the hiring of consulting services and procurement of equipment; (iv) the objectives and specific goals that the activities are to achieve; and (v) the respective beneficiary. The activities included in the plans of operation must complement initiatives currently being financed by the IDB and/or other international agencies.
- 3.58 The annual plans of operation will include the activities, the tentative plan for how they will be financed, showing both the IDB resources and the local counterpart funding, and the potential beneficiaries. Subsequent plans of operation, to be reviewed every six months, will cover the remainder of the program. The plan of execution will be reviewed every six months and must be agreed upon by the executive committee in consultation with the Bank's technical team.
- 3.59 Because this is a multisector program and the advisory services will need to be highly specialized, while the activities of the program are under way, the steering committee will interact with the beneficiary agencies and with the technical units of the Bank. The technical support will be part of the work to be performed by the Bank's specialized units with the help of the Country Office.
- 3.60 Working closely with the beneficiaries and in consultation with the Bank, the respective executing agency will prepare the terms of reference for each activity, detailing their costs and timetable. The terms of reference are to be submitted to the Bank for its nonobjection, which must be remitted within a reasonable time frame, depending on the scope of the proposed consulting services.
- 3.61 Before the terms of reference are sent to the Bank, the steering committee and the respective beneficiary are to agree on the objectives, characteristics and scope of the consulting services to be hired. The agreement, stipulating the commitments undertaken by the beneficiary, is to be attached to the respective terms of reference to be forwarded to the Bank for consideration.
- 3.62 Once an activity has been designed and agreed upon, the steering committee, in consultation with the respective beneficiary, will appoint a counterpart technical team that will monitor performance of the contracts signed with the consultants and/or specialized consulting firms. In consultation with the Bank, this team will be

responsible for evaluation and approval of the reports that the consultants are contractually required to submit.

4. Administrative aspects of execution

a. Coordination unit

3.63 A coordination unit will be created in the UPME and will be in charge of overall administration of the resources. The functions of this coordination unit will be purely administrative in nature and will include coordination of: (i) the signing of agreements with beneficiary agencies; (ii) preparation of the terms of reference with the respective technical units and with the help of the general technical coordinator, which terms of reference will then be submitted to the steering committee for approval; (iii) matters relating to the preparation of short lists, publication of notices, selection and evaluation of proposals, hiring of consultants and procurement of goods in accordance with Bank procedures; (iv) contracts administration; (v) the beneficiaries' participation in the performance of the contracts; (vi) preparation of the respective reports for the steering committee and the Bank; and (vii) submission of all the necessary information to the Bank.

3.64 In consultation with the steering committee, the coordination unit will also develop the method used to select consultants, devise a standard model contract, evaluate the credentials of the consultants and consulting firms, and provide assistance in their application and selection, all in accordance with Bank procedures. The IDB Country Office in Colombia will provide the coordination unit with any assistance it may require in following the respective procedures.

b. Administrative services for the program

3.65 Under current Bank policy, a borrower must select consulting services through competitive bidding. However, for this technical cooperation loan, the borrower has requested that the Bank waive the required bidding procedures in the case of the program's administrative services and directly hire the United Nations Development Programme (UNDP). One administrative office will handle all the IDB funds and the local counterpart funding as well.

3.66 This request was made because of the technical and institutional advantages that the UNDP offers by comparison with the other alternatives available. In terms of technical expertise, the agency and its staff have the capacity to administer consulting services and experience in this area as well as effective coordinating mechanisms. On the institutional front, the UNDP enjoys a good working relationship with the borrower, effectively assisting the latter to identify and coordinate individual experts and consulting firms as well as to administer the respective



commitments and ensure that they are observed. The UNDP also has the capacity to facilitate project execution, hiring mechanisms, and disbursement of funds efficiently and effectively.

- 3.67 The option of having these services contracted out directly by the executing agency and/or local entities was examined but was not found to be viable. The Government of Colombia justifies its request on the basis of the experience with previous technical cooperation programs in which the UNDP was hired to provide administrative services. UNDP-administered programs had fewer problems with hiring procedures, awarding of bids, contracting and conciliation.
- 3.68 Accordingly, and pursuant to policy GS-603 allowing the Bank to make exceptions so that specialized agencies can be contracted, it is recommended that the UNDP be contracted directly to provide administrative services for the proposed technical cooperation loan. The procedures governing the administration of the operation (such as audits, submission of financial statements, etc.) will need to conform to the requirements of Bank policy.

c. Disbursement authorizations

- 3.69 Disbursements will be made in accordance with IDB procedures. To facilitate the operation, a system may be established for an advance of up to US\$1 million which is equivalent to 10% of the reimbursable financing, provided the Bank's procedures have been followed. According to estimates, the disbursements would be made over a period of no more than four years.
- 3.70 Before authorization for the first disbursement is given, the borrower must submit evidence, to the Bank's satisfaction, that it has signed the agreement with the UNDP for the latter to provide administrative services.

d. Hiring of consultants and procurement of equipment

- 3.71 Individual, short-term consulting services will have to be hired to carry out some of the proposed activities. Therefore, to expedite contracting and simplify processing by the Bank, it is recommended that activities costing the equivalent of US\$50,000 or less be contracted by the executing agency through the UNDP without being required to submit terms of reference or short lists to the Bank for approval. In any event, the executing agency must inform the Bank ex post of any and all contracts and keep all necessary documentation, which will be examined at the Bank's request.
- 3.72 While the plans of operation are being drawn up, this system will be evaluated to determine whether it should be continued. The executing agency's capacity to perform this kind of contracting will also be evaluated and the IDB Country Office will institute a

sampling system as part of the ex post review agreed upon for such contracts.

- 3.73 For contracts involving sums in excess of US\$50,000 and under US\$200,000, the executing agency is to submit to the Bank for its nonobjection the terms of reference, selection procedures and, if applicable, announcement procedures to be used and a short list of the consultants and/or consulting firms from which the selection will be made.
- 3.74 Bank procedures will be followed for all contracts in excess of US\$200,000. To expedite the announcement and prequalification processes, once the activities in the plans of operation have been agreed upon, the respective announcements will be published in the United Nations publication *Development Business*.
- 3.75 While no equipment purchases are planned, Bank procedures will be followed should it prove necessary to purchase equipment during program implementation. When the estimated value of the goods to be purchased is equal to or greater than the equivalent of US\$350,000, procurement will be by international competitive bidding. This figure is justified since foreign bidders generally only compete for IDB-financed projects when the amounts involved are over US\$350,000.
- 3.76 Annex III-2 contains the tentative plan for the procurement of goods and services.

C. Monitoring of the program

- 3.77 While the program is in progress, technical missions will be conducted every six months for administration purposes. The steering committee, with the help of these missions, will evaluate the activities included in the previous plan of operations and decide the specifics of the plan for the next six-month period and subsequent periods, based on the criteria and system proposed. A followup should be conducted to determine whether the goals set for each year of the program have been met.
- 3.78 A midterm evaluation will be conducted 18 months after program initiation, based on which decisions can be made on any adjustments needed to improve the program. The final evaluation of the program (chapter V) will be conducted once the final plan of operations has been carried out.
- 3.79 The objectives and specific goals that the program's activities are to achieve will be further detailed and reviewed while the operation is under way. Based on the guidelines set out in CONPES document 2801, the specific targets for year one include:

- a. Design a financial plan and a study for regulation that encourages energy savings; establish and develop a methodology for energy audits in at least one subsector of the industry; and design and launch a campaign for rational energy consumption for year one based on the lessons learned from previous campaigns.
  - b. Evaluate the technical, financial, economic and environmental feasibility of at least one cogeneration project in industrial parks and prepare a strategy for carrying it out.
  - c. Analyze options for the use of fuel gases in urban public transport, select the most appropriate, and define and launch an action plan.
  - d. Define an institutional and financial plan for setting up energy management businesses, and promotes the introduction of such a plan in at least one company.
- 3.80 The goals and targets of the plan of operations for years two and three of the program will be determined, with the help of consultants by the steering committee and the Bank's project team upon completion of the operating plans for years one and two. These plans will need to include quantitative targets for each of the components of the project (paragraph 3.1).
- 3.81 The project team consisting of staff from the technical units at Headquarters and the Country Office in Colombia will bear basic responsibility for general supervision of the program by the Bank.

D. Total cost and financing

- 3.82 The total cost of the proposed technical cooperation program is US\$12 million. The IDB funds for the technical cooperation loan of up to US\$10 million will come from the single-currency facility of the Bank's ordinary capital and will be reimbursable. The borrower will contribute the equivalent of US\$2 million, which will come from local contributions and the beneficiary entities.
- 3.83 The IDB loan will be in United States dollars, for which the Colombian government will use the Single Currency Facility. The IDB financing will be made available once the Bank's Board of Executive Directors approves the loan and once the rules and regulations that the Bank establishes for programs of this type have been complied with. Provision has also been made for recognition of prior expenditures to the equivalent of 10% of the financing, that have been incurred to help finance activities that need priority attention and that have adhered substantially to Bank procedures.
- 3.84 The disbursements will be made within a four-year period. The loan proceeds will be disbursed at the government's request and will be

deposited in a single account which the UNDP will administer. The latter is to submit the respective financial statements to the executing agency promptly. The executing agency and the Bank will oversee the UNDP's administration of program resources.

- 3.85 The terms and conditions of the IDB loan can be summed up as follows:

Amortization period: 20 years  
 Disbursement period: 4 years  
 Interest rate: variable  
 Inspection and supervision: 1%  
 Credit fee: 0.75%  
 Currency: US dollars from the single currency facility

- 3.86 The table that follows summarizes the program's total cost and breaks it down between IDB financing and local counterpart funding. Unless the total cost of the program changes, the amounts shown for each sector may be reallocated after consulting with the Bank during preparation of the plans of operation.

SUMMARY OF THE TOTAL COST AND SOURCES OF FINANCING (in US dollars)			
Activities	Cost	IDB financing	Local counterpart funding
1. Orchestrating demand	4,510,000	3,600,000	910,000
2. Optimizing generation	1,650,000	1,370,000	280,000
3. Fuel substitution	1,350,000	1,090,000	260,000
4. Supporting activities	2,650,000	2,200,000	450,000
<b>Subtotal</b>	<b>10,160,000</b>	<b>8,260,000</b>	<b>1,900,000</b>
5. Coordination unit and technical support	500,000	400,000	100,000
6. Administration services <u>a/</u>	305,000	305,000	0
7. Inspection and supervision <u>b/</u>	100,000	100,000	0
8. Contingencies	935,000	935,000	0
<b>TOTAL</b>	<b>12,000,000</b>	<b>10,000,000</b>	<b>2,000,000</b>

a/ This represents a maximum of 3% of the funds allocated to financing the activities under each component.

b/ Equivalent to 1% of the IDB loan.

#### IV. BENEFITS AND RISKS

##### A. Benefits

- 4.1 With the proposed technical cooperation, officials in the electric power sector will have the information, tools and concrete plans to introduce energy efficient measures. These measures will help reduce the rate at which energy demand and consumption are increasing and consequently slow down the investment program and fuel consumption.
- 4.2 Reducing fuel consumption and using cleaner fuels will have a positive impact on the environment. The reduction in the consumption of heavy fuels and their partial substitution with natural gas will reduce the total volume of nitrogen oxide and sulphur (NOx and SOx, respectively) emitted into the atmosphere and will decrease carbon dioxide (CO<sub>2</sub>) emissions and their effect on global warming.

##### B. Risks

- 4.3 Proper and timely execution of this program should be facilitated by the coordinating role that the steering committee will play, which will establish the goals and priorities to be achieved and coordinate the various agencies participating in the program. This will substantially reduce the risk of interagency coordination problems that multisector programs can have. Given the innovative nature of these mechanisms and the ongoing technical advances, the proposed operation has the flexibility to be adjusted as necessary during the implementation phase.
- 4.4 For the objectives to be achieved fully and the recommendations resulting from the activities to be put into practice, the counterpart agencies and program beneficiaries will have to participate in and be committed to the program. To reduce the potential risks, the potential beneficiaries and the steering committee are to agree upon the objectives, characteristics and scope of the activities and to be actively involved in its implementation.
- 4.5 Finally, determining the financing needed to implement the recommendations resulting from the advisory assistance and identifying the sources of that financing will help guarantee the availability of financing for such implementation.

## V. EVALUATION

- 5.1 Given this operation's characteristics and in order for it to function smoothly, a midterm evaluation will be conducted to help ascertain and agree upon the adjustments needed to the program, if any. There will also be a final evaluation of the program. The review and clearance of the consulting reports will be helpful in these evaluations. The observations that, under the terms of reference, the executing agency and the beneficiaries will prepare concerning the performance of the services contracted will be used to prepare a summary of the performance of the consulting services in general for each component. The evaluations are also to include concrete data on goals achieved under the program.

**COLOMBIA: TECHNICAL COOPERATION LOAN  
TO SUPPORT THE ENERGY EFFICIENCY PROGRAM (CO-0163)  
LOGICAL FRAMEWORK AND INDICATORS**

OBJECTIVES	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
Markets for rational energy and energy efficiency	<p>Strategy adopted for:</p> <ol style="list-style-type: none"> <li>1. Optimizing the cost of the service</li> <li>2. Optimizing the sector's financial costs</li> <li>3. Mitigating the environmental impact of the production and use of energy</li> <li>4. Orchestrating the country's supply of energy resources, including the use of alternative energy sources, with demand</li> </ol>	<ol style="list-style-type: none"> <li>1. Report on compliance with targets set in CONPES Document 2801 of August 1995</li> </ol>	<ol style="list-style-type: none"> <li>1. Political and macroeconomic conditions supporting economic and environmental optimization of the electric power are maintained.</li> </ol>
<p>Measures for:</p> <p>Managing energy demand</p> <p>Processes for rational energy consumption</p> <p>Fuel substitution</p> <p>Supporting activities</p>	<p>Activities for preparation and/or evaluation of the following have been devised:</p> <ol style="list-style-type: none"> <li>1. Orchestrating energy demand.</li> <li>2. Processes for rational energy consumption</li> <li>3. Fuel substitution</li> <li>4. Supporting activities.</li> </ol>	<ol style="list-style-type: none"> <li>1. Information submitted by the government agencies and beneficiaries directly involved.</li> <li>2. Information obtained during the technical administration missions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Responsibilities are established and financing is available for the new activities.</li> <li>2. The government decides on and implements the rational energy consumption measures.</li> <li>3. Users remain interested in rational energy consumption measures.</li> </ol>

OBJECTIVES	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>Plans for clean coal-burning, use of heavy fuels as asphalt binders, use of charcoal briquettes, institution of construction standards and the use of natural gas in the transportation sector</p> <p>Plans promoting rational energy consumption.</p> <p>Studies on cogeneration projects.</p> <p>Plans and fuel substitution plans for consumption sectors.</p> <p>Plans for strengthening for rational energy consumption and an institutional structure for energy audits and diagnostic studies.</p> <p>Plans for self-financing and incentives for rational energy consumption.</p> <p>Plans for equipment, the construction safety in the use of gas in the transportation sector.</p>	<p>Contracting of specialized consulting services to prepare and/or carry out:</p> <ol style="list-style-type: none"> <li>1. Pilot programs for clean, coal-burning technologies, use of heavy fuels as asphalt binders, use of charcoal briquettes, institution of construction standards and the use of natural gas in the transportation sector.</li> <li>2. Campaigns promoting rational energy consumption.</li> <li>3. Feasibility studies on cogeneration projects.</li> <li>4. Energy savings and fuel substitution plans for the consumption sectors.</li> <li>5. Institutional strengthening for rational energy consumption and an institutional structure for energy audits and diagnostic studies. Creation of energy management companies.</li> <li>6. Systems for self-financing and incentives for rational energy consumption.</li> <li>7. Standards for equipment, the construction sector and safety in the use of gas in the transportation sector.</li> </ol>	<ol style="list-style-type: none"> <li>1. Completed studies</li> <li>2. Recommendations adopted by the government and other consumption sectors.</li> <li>3. Programs of measures approved and in the process of being introduced.</li> </ol>	<ol style="list-style-type: none"> <li>1. Agreements are signed for government agencies and program beneficiaries to participate and collaborate there</li> <li>2. The responsibilities of the executing agency and program beneficiaries are clearly established.</li> <li>3. The executing agency and the beneficiaries perform their functions and take active part in the program.</li> <li>4. Coordination among government agencies is good.</li> </ol>
<p>Members of the steering committee</p> <p>Agreements with beneficiary entities</p> <p>Use of specialized consulting services.</p> <p>Activities in the procurement plan</p>	<ol style="list-style-type: none"> <li>1. Steering committee in operation.</li> <li>2. Number of agreements signed with beneficiaries</li> <li>3. Amount of specialized consulting services retained equivalent to at least US\$3 million per year of the program.</li> </ol>	<ol style="list-style-type: none"> <li>1. Terms of reference submitted and approved.</li> <li>2. Requests for authorization of annual commitments and disbursements.</li> <li>3. Semiannual administration missions</li> </ol>	<ol style="list-style-type: none"> <li>1. Local and international specialized consultants available.</li> <li>2. Local counterpart funding available</li> <li>3. Contracting done in accordance with established procedures.</li> <li>4. Coordination unit functioning properly</li> </ol>



**COLOMBIA: TECHNICAL COOPERATION LOAN  
TO SUPPORT THE ENERGY EFFICIENCY PROGRAM (CO-0163)  
TENTATIVE PROCUREMENT PLAN <sup>1/</sup>**

ACTIVITIES	AMOUNT IN US\$ (thousands)	% FINANCING		BENEFICIARIES	METHOD 2/	PREQUALIFICATION	1 E
		IDB	LOCAL				
STRATEGIZING DEMAND							
Incentives schemes, including rates that encourage rational energy consumption.	300	100	--	MINMINAS CREG POWER COS.	LCB	None	one
Identification of market potential for energy savings	550	90	10	MINMINAS UPME	LCB and/or ICB	To be determined	one three
Training programs in rational energy consumption	660	90	10	UPME MINMINAS	LCB and/or ICB	To be determined	one three
Campaigns on rational energy consumption and energy efficiency	3,000	75	25	MINMINAS UPME ISA ECOPETROL	ICB	Yes	one three
Strategizing demand	4,510						
Optimizing generation processes							
Identification of generation projects in industrial parks, hospitals and commercial centers	130	76	24	MINMINAS UPME	LCB	No	one
Technical, financial, economic and environmental feasibility studies specific cogeneration projects in the industrial sector	500	100	--	MINMINAS UPME Private industry	LCB and/or ICB	To be determined	one
Identification of opportunities for improving energy efficiency in coal-mining industrial processes and evaluation of the environmental benefits	520	76	24	UPME Mining companies	LCB and/or ICB	To be determined	one three
Financing plan to enable rational energy consumption programs to be self-sufficient	500	80	20	MINMINAS UPME CREG	LCB and/or ICB	To be determined	one
Optimizing generating processes	1,650						

ACTIVITIES	AMOUNT IN US\$ (thousands)	% FINANCING		BENEFICIARIES	METHOD 2/	PREQUALIFICATION	E
		IDB	LOCAL				
stitution							
alternatives to use of heavy crudes as industrial fuel	270	74	26	ECOPETROL MINMINAS UPME	LCB	No	one
of heavy crudes as asphalt binders in pavement	400	75	25	ECOPETROL UPME	LCB and/or ICB	To be determined	one
ions for marketing and use of charcoal briquettes in pilot communities	330	76	24	Mining companies MINMINAS UPME	LCB and/or ICB	To be determined	one
ions for use of fuel gases in urban public transportation	350	100	--	MINTRANSPORTE ECOPETROL Municipalities	LCB and/or ICB	To be determined	one
l substitution	1,350						
RTING ACTIVITIES							
ngthening the standards, certification and labeling program	1,500	87	13	MINMINAS UPME ICONTEC	LCB and/or ICB	To be determined	one thre
elopment of construction standards	60	83	17	UPME	LCB	No	one
elopment of energy management businesses	590	84	16	MINMINAS UPME	LCB and/or ICB	To be determined	one
tutional strengthening of the UPME	500	72	28	UPME	LCB and/or ICB	To be determined	one
upporting activities	2,650						
Subtotal	10,160						

ACTIVITIES	AMOUNT IN US\$ (thousands)	% FINANCING		BENEFICIARIES	METHOD 2/	PREQUALIFICATION	S E
		IDB	LOCAL				
ISTRATION AND COORDINATION							
rdination unit and technical support	500	80	20	UPME	LCB	No	one thre
ministrative services	305	100	0	Steering committee	--	No	one thre
tingencies	935	100	0				
ection and supervision	100	100	0				
ministration and coordination	1,840						
	12,000	83	17				
Total							

ICB: specific procurements notices; ICB: international competitive bidding; LCB: local competitive bidding not restricted to local firms.

Costs allocated during preparation of the plans of operations. The total cost is an estimate and will be adjusted according to the proposals submitted.

Costs allocated will be divided among one or more contracts. The method to be used will depend on the amount of each such contract.

PROPOSED RESOLUTION

COLOMBIA. TECHNICAL COOPERATION LOAN No.    /OC-CO  
SUPPORT TO THE ENERGY EFFICIENCY PROGRAM

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 and to adopt such other measures as may be pertinent for the execution of the plan of operations referred to in Document PR-\_\_\_\_\_ with respect to a technical cooperation with the Republic of Colombia, the purpose of which is the execution of an energy efficiency program.

2. That up to the sum of US\$10,000,000 is authorized for the purposes of this resolution, chargeable to the Single Currency Facility of Ordinary Capital resources of the Bank.

3. That the above mentioned amount is to 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.