olade
LATIN AMERICAN ENERGY ORGANIZATION

Dominican Republic: Energy Reform and Economic Transformation

Energy Magazine

Year 22, number 4, October-November-December 1998

- Energy Risk Management: Futures Markets
- Sustainable Energy for Restructured Markets
- Modernization of the Electric Power Subsector in Latin America and the Caribbean
- Energy Statistics
- Calendar of Events

Organización Latinoamericana de Energía

Contents

The *Energy Magazine* is a quarterly publication issued by the Permanent Secretariat of the Latin American Energy Organization (OLADE), under the supervision of its Editorial Board. The signed articles are the sole responsibility of their authors and do not necessarily reflect the official position of the Organization or its member countries. OLADE permits the reproduction of the present articles, in part or in full, as well as illustrations, as long as the source is quoted.

EDITOR-IN-CHIEF
Luiz A. M. da Fonseca
Executive Secretary, OLADE

EDITORIAL BOARD
Ana Lia Duco and Lidia Macías, Argentina/Gloria Villa, Costa Rica/Pedro Morales Carballo, Cuba
Dieuseul Anglade, Haiti/Ricardo Samaniego Breach, Mexico/David Small, Trinidad and Tobago
Cristina Mattos, Uruguay

EDITOR
Gustavo Martínez

PHOTOGRAPHS
Technical Secretariat of the Office of the President of the Dominican Republic,
Eliana Fernandes/Petrobras, Image Bank

Latin American Energy Organization
Ave. Antonio José de Sucre N58-63 & Fernández Salvador, OLADE Building, Sector San Carlos • P.O. Box 17-11-06413,
Quito, Ecuador • Phones: (593-2) 597-995/598-122
Fax: (593-2) 539-684 • E-mail: olade1@olade.org.ec
ISBN 02544-845

Editorial

The countries of Latin America and the Caribbean, at differing degrees of intensity, have been engaged in restructuring their energy sector. The element that they share in this process is the promotion of wider private-sector participation in activities traditionally conducted by the State.

As part of these efforts, new legal frameworks have been established and national regulatory institutions have been created or consolidated, thus fostering an environment of confidence and stability, which in turn is luring investment to the sector and contributing to its sustainability, as well as improving energy service to users.

Over the last few years, OLADE has been studying the evolution of these processes and is determined to quantify their results as its contribution to the development of the region's energy sector.

In this context, the Fourth Energy Conference of Latin America and the Caribbean (***Enerlac '98***) was held in Santo Domingo, the Dominican Republic, on November 16-19, 1998. Its objectives were to analyze the current status and prospects of regional energy sector transformation processes and their insertion in the framework of globalization and sustainable development and to promote business and investments in the energy sector of Latin America and the Caribbean.

The present edition of the *Energy Magazine* provides a summary of the issues and conclusions of the principal events of ***Enerlac '98***: the pre-Conference Seminar on Energy Risk Management and Futures Markets; the Seminar on Sustainable Energy for Restructured Markets; and the Seminar on Modernization of the Electric Power Subsector in Latin America and the Caribbean.

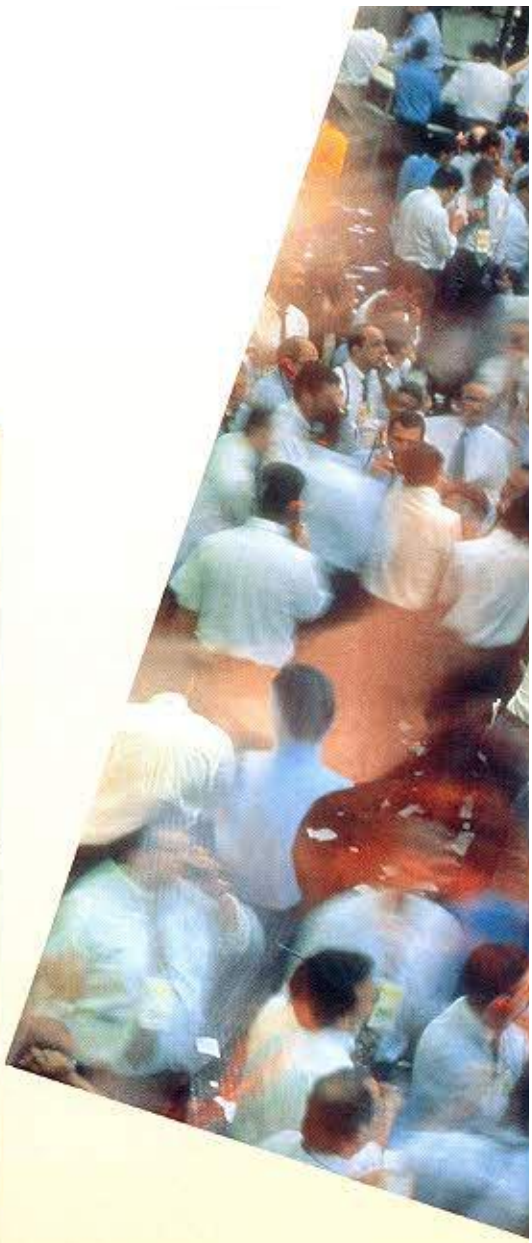
Thanks success to the sponsorship and participation of the Inter-American Development Bank (IDB), the European Commission, and the World Bank, as well as the support of various major companies involved in the regional and world energy sector, ***Enerlac '98*** was a resounding success.

The key factor ensuring compliance with the objectives of ***Enerlac '98*** and its success was the support of the government and public and private institutions of the Conference's host country, the Dominican Republic, which extensively promoted the event with the leadership of the Technical Secretariat of the Office of the President of the Republic.

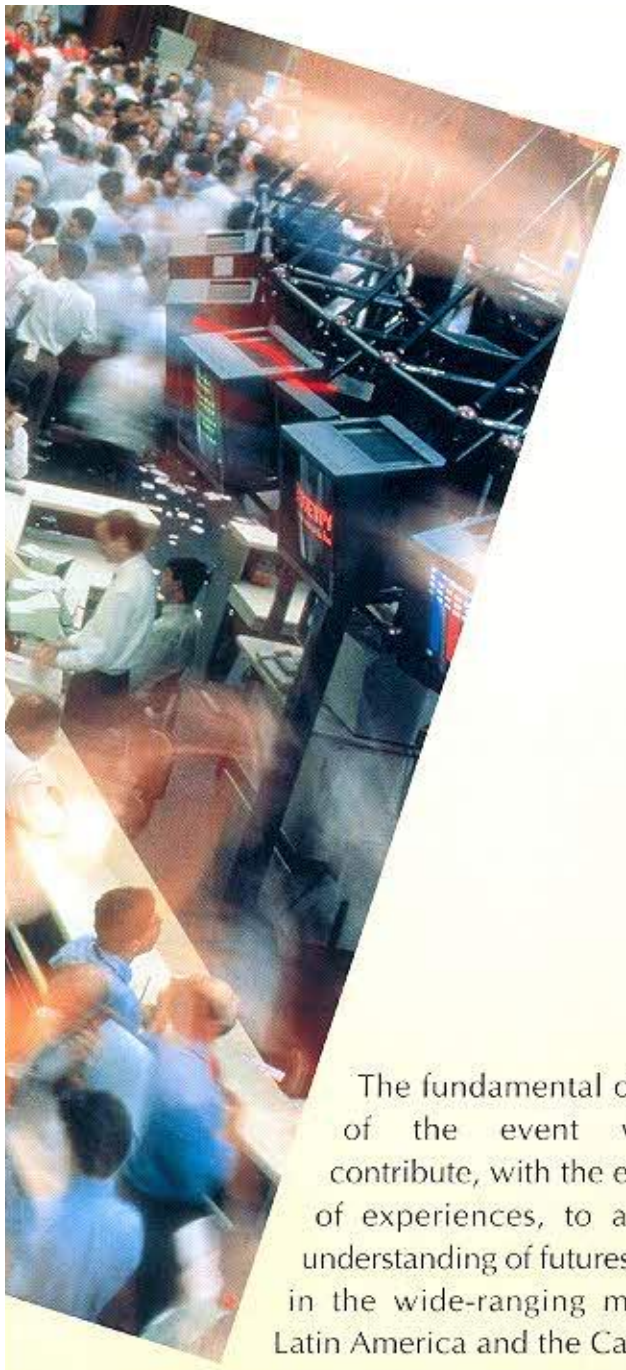
The Dominican Republic, in addition, aroused the interest of those participating in ***Enerlac '98*** for the important reforms it is promoting in the country's electric power subsector, which is the subject of the spotlight section of the *Energy Magazine's* present issue.

Luiz A.M. da Fonseca
Executive Secretary

Seminar on Energy Risk Management: Futures Markets



Before the formal opening of the Fourth Energy Conference of Latin America and the Caribbean (***Enerlac '98***), a pre-Conference seminar focusing on Energy Sector Risk Management: Futures Markets was held on November 16, 1998, under the auspices of the New York Mercantile Exchange (NYMEX)



The fundamental objective of the event was to contribute, with the exchange of experiences, to a greater understanding of futures markets in the wide-ranging market of Latin America and the Caribbean.

It is evident that, at present, uncertainty characterizes markets in general and financial and energy markets in particular. Because of this, it is necessary to find the appropriate mechanisms to reduce the volatility of prices, interest rates, and exchange rates on the energy market.

International energy prices, especially those for oil and products, manifest sharp and constant fluctuations, which are a risk for both producers and consumers. Because of this, some companies, both public and private, find that energy futures market mechanisms provide them with an acceptable degree of security and are resorting, with increasingly greater confidence, to these mechanisms.

In this context, it is now feasible to train skilled teams, who by using instruments for the analysis and management of financial operations, which have been facilitated by the outbreak of new technologies, can provide sophisticated and accurate risk assessments.

During the Seminar, the experiences of the New York Mercantile Exchange (NYMEX), Norway and Sweden, the Brazilian state oil company Petróleo Brasileiro (Petrobras), the Mexican state oil company Petróleos Mexicanos (PEMEX), the Venezuelan oil state company Petróleos de Venezuela, S.A. (PDVSA), and the Electric Power Regulation Entity of Argentina (ENRE), were presented.

NYMEX emphasized the strategy of providing advisory services to national, provincial (state), and municipal governments. Regarding this, it described the case of the State of Texas, which in 1991 applied coverage for royalty earnings of the state company. It also focused on the gas market, which has been involved in risk management and occasionally has unburdened its operations on futures markets, since its deregulation.

As a result of this experience, the Seminar highlighted the importance of promoting incentive programs to distribute both earnings and losses with end-users and provided the example of the State of Delaware, which provides risk coverage for its heating fuels. It indicated that one of the major advantages of this procedure involves the granting of certainty to the approved budget for price fluctuations that might occur.

NYMEX also underscored the importance of using standardized contracts in order to ensure the efficiency that characterizes negotiations in futures markets, where there is no time to discuss at great length contract conditions, since these transactions are carried out simply to eliminate price volatility. The market rule consists of always getting involved in the opposite operation: "If I am selling I buy myself and vice-versa."

The experience of Norway and Sweden as pioneers of the inclusion of the electric power subsector in futures markets is of the utmost interest. For two years now, these two countries have been working together on this, and as of 1999 the actions of the other Scandinavian countries will be incorporated.

The experience of Norway and Sweden highlight the fact that both the planned solution and the market solution minimize short-run marginal costs, which is valid for investments but not for daily financial operations. The latter are supported by spot tariffs, which is not the case for those determined at a distance. Nevertheless, the Scandinavians, because they are pioneers in the installation of futures markets in the electric power sector, have been addressing several problems, especially the concerns of their customers who believe that prices could be lower.

The presentations on company experiences in the Seminar started with that of Petrobrás, which emphasized the wide volatility of energy products and underscored the fact that the greater the volatility the greater the uncertainty, which in turn makes it imperative to cover risks. It also indicated that leaving the outcome to market forces is also a valid decision, but which can be taken as a result of analysis, rather than ignorance of the problem.

Petrobrás is changing its physical operations for NYMEX contracts for its spot market deliveries. The schemes most frequently used by the negotiating team of Petrobrás are the so-called collars and swaps.

The Mexican oil state company, PEMEX, considers that prices, credits, exchange rates, tax payments, and project lags are the company's principal risks. In this situation, the handling of asset and liability risks (amount, maturity, and foreign currency) is very interesting. In this case, the question is: What is the cost-benefit ratio of income stabilization?

PEMEX also formulates a definition of the company's risk appetite, as well as a definition of benchmark or tradeoff between risk and benefits. The company is promoting the incorporation of the so-called real options.

In the Venezuela state oil company, PDVSA, financial engineering has been applied for three years now, especially in the areas of marketing and third-party production. Without any baseline risk, zero-cost swaps or collars are used on crude oil purchases and sales to generate additional income.

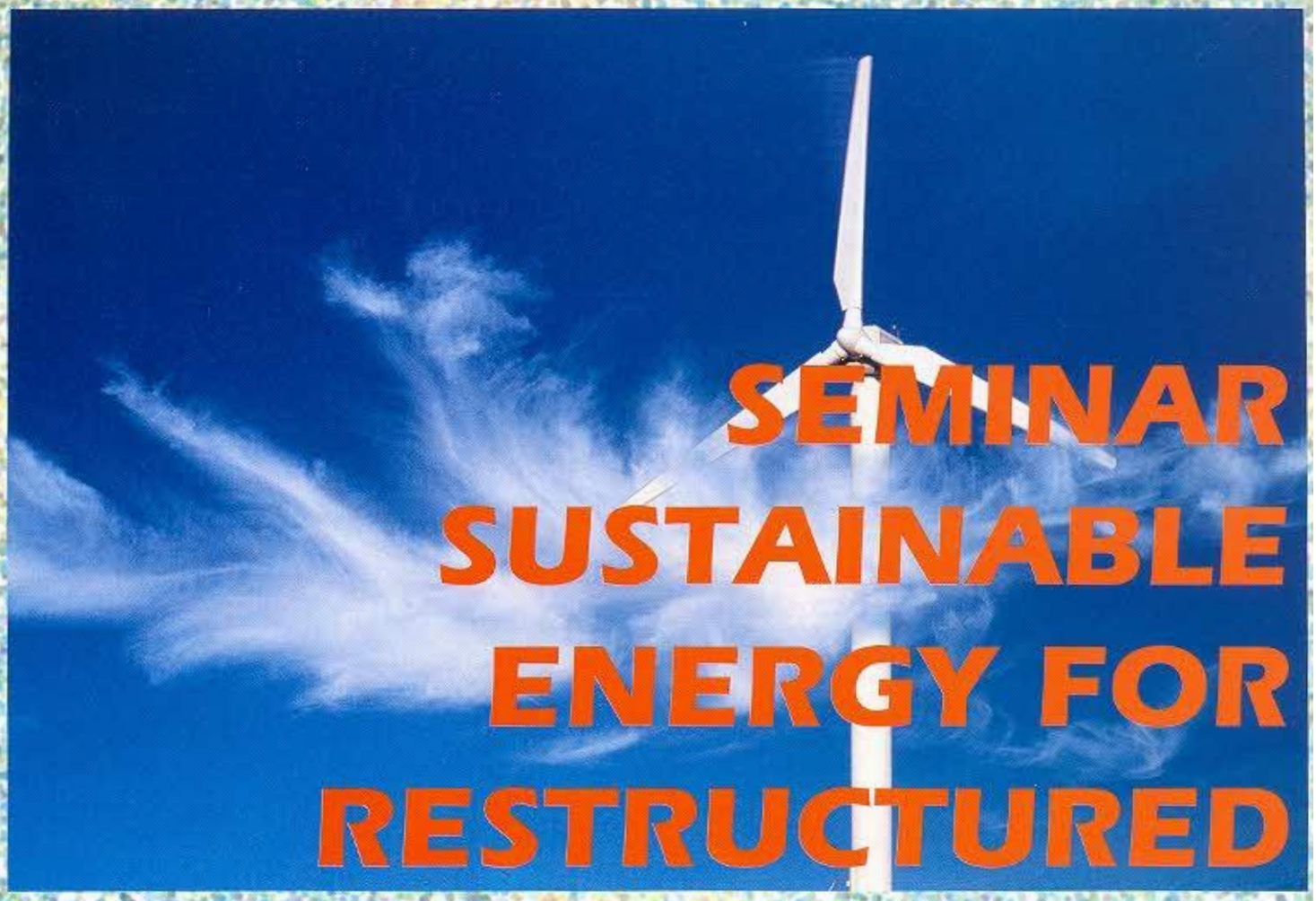
The National Electric Power Regulatory Agency of Argentina (ENRE) explained the characteristics of the forward markets for electric power, which are aimed at lowering risks by

Futures markets and price uncertainty management are mechanisms that help to avoid unexpected changes in companies

paying a price for certainty. When distributors make spot purchases at the season price (forecast and stabilized spot price) by quarter, the operation should be covered by the futures market.

At the end of the Seminar, a round table was conducted with the participation of all the speakers. At this time, it was emphasized that the use of various futures market mechanisms facilitates the management of price uncertainty, provides flexibility in negotiations, permits prices to reflect and activate the sector in local capital markets, and performs as a base tool to avoid unexpected changes in the company.

It was also underscored that it is necessary to train professionals who know about the functioning and scope of the new technologies developed in this area. Otherwise, two types of losses can occur: those stemming from ignorance of operations and those involving speculation, that is, the hedge ratio.



SEMINAR SUSTAINABLE ENERGY FOR RESTRUCTURED MARKETS

The Seminar on Sustainable Energy for Restructured Markets took place on November 17-18, 1998 under the auspices of the Inter-American Development Bank (IDB). It was aimed at promoting the presentation and discussion of experiences in the development of sustainable energy in markets under the competitive conditions now characterizing energy sector development in Latin America and the Caribbean.

In most of the region's countries, energy sector reform is in the process of being fully consolidated. This reform strives to ensure a competitive market with the broad involvement of the private sector.

Private-sector participation and the consolidation of competitiveness are the new challenges for environmental sustainability. Speaking in concrete terms, the markets require incentives aimed at both the efficient end-use of energy

and the generation of clean energy. Signature of the Kyoto Protocol in December 1997 and the COP-4 Meeting in Buenos Aires in November 1998 highlighted the importance of the efficient use of energy and renewables for environmental conservation.

Latin America and the Caribbean has a very high renewable energy potential, especially hydroenergy and geothermal energy. Likewise, there is a possibility of economically using small-scale renewable energy sources, such as small hydropower plants, wind energy, and photovoltaic energy to meet the needs of a high share of the rural population that has no access to modern energy. In addition, programs for the efficient use of energy by the end-user is one of the most attractive alternatives to meet the population's energy requirements.

These profound and wide-ranging reforms in the energy sector are reflected by the issues that are on OLADE's agenda, whose activities are aimed at consolidating processes for the formulation of energy policies that seek to strike a balance between economic growth, social equity, and environmental protection. Working in this same area, IDB has been promoting the program Sustainable Markets for Sustainable Energy.

This Seminar delivered four sets of presentations. The first focused on the perspective of regional organizations regarding problems, new policies, and alternatives for developing sustainable energy resources in the new markets that are being developed in Latin America and the Caribbean. The second addressed experiences in the development of energy service companies (ESCOs) and energy efficiency worldwide, especially in Latin America and the Caribbean.

Afterwards, four case studies of different renewable energy developments in restructured markets were presented, involving geothermal energy, remote energy services in rural areas, solar energy, and hydropower.

Finally, with the participation of IDB, OLADE, the World Bank, the U.S. Department of Energy (DOE), REIA/USAID, and the European Commission, the Seminar organized a panel discussion on the experience and prospects of sustainable energy in competitive markets.

SUSTAINABILITY, HUMAN DEVELOPMENT AND ENERGY

One of the tenets of sustainability states that the objective of development should be the welfare and opportunities provided to human beings. Sustainability is a concept that is far more ample in its meaning than economic growth. Sustainability is an additional criterion, one complementing the concept of human development because it expressly adds to it a provision for future generations.

Human development is not necessarily correlated with per capita GDP. The correlation manifest in social development indicators does not merely depend on the level of production and average income, but rather on other factors, among which the most noteworthy is a social investment policy.

In the future, concerns about development and its sustainability will continue to be different depending on the regions and countries involved, for different reasons. Whereas the world as a whole fears climate change, the decline of fossil resources, and the loss of biodiversity, the prevailing concern of Latin America and the Caribbean is poverty and the overall depletion of its natural resources.

In order to achieve sustainable development in Latin America and the Caribbean, the countries' energy policies must adopt sustainability as their principal approach. To ensure its feasibility, an effective consensus of society, as well as a realistic approach adjusted to current decision-making and coordination schemes (market, globalization), in addition to a tangible commitment by the industrialized countries, is needed.

In addition, in order to ensure the sustainable development of the energy sector, it is necessary to dismantle barriers and incorporate elements that promote the use of technological

options, as well as the effective incorporation of this approach onto the agenda of municipalities or other decentralized entities. Energy policies must also consider a social policy for the benefit of the neediest groups of the population, the intelligent use of incentives and disincentives, based on opportunity pricing processes to facilitate the access to different technological options.

Furthermore, it is indispensable to establish a policy for the promotion of technologies and the creation of energy service markets, as well as a rational policy for tapping fossil resources.

IMPORTANCE OF LEGISLATION AND REGULATION IN THE PROMOTION OF EFFICIENT USE OF ENERGY

The efficient use of energy is a right and an obligation of both society and the State since the majority of the constitutional provisions of the countries of Latin America and the Caribbean have determined that both renewable and nonrenewable natural resources are assets of the nation and that, as a result of this legal framework, it behooves the State to define policies for the preservation and sustainable use of natural assets and to protect the environment.

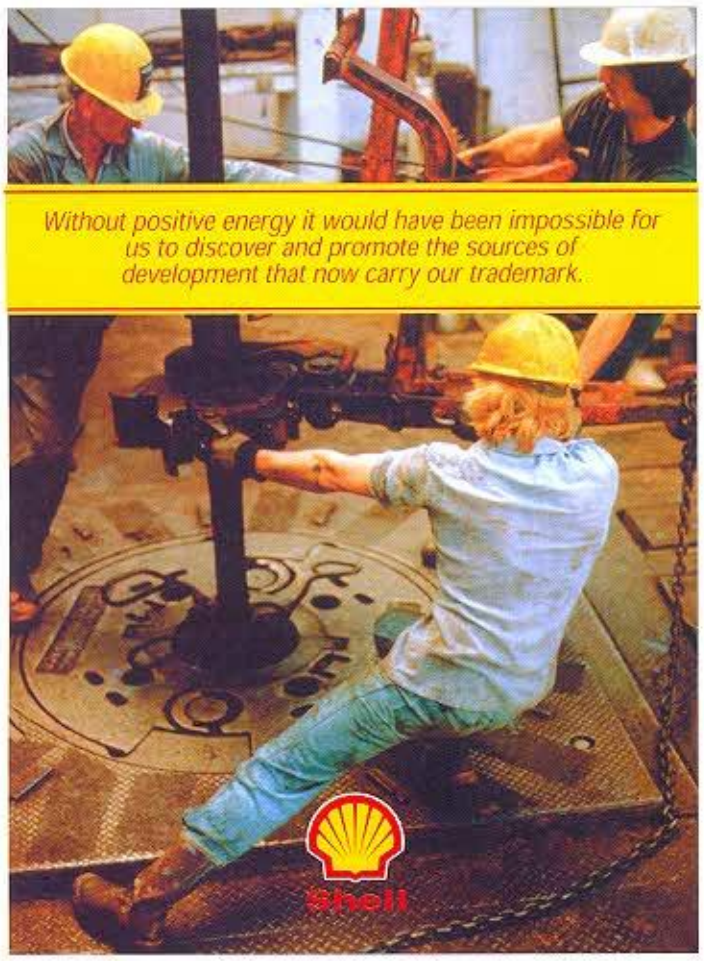
The efficient use of energy should be understood as the right of users to be informed about how to meet their energy needs and use goods manufactured with techniques that enable them to use energy rationally.

In addition to receiving information for the better use of energy, the user should also be

informed about how the supplier provides its service so that the supplier's inefficiencies are not transferred to the customer and how these inefficiencies can affect the price and quality of the service that is provided.

MANAGEMENT OF EFFICIENT USE OF ENERGY AND ENERGY EFFICIENCY MARKET IN EUROPE

The efficient use of energy and energy efficiency markets are included in the broad framework of policies for the efficient use of energy of the European Union and its member countries. The set of laws, regulations, standards, instruments, and programs in this area, with its wealth of experiences and with exceptional future challenges, can serve as a reference for the countries of Latin America and the Caribbean and inclusion in their own legislation. Europe recognizes the need to reconcile the objectives of economic growth, social development, and environmental protection. Various European countries have taken leading roles in the issue of environment and sustainable development. More recently, the European Union and its member countries have made commitments to achieve important reductions in their greenhouse gas emissions. The countries of the European Union are applying a series of instruments, such as legal instruments and regulations, economic incentives, information, technical assistance, research, development and demonstration, commitments, and promotion of energy efficiency markets.



THE IDB PROGRAM SUPPORTING SUSTAINABLE MARKETS FOR SUSTAINABLE ENERGY

In its search for solutions inspired by the relative success obtained in the eighties from promoting the efficient use of energy and renewables, IDB started a program aimed at designing and testing innovative models for sustainable energy approved for the new competitive energy markets. The Program Sustainable Markets for Sustainable Energy (SMSE) strives to find cooperation schemes between donors, IDB, and

governments of the countries, to identify and resolve obstacles to the development of markets for sustainable energy in the region. The Bank is looking for a dynamic long-term catalyzer that would tackle institutional, regulatory, informative, credit access, and business resource problems that hamper the development of these markets.

Different experiences being developed in key market niches, among which energy service companies (ESCOs), which are being developed in Peru, El Salvador, and Argentina, countries where energy sector reforms are quite advanced, were presented by IDB during the Seminar. Regarding this, the Seminar highlighted the economic opportunities that are available to the ESCOs to provide, for a profit, a wide range of energy-saving services to industrial users and other large consumers, while helping energy service companies to be more competitive.

It is expected that these actions will reduce energy costs for the consumer, improve economic productivity, and mitigate the environmental impacts stemming from energy consumption.

Another important experience in the program is to promote and support, both individually and in partnership, equipment suppliers, NGOs, partnerships, and individuals for the expansion of rural energy service markets in the different countries of the region, similar to what is being done in Brazil.

Likewise, the development of efficient and clean urban transportation has been considered; to do this, comprehensive and innovative solutions are being proposed to meet the needs of the entire range of transportation users, while preserving the quality of the urban environment. At present, a model displaying these features has been implemented in the city of Curitiba, in the State of Paraná in Brazil, and it is expected that it can be replicated in other cities of Latin America and the Caribbean. In Cuenca, Ecuador, a similar project with the same characteristics will also be launched soon.

ENERGY EFFICIENCY AND ENERGY SERVICE COMPANIES (ESCOs)

Restructured markets should lead to improvements in system efficiency, foster competitiveness, reduce energy costs, encourage the participation of the different economic sectors, and eliminate cross subsidies.

In this context, the governments can promote policies to enhance the efficiency of energy systems, promote economic development, and reduce environmental damage.

To ensure energy efficiency, it is necessary to take into account the type of activity where it will be applied, the development of the participating organizations or companies, and the funding sources.

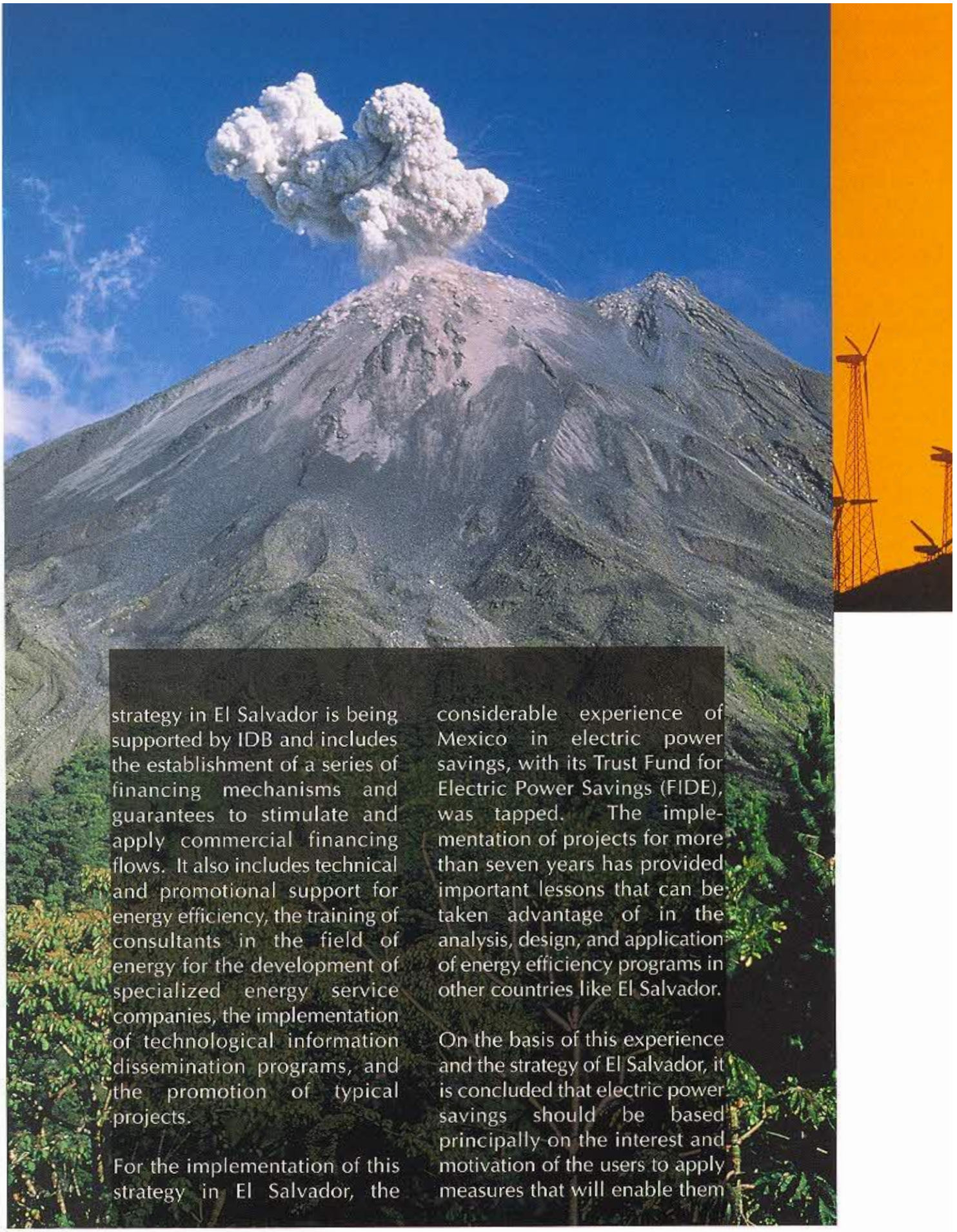
One type of organization being created to promote energy efficiency is the energy service company (ESCO); some of these companies, in addition to promoting energy efficiency, are involved in providing a full range of energy services.

The development of ESCOs in Latin America and the Caribbean provides an institutional and financial solution for the implementation of energy efficiency programs.

The strategy to develop energy efficiency should envisage the characterization of specific markets, policies, and implementation policies.

EL SALVADOR AND THE ENERGY EFFICIENCY PROGRAM STRATEGY

The evolution of the strategy of implementing measures to promote and market energy efficiency in El Salvador, where the scheme for the electric power sector has shifted from a state-owned utility to a model based on the private sector and the business initiatives of energy efficiency companies, which must comply with the varied requirements of electricity consumers, was analyzed as a special case in the Seminar. This case is of special interest because the general reforms in this country's electric power sector take into account the opening up of competition up to the end-user level. The



strategy in El Salvador is being supported by IDB and includes the establishment of a series of financing mechanisms and guarantees to stimulate and apply commercial financing flows. It also includes technical and promotional support for energy efficiency, the training of consultants in the field of energy for the development of specialized energy service companies, the implementation of technological information dissemination programs, and the promotion of typical projects.

For the implementation of this strategy in El Salvador, the considerable experience of Mexico in electric power savings, with its Trust Fund for Electric Power Savings (FIDE), was tapped. The implementation of projects for more than seven years has provided important lessons that can be taken advantage of in the analysis, design, and application of energy efficiency programs in other countries like El Salvador.

On the basis of this experience and the strategy of El Salvador, it is concluded that electric power savings should be based principally on the interest and motivation of the users to apply measures that will enable them

to reduce payments for their use of electricity.

Likewise, it is evident that there is a need for a service infrastructure such as energy service companies (ESCOs), in addition to the active participation of electric power utilities and the availability of efficient appliances on the market.

It is emphasized that energy saving is technically feasible and profitable for projects and that it is necessary to develop energy savings dissemination programs, as well as promote a process of standardization that would include labeling.

GEOTHERMAL ENERGY IN COMPETITIVE MARKETS OF LATIN AMERICA AND THE CARIBBEAN

Geothermal energy is a resource that has a great deal of potential in Latin America and the Caribbean. Nevertheless, recent reform and privatization processes taking place in the majority of the region, along with the risk inherent to the different phases of geothermal energy production, could impede the use of this valuable energy source. To avoid this, mechanisms have to be found to reduce or share the costs, risks, and benefits equitably between governments and private-sector or mixed enterprises. These mechanisms should provide clear, transparent rules for investors.

It should also be underscored that geothermal energy development and operating costs have been declining, making geothermal energy increasingly competitive and arousing the interest of investors in participating in the different stages of geothermal energy development. To do this, at present, there are options on the basis of which risk is taken completely by the investor up to where it assumes only the risk of power generation.

RURAL ENERGY SERVICE SUPPLY IN BRAZIL

Another sustainable energy development experience described at the Seminar is the one carried out in Brazil by the Teotonio Vilela Foundation (FTV), a NGO located in the northeastern part of the country. The basic premise of the projects being implemented by FTV is environmental and economic sustainability and local self-management. It has tried to avoid the growth of models using diesel generators. It has implemented solutions that are affordable for rural population groups in small towns or villages. These solutions are all based on photovoltaic generation using battery-charged stations for rural communities with more than 70 users and unit household systems for communities with less than 70 households. The Foundation has developed micro-businesses to achieve autonomous technical capacity, as well as to ensure self-financing of the users.

At present, the Teotnio Vilela Foundation is working on the Energy Development Program of the States and Municipalities of the Ministry of Mines and Energy of Brazil for the electrification of different community services. In 1999, it is expected that 3,000 communities will be provided with electricity in the country.

EXPERIENCE WITH SOLAR ENERGY IN THE DOMINICAN REPUBLIC

At the seminar, the SOLUZ Company of the Dominican Republic also described its experience in developing rural electrification using photovoltaic energy. At present, it has 5,000 customers. Investment, operation, and maintenance of the systems are carried out commercially between the users and SOLUZ. It is expected that this experience will be extended to other countries, such as Honduras.

SMALL AND MEDIUM-SIZED HYDROPOWER PLANTS IN COMPETITIVE MARKETS: THE CASE OF RIO PIEDRAS, COLOMBIA

The first initiative of private-sector hydropower generation in Colombia, within the new competitive legal framework, is the Hydropower Project of Piedras River. Different standards were adopted in its design and construction to ensure more competitive operation in a free market, marked by high price fluctuations and subject, to some extent, to the market power of the large generators.

For its development, it was necessary to address different situations that are not very propitious, such as financial risk, mainly for hydropower projects, and the lesser financial impetus being given to hydropower projects compared to thermoelectric and gas-fired projects.

The barriers, challenges, and risks of the project were handled in accordance with technical criteria and actions in the technical, economic, financial, and environmental areas.

Among the relevant economic and financial aspects of this experience presented at the Seminar, there is the size of the project (22.4 MW), which facilitated the placement of risk capital and financing in the stock and financial markets of Colombia, despite the aversion to risk on the part of investors when dealing with hydropower projects. The marketing is being undertaken by the partial bidding of energy production on the Energy Mercantile Exchange.

CONCLUSIONS OF THE SEMINAR

At the end of the Seminar, a panel was set to highlight the importance of the concept of sustainability, which must become part of a comprehensive overview of all the elements that can ensure the durability of any development strategy, that is political, social, economic, financial, and environmental sustainability.

The participants on the panel concluded that:

There are successful sustainable energy development experiences in Latin America and the Caribbean (efficient use of energy at the consumer level and new and renewable energy sources), in the new competitive energy markets.

Energy markets, as a rule, should reflect all their costs, including

supply, energy sources, and market placement expectations.

Multilateral and bilateral institutions should focus efforts on being the catalyzers for the development of energy efficiency and renewable resource programs.

The growing preference of the population, as in the United States, is aimed at the use of clean electricity, for which purpose different actions are being undertaken such as including support for renewable resources in new legislation and the development and application of new technologies.

To ensure the competitiveness of renewables on a country's market, there must be well-defined energy goals and policies.

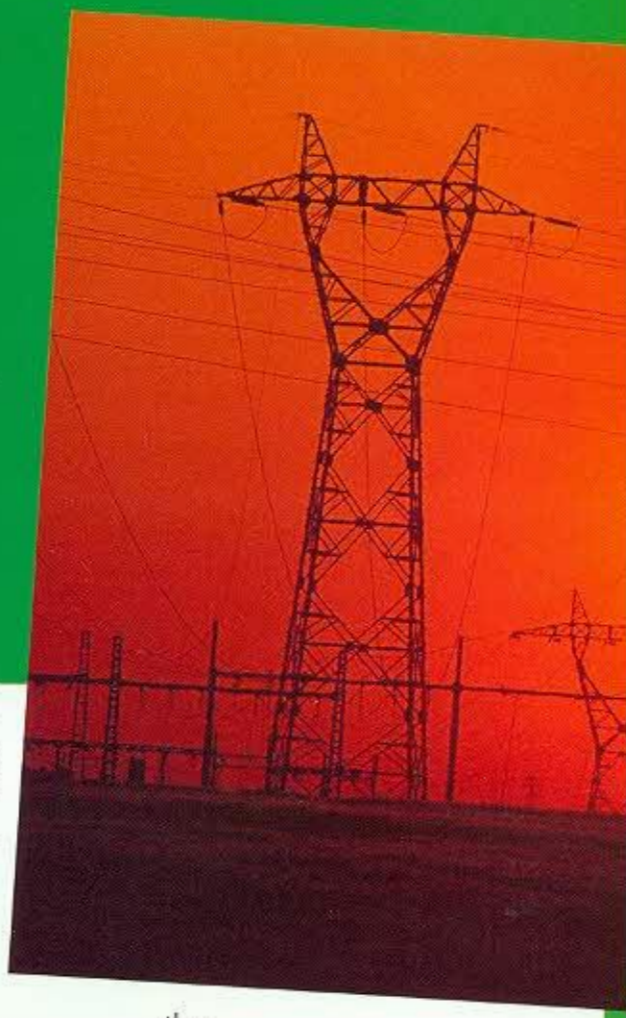
There are still risks or barriers to the development of renewables, and they should be eliminated on the basis of mechanisms that provide clear and transparent rules.

It is necessary to implement strategies and different financial mechanisms that would permit the development of renewable energy projects and energy efficiency programs.

One item that has been left open for discussion is how to mitigate risks by sharing them and their costs between the public and private sectors.

At present, sustainable market conditions are being promoted for the use of renewables and energy efficient programs with three basic objectives: increase electricity coverage in rural areas, reduce greenhouse gas emissions, and promote the transfer of high technology, as USAID does. Thus, actions aimed at improving regulatory frameworks, financing mechanisms, information dissemination, and training are being supported.

Energy Reform: Key Element for the Economic and Institutional Transformation of the Dominican Republic



In order to have an overview of the Dominican Republic's energy sector and the important changes that are taking place, it is necessary to emphasize previously the performance of the country's economy, which over the last five years has shifted from a situation of scarce economic growth and high levels of inflation to a situation of steady growth, economic stability, high savings and investment, and external solvency.

In the eighties, the growth of the Dominican economy, on average, amounted to 3.6% per year, whereas between 1993 and 1998, economic growth was equivalent to an annual rate of 6.4%. Likewise, while annual inflation amounted to 21.7% during 1980-1989, over the last five years, growth of prices has not, on average, been over two digits.

Investment performance has also been important. As of 1995, the share of gross domestic product aimed at investment has been over 28%, one of the highest in Latin America.

The buoyancy of the Dominican economy over the last few years has been based on the macroeconomic stability achieved thanks to careful management of public finance, the high level of savings and investment, and in particular the steady increase of exports of goods and services, which between 1995 and 1998 grew by more than 50% in terms of U.S. dollars of 1990.

Moreover, the Dominican Republic has been exemplary with respect to the payment of its foreign debt. While in 1990 this debt accounted for 83% of GDP, by 1998 this indicator had declined to 21.6%. Between

1993 and 1998, Dominican foreign debt dropped by about US$1.1 billion.

TOWARD THE TRANSFORMATION OF THE DOMINICAN ENERGY SECTOR

What has been the driving force behind the transformation of the energy sector in the Dominican Republic?

There are basically two elements involved here: improvement of the living standards of the population and competitiveness of the country's production sectors.

In the case of the Dominican Republic, which is a net importer of energy, capital goods, and technology, to manage the energy crisis of the seventies and eighties resources needed for other sectors had to be transferred to the energy sector and a considerable public debt was incurred. All of this debt was aimed at funding subsidies and covering up inefficiencies that undermined the future.

Already in 1990 subsidies to fuels and the electric power sector had reached such a magnitude that the State was unable to assume the burden, and this triggered a crisis that led to outages and fuel shortages.

Fortunately, the economic crisis of 1990 led to a series of dramatic decisions in the area of oil and gas. Although all the necessary reforms did not take place, prices were adjusted so that costs could be covered and a profit margin could be secured to invest into development actions. Even when sector reform remained pending, except for specific transitory conditions, Dominican society began to enjoy growing fuel supply security, which was possible to ensure even the first days after Hurricane Georges hit the country in September 1998.

Regarding the electric power subsector, it should be emphasized that the Dominican Republic is involved in a rapid process of economic modernization and urbanization, which requires increasingly higher consumption of electricity. It is not possible to promote the development of telecommunications, tourism, free trade zones and other industrial activities without high-quality and adequate electric power supply. But it has turned out that the more energy is placed on the interconnected system to meet national development needs, the more

Doctor Leonel Fernández, President of the Dominican Republic: "During the seventies and early eighties, the energy situation of countries such as the Dominican Republic was especially difficult due to increasingly higher prices. But we were lucky to have an organization like OLADE promoting cooperation between our countries to overcome the harshness of those times" (address at the opening of the XXIX Meeting of Ministers of OLADE in November 1998).

resources are lost by the state power utility. Likewise, the more support is required by the state power utility to cover its deficit, the harder it is for the State to provide for the investments that are needed to expand the system to meet growing demand.

DRIVING FORCE BEHIND STATE ENTERPRISE REFORMS

The previously mentioned problem is not exclusive to the energy sector. Various sectors of the Dominican economy are experiencing the same conflicts, with growing need for capital, technology, and management skills that cannot be provided by the State. In this context, the options that have been formulated by Dominican government authorities and, especially, by those in charge of modernizing the country are quite simple: either the country's social and economic development is brought to a standstill in order to buttress a state monopoly that no longer has the right answers or a reform process is launched to find the solution to a situation that can longer be managed by the State.

In a poor society that has been unable to resolve basic health and education problems, which must improve clean water supply, and which has very few resources available to tackle society's most fundamental difficulties, a group of state enterprises that should have generated enormous profits for their owners have become a bottomless pit that, in 1990, absorbed 15% of the national budget. There is no prospect whatsoever that, in the hands of the State, these companies can generate profits and resolve the problems that they were supposed to address.

The urgency of overcoming this obstacle to development has led government authorities to establish a State Enterprise Reform Commission (CREP) of the Dominican Republic and to support its actions.

It was therefore in this context that the State Enterprise Reform Law, the new Telecommunications Law, and the Law establishing the Directorate General of Domestic Taxes were enacted. This was also the situation that fosters congressional ratification of a new Customs Duty Law, a Market Restructuring Law, a Stock Market Law, a Law for Reactivating Imports, a new Social Security Law, a new Monetary and Financial Code, and specifically with reference to the focus of the present article, the General Electric Power Law.

ELECTRIC POWER SUBSECTOR MODERNIZATION LAW

Converting the electric power system into a fundamental pillar of the new development strategy is a challenge that the Dominican Republic has taken up with determination. The culminating point of this effort will be the capitalization and restructuring of the Dominican Electric Power Corporation.

The process started with submittal of the bill of the General Electric Power Law on December 27, 1993, which provides for radical changes in the inter-relations of the national electric power sector, incorporating successful international experiences of electric power markets that have already been reformed.

Among its fundamental objectives, this scheme envisaged the establishment of an open and competitive power generation market that bills the users with adequate prices. The efficiency and productivity of the electric power industry should be achieved by the private sector, which on the basis of rules of the game that have been previously established by the current regulatory framework will have to maximize its profitability and ensure the self-sustainability and growth of a modern and dynamic electric power industry

that is capable of meeting society's growing energy requirements at economically rational prices.

As part of the new scheme, the State is withdrawing from its business function and is starting to play the role of catalyzer and supervisor of an economic activity that brings together both the interests of private-sector investors and those of the collective beneficiaries of this important service.

Until the bill for the General Electric Power Law has been passed by Congress, the Dominican Government is using the current legislation to establish a regulatory framework that is provided for in this legislation.

In view of this new transforming vision of the Dominican electric power sector, what will remain in the hands of the State? According to the State Enterprise Reform Law, hydropower generation and electric power transmission will remain in the hands of the State. For this purpose, schemes are being designed to permit the adjustment of these state players to the new sector operation framework. The state transmission utility will have to serve as the catalyzer for the trade relations between distributors, generators, and large users, permitting free access to its lines. The hydropower generation utility will be administering the contracts that have been drawn up with independent power producers to prevent power from being supplied to the users at a distorted cost.

In addition, in order to consolidate a consistent and sound reform, which will help to diminish the risk perception of investors, a series of contracts for transferring the production rights of power facilities have been drawn up. These contracts support the regulatory scheme that was established by the current legislation with agreements subscribed between the Dominican Electric Power Corporation, which is the state utility that is the sole owner of public power generation and distribution service, and the new utilities stemming from the CDE that will be injected with both private-sector capital and private-sector management.

The capitalization process, which is expected to started in February 1999, has aroused the interest of first-rate international companies, such as Iberdrola, Unión Fenosa, Endesa, Electricidad de Caracas, Gener, Enron, AES, Coastal, EdF, etc. Thus, the electric power supply shortage that the country has suffered for decades will come to an end with the incorporation of private-sector capital by means of capitalization, since these utilities will be obliged to add 100 MW of effective capacity per year to the country's electric power grid.

In addition, the quality and reliability of the service will not mean any additional outlays for the user. The first tariff-setting exercise, which has been designed basically taking into account the spirit and procedures set forth in the regulatory framework, has determined that the current tariff will remained unchanged for the first four years and provides for the gradual application of a technical tariff, thus reducing its impact on the sectors with the lowest consumption of electricity and mitigating the reductions in the sectors with the highest electricity consumption.

Thus, the development and modernization of the Dominican electric power sector will be relying on the business and management capabilities of the private sector and to what extent the success of restructured industries can be incorporated into the country's socio-economic reality, as well as the State's capacity to guarantee an optimal inter-relation between capital assets and the common good.

OIL SUBSECTOR: A LONG-STANDING COOPERATION BETWEEN STATE AND THE PRIVATE SECTOR

The Dominican Republic, as a net oil importer, has witnessed the steady increase in consumption of this energy product over the last few years, as a result of the country's growth in industry, tourism, and trade.

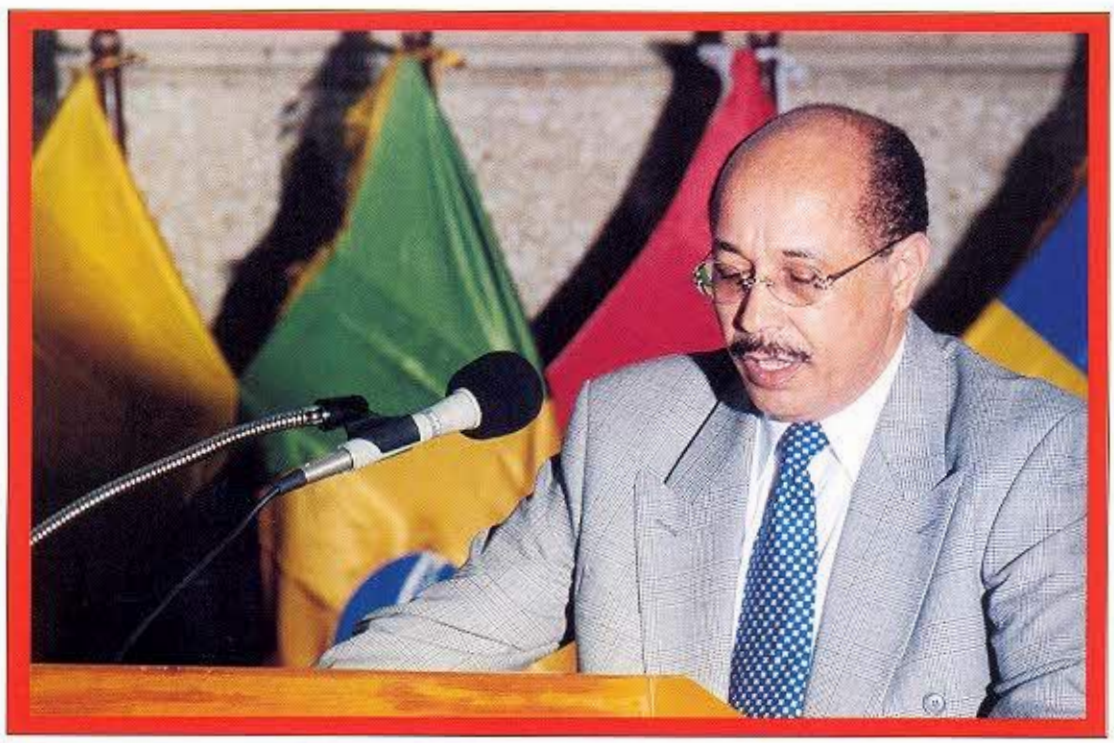
Noteworthy in this subsector is the agreement in force since 1969 between the Dominican Government and Shell oil company, whereby each one is holder of 50% of the shares of the Dominican Oil Refinery (REFIDOMSA), which is operated by Shell.

Oil consumption for industrial use increased by 6.1% from 1996 to 1997. Likewise, the sale of various types of gasoline rose by 6.3% during the same period.

According to data published by REFIDOMSA, the consumption of oil-based fuels has increased steadily over the last few years: whereas in 1995 consumption amounted to 16,998,300 barrels, in 1997 this figure had grown to 17,810,500 barrels.

At present, the refinery uses about 90% of its refining capacity, which is equivalent to 49,400 barrels per day, which indicates that to maintain the growth indicators for the consumption of oil products, steps will have to be taken to enlarge this capacity and meet domestic demand.

The country's authorities are working on this. Their objective is to meet demand in terms of quantity and quality, as an element supporting the socio-economic development of the Dominican Republic.



The Technical Secretary of the Office of the President of the Dominican Republic, Mr. Juan Temístocles Montás, has been promoting transformaton of his country's electric power sector in order to improve the living conditions of the population and build up the competitiveness of Dominican production sectors.

Seminar Modernization of the Electric Power Subsector in Latin America and the Caribbean

As part of ***Enerlac '98,*** a Seminar on Modernization of the Electric Power Subsector in Latin America and the Caribbean was held on November 16-18, 1998, in order to analyze the evolution and experience accumulated in those countries of the region that have carried out, or are in the process of undertaking, structural reforms in the electric power subsector.

The Seminar was aimed at presenting an overview of the current regulatory situation, addressing issues of competition, subregional electric power integration, regulatory framework for rural electrification, and the evolution of average electricity prices.

The principal issues that were tackled involve various aspects of the sector's modernization processes, as summarized below:

According to the forecasting conducted by the region's countries, as well as estimates made by OLADE, the peak demand of the Latin America and Caribbean countries as a whole will increase by more than 7,000 MW per year over the next four years. To meet this increase in electric power demand, production capacity will have to expand by more than 35,000 MW during the period 1999-2002, and this would require a total investment of about US$35 billion in just power generation. This figure could amount to more than US$70 billion if electric power transmission and distribution are included.

Analyses carried out by OLADE have determined that the types of stations that have been considered in electric power programs and forecasting have been varied and depend on the technology available, the degree of private-sector participation, and the resources and reserves of primary energy sources in each country. Thus, it can observed that expansion of power generation could be comprised as follows: 14,758 MW hydro, 1,309 MW nuclear energy, 344 MW geothermal energy, 74 MW wind energy, and the rest conventional thermoelectric energy, most of which with combined cycles, using natural gas, fuel oil, or diesel as feedstock.

There is a wide variety of indicative expansion plans, which usually depend on the economic and energy conditions of each country. Nevertheless, it must emphasized that the short- and medium-term trend is toward the wider use of thermoelectric facilities for power generation, not only because of the substantial penetration of natural gas in power generation owing to the high efficiency it displays in energy transformation, relatively low fuel prices, and lesser environmental impacts, but also the growing participation of the private sector in thermoelectric projects, which require lower investment levels, shorter lead

times and start-up periods and ensure capital recovery in shorter periods of time compared to hydropower projects.

Except for Chile, Argentina, Peru, Bolivia, and Colombia, the legal and institutional frameworks supporting the modernization and liberalization process in electric power activities in the majority of the countries of Latin America and the Caribbean have been installed over the last four years. Countries such as Venezuela, Paraguay, the Dominican Republic, and Cuba are in the process of drafting and/or ratifying their respective legal frameworks, whereas Mexico and Costa Rica have already done so partially in 1992 when they permitted the participation of the private sector in electric power generation activities under certain conditions.

The concept of competition has been included in the majority of laws for the electric power sector. For some countries, this competition is taking place outside the electric power market, by means of bidding processes, whereby the winning utility company obtains a contract that guarantees at least the purchase of power capacity. In this scheme, adopted by those countries where this a single buyer, with a quasi-monopolistic framework, the investor not only minimizes its risks but also ensures the recovery of investment plus a margin of earnings. To a certain extent, this type of private-sector participation does not respond to a real liberalization of the electric power subsector; rather it could be seen as a "costly financing" of the private sector for electric power production activities.

The countries of the region, with the most experience, have seen the overall efficiency of the electric power sector improve: lower loss levels, declining marginal production costs, higher business indicators, etc. Nevertheless, greater attention must be focused on sharing these benefits with the customers of the electric power system and improving service coverage, including rural electrification projects.

SUPPORT TO THE MODERNIZATION PROCESS

The modernization process that is being undertaken by the region's countries in their respective electric power subsectors is backed by international banking institutions. Regarding this, the Inter-American Development Bank (IDB) has set up a new strategy aimed at supporting the development, initiatives, and consolidation of sector reforms undertaken since the last decade by the region's countries. To achieve this, it is suggested that all the instruments available to the Bank in a given country be articulated around a support program mutually agreed upon with the country.

The IDB strategy strives to provide comprehensive support for the development of new energy markets emerging as a result of the reforms, meeting their credit needs by means of the instruments and units that are most suited to the characteristics of each market.

It is also based on a global approach to both energy supply and demand problems. This leads to recommending a multidisciplinary and inter-departmental action to experiment with comprehensive solutions to the complex problem of urban transportation in the region's cities.

IDB proposes the experimental use of new instruments to support the development of futures markets for the energy sector by means of programs that recognize the uncertainty and importance of the process, rather than the project itself, and the importance of learning new skills in new areas. It also recommends the establishment of effective strategic partnerships with other multilateral and bilateral credit entities and technical assistance to complement its action and avoid redundancies in setting up technical teams.

SUSTAINABILITY OF REFORMS

During the Seminar, there was a consensus that the reforms of the electric power subsector have sought to set up an economic structure that would permit self-sustainable functioning so that operation and investments needed for expansion would take place without any outside

contributions, especially government subsidies or outlays.

The financial sustainability of the electric power subsector requires two fundamental elements:

- Restoration and permanence of the financial flows produced by the sector's own economic activity in the different segments of the market, that is, the internal generation of funds, in clear and stable regulatory frameworks.

- The existence of a macroeconomic environment that would permit the evolution of companies under conditions ensuring stability of the rules of the game and minimum legal security.

The first factor is closely linked to the generation of income flows stemming from transactions in the different stages of the process, including transport. The point of departure of this chain is the end-user, who uses the energy and pays for it with resources coming from his own economic activity, that is, they are resources from outside the sector which enter the sector in exchange for electricity supply.

Although apparently simple and trivial, this is a key element so that distributors or traders of electricity can sustain themselves economically and can finance their operations and investments, while fulfilling their commitments to pay carriers and generators, which in turn can thus ensure the financial sustainability of their own activities.

The generation of flows of internal funds is indispensable to gain access to financial markets and lure risk capital and indebtedness to finance investments, and this is very closely linked to the economic structure of the electric power market and the suitable operation of the regulatory system.

The second element is external to the sector and involves the country's general political, economic, and legal conditions. This establishes the country's risk rating and therefore the difficulty and cost of gaining access to capital markets. In turn, it is closely tied to the sector's regulatory framework, the market structure and the operation of utilities because it is difficult to have an orderly and efficient electric power sector in an economy with severe deficiencies, political instability, and overall legal insecurity.

Obviously, to ensure the financial sustainability of the electric power subsector, efficient utilities are needed, but this is the natural outcome of the regulatory framework, which

must establish a suitable economic structure for electric power markets, as well as ensure the correct operation of the institutional regulatory system, that is, the first of the essential factors referred to above. If a utility is inefficient, even in a market with appropriate conditions, it will not be able to generate a flow of internal resources and therefore it will not be financially sustainable. Therefore, if the regulatory framework has been well designed, this utility's defects will be corrected or it will be forced to drop out of the market altogether.

REFORM PROCESS AND ITS FISCAL IMPACTS

The Economic Commission for Latin America and the Caribbean (ECLAC) believes that determining the fiscal impacts attributable to the electric power sector reform process is an extremely complex process, because in addition to the lack of sector information, there would have to be a complete and comprehensive evaluation considering and quantifying short-, medium-, and long-term impacts. The complex fiscal impacts stemming from electric power sector reforms involve both the tax changes observed in the different restructuring processes of the electric power industry (total liberalization or single-buyer scheme) and how the process of selling a state-owned utility to the private sector is conducted.

ECLAC asserts that "although difficult to quantify, in the case of privatization there is a difference between the fiscal impact on the year in which the transfer is made and its total impact." Nevertheless, from the economic standpoint, there is some basic consensus regarding privatization:

- It is not suitable for tackling public account imbalances over the short term.

- It usually leads to improvements in company management, with the resulting improvements in operating efficiency, in the phase before the sale, which generates favorable fiscal impacts over the short term.

- It has positive repercussions on savings, since the reduction of subsidies that is part of the process consolidates the financial sustainability of the corresponding sectors.

- It can be an effective mechanism to improve lastingly public finance, if the earnings are used to reduce public debt and especially to buy debt obligations with a discount on secondary markets."

REFORMS AND SERVICE COVERAGE

Another issue that is increasingly important is the electrification of remote areas. In the course of the last few years, various technologies have appeared for the rural electrification of the region's countries. These technologies, which tap local and renewable energy resources, mainly sun, wind, and small waterfalls and water flows, have come to complement and, on occasion, to substitute traditional electric power supply schemes by means of network extensions and diesel-fired electrogen groups.

On par with the new technologies, new players have appeared, looking for their natural role in the electrification process. At the same time, the role that both public and private electric power utilities must perform in this new phase must be studied. As for the State, it is obliged to redefine the role it has to play in the process of applying the new technologies to provide power coverage to areas that have not yet been connected to the grid by extensions.

REFORMS AND REGIONAL INTEGRATION

In energy integration, there are many bilateral or multilateral efforts that have been made in the region in order to ensure an electric power integration that will establish a nondiscriminatory environment where prices and tariffs reflect efficient economic costs, without any distortions that could affect subregional trade, and where competitiveness provide the guidelines for the configuration of electric power trade. This is the case of Central America, where the Framework Treaty for the Electric Power Market of Central America (1996) was signed to progressively create a subregional electric power market. Likewise, in South America, especially the MERCOSUR countries, various agreements, memorandums of understanding, protocols, etc., have been formalized over the last few years to promote suitable legal conditions favoring the subregion's energy integration process. As part of the electric power integration process, the countries that are members of MERCOSUR have recently formally entered into a Memorandum of Understanding on Electric Power Exchanges and Electric Power Integration in MERCOSUR (1998).

It is possible that, over the short or medium term, there will be suitable conditions for the operation of electric power systems and the expansion of power generation infrastructure to take place in an environment of cooperation, regional coordination, and competition with clear market rules leading to the establishment of a large regional or subregional power market.

From the strategic standpoint, an integrated and coordinated market would lead to lower production costs and the more efficient development of energy resources and reserves, based on an electric power operation that taps the diversity of hydrological conditions prevailing throughout the continent, different hourly schedules, load curves, seasonal variations, and concentration of primary energy sources of each one of the countries. As occurs in Central America, the possibility of carrying electric power from one country to another, using the grids of one or two countries, is another aspect that must be considered in regional electric power integration schemes. In this integrated model, with a well-organized

regional operation and open power expansion, private-sector investors could find greater opportunities that would lead to economic benefits for the population. Thus, it would be necessary to eliminate the technical, commercial, legal, etc. barriers so that, over the medium and long term, subregional and regional electric power corridors could be created.

CONCLUSIONS

Among the conclusions of the seminar, the following are noteworthy:

- The Inter-American Development Bank and the World Bank continue to promote policies supporting reform and modernization processes aimed at fostering the development of regional energy sectors.

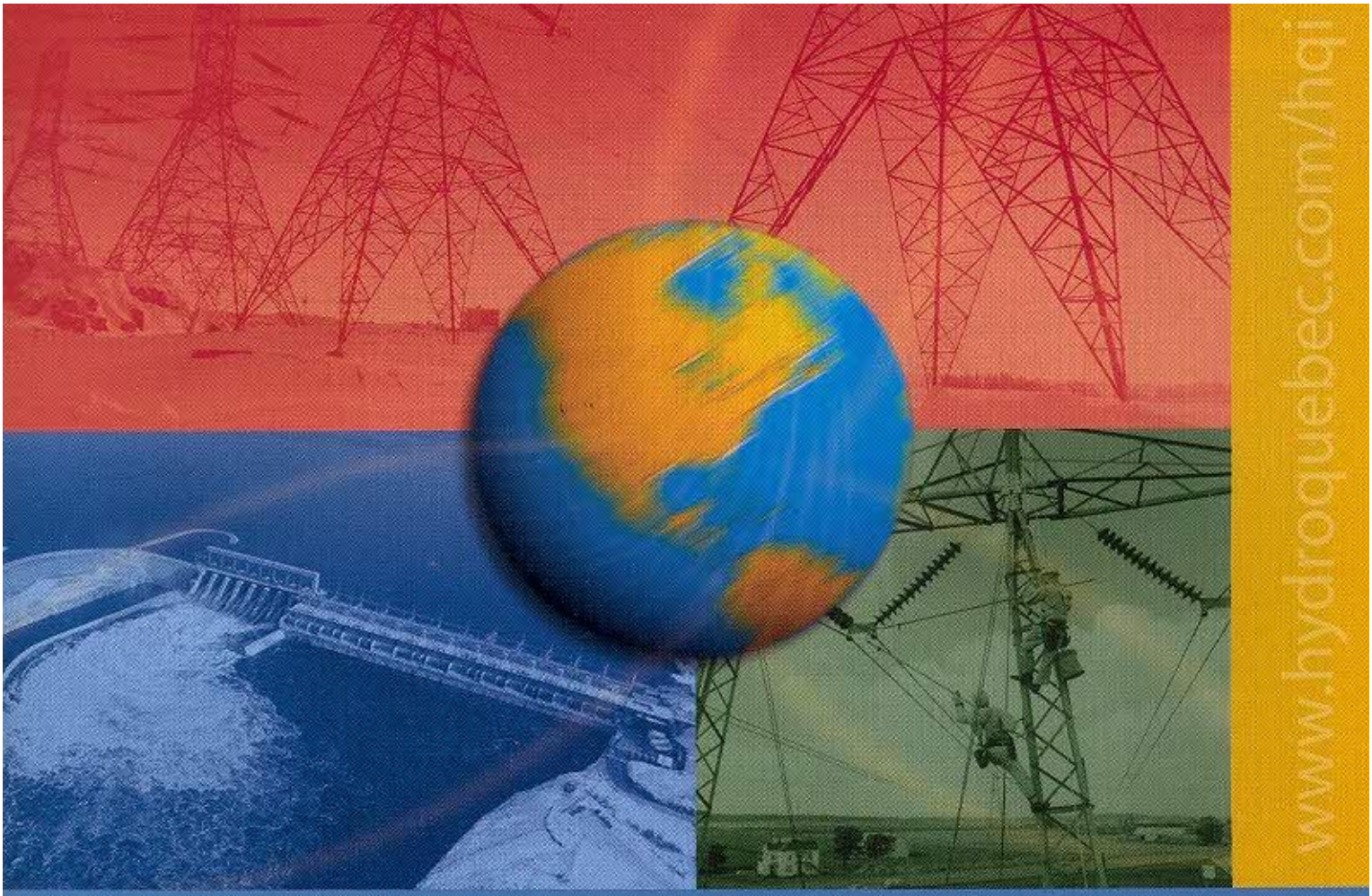
- The financial sustainability of the electric power subsector is closely related to the financial flows produced by the sector's own economic activities and the existence of a suitable macroeconomic environment, with efficient power utilities and adequate regulatory frameworks.

- As for renewable energy sources and rural electrification, in addition to the problem of financing, there is a lack of trained human resources and there is a need for a technical standardization framework to ensure the quality of equipment and installations.

- The fiscal aspects of the subject were dealt with by ECLAC, which indicated that privatization is not an appropriate way to tackle public account imbalances. Privatization can lead to improvements in utility management prior to the sale and can have positive repercussions on savings since the reduction of subsidies that is part of the process will consolidate the financial sustainability of the corresponding sectors.

- The country hosting ***Enerlac '98,*** the Dominican Republic, showed special interest in the Seminar, basically because it is in the midst of restructuring and reforming its electric power subsector.

The Seminar on Modernization of the Electric Power Subsector of Latin America and the Caribbean is a follow-up to the Seminar on Evolution, Situation, and Perspectives of the Electric Power Sector in the Countries of Latin America and the Caribbean held in 1991 in Cocoyoc, Mexico. A third installment of this seminar would depend, to a certain extent, on whether the countries that have undertaken regulatory and institutional reforms in the electric power subsector over the last two or three years, have had the opportunity of concluding their restructuring process, selling their corresponding shares, and operating with a private-sector administration during a period of time that would enable to detect and share the success that has been achieved, as well as discover the deficiencies that require greater attention by the subsector's principal players.



The **energy** to invest.

HQI invests, as a partner, in power generation facilities, as well as transmission and distribution systems. Backed by Hydro-Québec, a multienergy group and one of the world's largest publicly owned electric utilities, HQI can play a key role in developing all types of energy infrastructure.

The **expertise** to build long-term partnerships.

HQI also acts as the prime contractor and strategic supplier to offer competitive solutions in hydroelectricity, thermal or nuclear power generation, natural gas and related sectors. In addition to offering a complete range of integrated services designed to meet evolving needs, HQI provides a wide selection of products and systems at the cutting edge of applied technology.

Hydro-Québec International
500, boul. René-Lévesque Ouest
26e étage
Montréal (Québec)
Canada H3C 3A7
Phone: +1 514 395 4200
Fax: +1 514 395 4300

Hydro Québec International

ARGENTINA: Sale of YPF shares to Repsol of Spain

In an operation involving more than US$2 billion, the Government of Argentina will be selling to the Spanish company Repsol 14.99% of its shares of the oil company YPF, the country's largest company.

According to Argentine government sources, the government will retain a 5.4% share in YPF but will be selling "at some time in 1999" about 5.3% of its shares and will keep its "golden share" which entitles it to veto decisions to merge or bid for majority shareholding.

CUBA: Efficiency enhancement: challenge of the electric power sector

The Minister of Basic Industry, Marcos Portal, during the annual report of the Electric Power Union (UNE), emphasized that the sector has the huge challenge of restoring service reliability and quality by modernizing its thermoelectric stations, implementing an energy-saving program, and changing the consumption structure by the year 2001.

In 1998, the UNE managed to achieve a record reduction in crude oil consumption by the thermoelectric plants (more than a million tons), and its power generation growth rate amounted to 0.2%, whereas peak demand declined by 3.5%. It was also able to halt the rise of power losses in the grid by applying metering standards and combating fraud.

URUGUAY: Transforming voltage from 220 to 400 volts

The low-voltage electric power network of Uruguay will be transformed from 220 to 400 volts, in line with international standards. To do this, over a 20-year period, US$400 million will be invested in Montevideo alone, according to official sources from the power utility Electric Power Plants and Transmission (UTE).

This conversion will reduce the cost of industrial inputs and build up the capacity of the national electric power system, but will not imply any changes in the use of household appliances. This plan is aimed at putting the country on par with the rest of the world in terms of electric power voltage and will enable UTE to offer higher-quality service.

MEXICO-COSTA RICA: Energy cooperation agreement

The President of Mexico, Ernesto Zedillo, and the President of Costa Rica, Miguel Angel Rodríguez, during a recent official visit by the Mexican Head of State, subscribed nine cooperation agreements in San José.

One of the most important agreements is the energy cooperation agreement that provides for a preferential partnership between the two countries and involves a first step by Mexico to support electric power interconnections between Central American countries. The agreement also envisages actions to modernize refinery facilities and conduct research to determine Costa Rica's oil potential.

ECUADOR: Privatization of electric power utilities

With the official ratification of the statutes and the subscription of the public documents for the new power generation and transmission utility companies, the basic steps to start electric power sector privatization have been taken.

Regarding this, the Minister of Energy and Mines of Ecuador, Patricio Ribadeneira, reported that a bill aimed at amending the law is being drafted in order to provide greater flexibility to the sale of shares of electric power utilities. According to the Law Governing the Electric Power Sector, only 39% of the shares will be sold to the private sector, 10% will be sold to employees, and 51% will remain in the hands of the state.

EL SALVADOR: Opening up to private-sector investment

The General Superintendence of Electricity and Telecommunications (SIGET) announced that authorization was given for two new power utilities to generate electric power, thus bringing to an end the monopoly held by the Lempa River Electric Power Commission (CEL). The new utility companies are the U.S. company Pacific Power and the Canadian company Power and Energy, which will be starting their activities immediately.

Energy Statistics

of

Latin America & the Caribbean

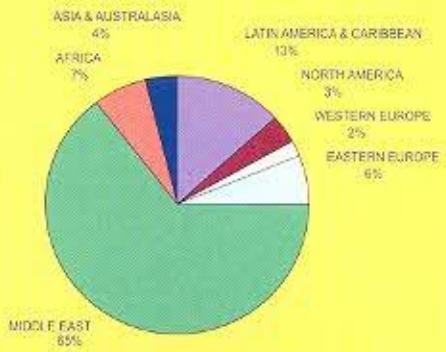
Organización Latinoamericana de Energía

OIL

PROVEN WORLD RESERVES
[10^9 Bbl]

REGIONS	1976	1986	1991	1995	1996	1997	GROWTH RATE
LATIN AMERICA & CARIBBEAN	32.2	119.4	123.1	130.3	135.8	140.5	3.5 %
NORTH AMERICA	39.8	42.0	41.7	33.1	37.1	36.6	-1.3 %
WESTERN EUROPE	25.2	21.9	14.5	16.5	20.5	20.2	-1.5 %
EASTERN EUROPE (Incl. CIS)	83.4	60.9	58.8	56.1	65.5	65.4	-0.2 %
MIDDLE EAST	368.3	401.9	661.6	641.8	676.3	676.9	0.1 %
AFRICA	65.1	55.2	60.4	70.5	67.5	70.0	3.7 %
ASIA AND AUSTRALASIA	41.4	37.4	44.1	43.9	42.4	42.3	-0.2 %
WORLD	655.4	738.7	1004.2	992.2	1045.1	1051.9	0.6 %

1997



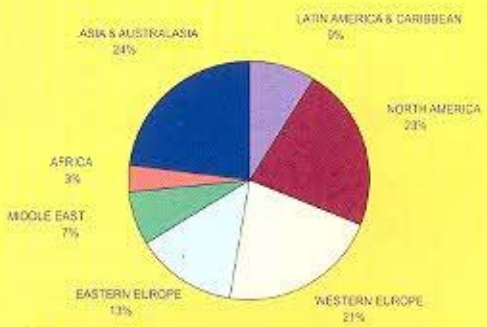
TOTAL: 1051.9 (10^9 Bbl)

Sources: Latin American and the Caribbean; OLADE-EC, Energy-Economic Information System (SIEE)
Energy Statistics Sourcebook 1998, Oil & Gas Journal. Years 1989-1997
BP Statistical Review of World Energy 1998

WORLD REFINING CAPACITY
[10^3 Bbl/day]

REGIONS	1976	1986	1991	1995	1996	1997	GROWTH RATE
LATIN AMERICA & CARIBBEAN	5360	5940	6460	6435	6404	6814	6.4 %
NORTH AMERICA	18595	17645	17600	17060	17220	17475	1.5 %
WESTERN EUROPE	21150	14690	17130	16510	16425	16650	1.4 %
EASTERN EUROPE (Incl. CIS)	11360	14790	12300	10325	10340	10435	0.9 %
MIDDLE EAST	2950	3850	4355	5510	5610	5775	2.9 %
AFRICA	1380	2550	2860	2860	2860	2630	-8.7 %
ASIA AND AUSTRALASIA	11135	12515	13815	16755	15595	18045	15.7 %
WORLD	71930	71980	74520	75455	74474	77824	4.5 %

1997



TOTAL: 77824 (10^3 Bbl/day)

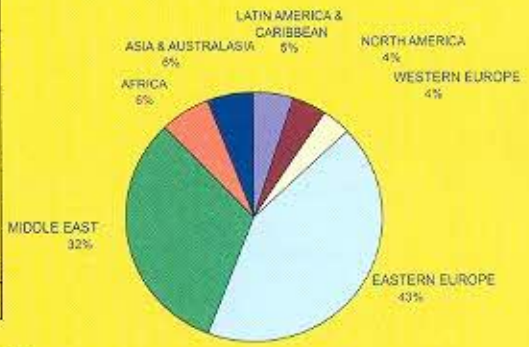
Sources: Latin American and the Caribbean; OLADE-EC, Energy-Economic Information System (SIEE)
BP Statistical Review of World Energy 1998

NATURAL GAS

PROVEN WORLD RESERVES
[10^9 m3]

REGIONS	1976	1986	1991	1995	1996	1997	GROWTH RATE
LATIN AMERICA & CARIBBEAN	2228	6193	7122	7604	7869	7805	-0.8 %
NORTH AMERICA	7969	8246	7300	6500	6610	6550	-0.9 %
WESTERN EUROPE	5091	6504	5100	5500	5420	5570	2.8 %
EASTERN EUROPE (Incl. CIS)	23673	44339	50000	56000	57280	65710	14.7 %
MIDDLE EAST	15228	26202	37400	45200	45790	48880	6.7 %
AFRICA	5864	5703	8800	9400	9300	9870	6.1 %
ASIA AND AUSTRALASIA	3158	6473	8400	9500	9110	9080	-0.3 %
WORLD	63211	103660	124122	139704	141379	153465	8.5 %

1997

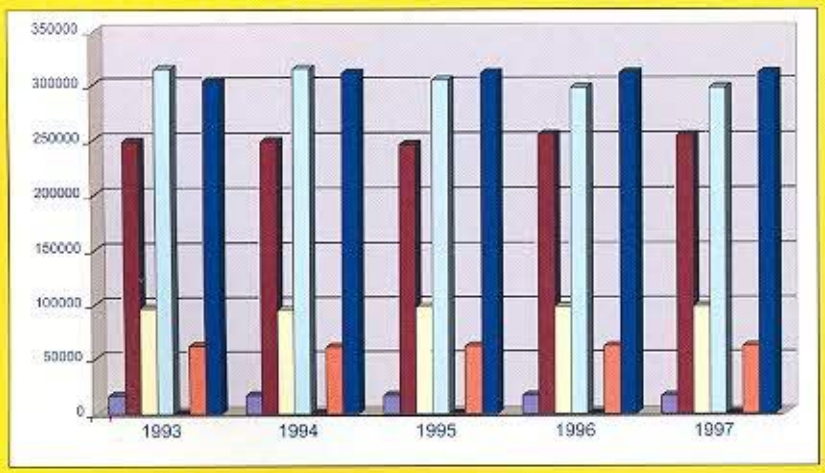


TOTAL: 15346 (10^9 m3)

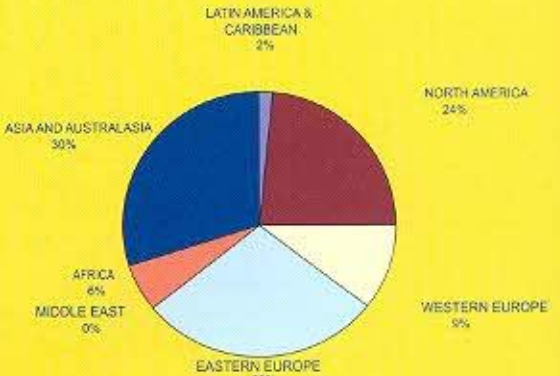
Sources: Latin American and the Caribbean; OLADE-EC, Energy-Economic Information System (SIEE)
Energy Statistics Sourcebook 1998, Oil & Gas Journal. Years 1969-1997
BP Statistical Review of World Energy 1998

COAL

PROVEN WORLD RESERVES
[10^6 Tons]



1997



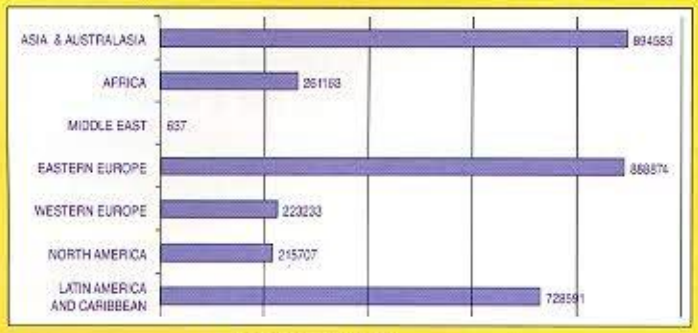
TOTAL: 1040565 (10^6 Tons)

Sources: Latin America and the Caribbean; OLADE-EC, Energy-Economic Information System (SIEE)
Years 1990-1997, BP Statistical Review of World Energy 1998

ELECTRICITY

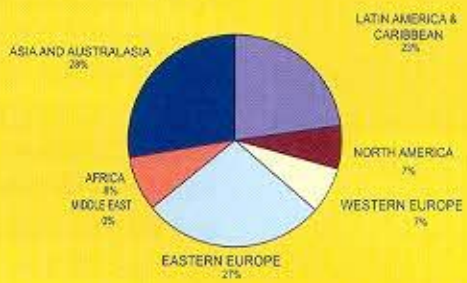
WORLD HYDROPOWER POTENTIAL

1997



TOTAL 3212.8 [GW]

1997



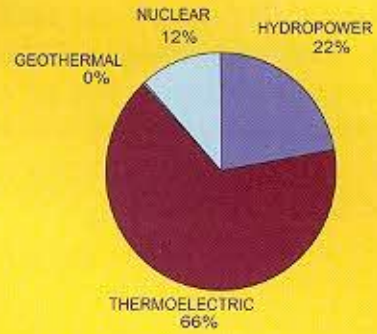
WORLD INSTALLED CAPACITY BY TYPE OF PLANT

1997 [MW]

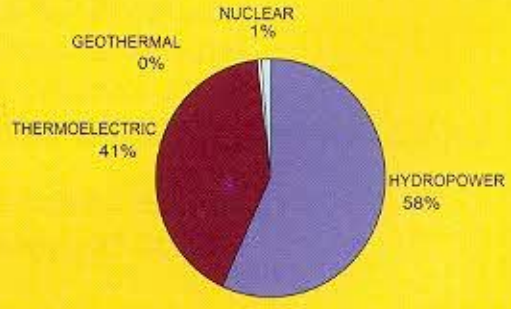
REGIONS	HYDRO-POWER	THERMO-ELECTRIC	GEOTHERMAL	NUCLEAR	TOTAL
LATIN AMERICA & CARIBBEAN	117284	86052	998	3025	207359
NORTH AMERICA	165000	587000	1700	116000	869700
WESTERN EUROPE	144000	328000	4000	123000	599000
EASTERN EUROPE (Incl. CIS)	80000	309000	0	47000	436000
MIDDLE EAST	5000	81000	0	0	86000
AFRICA	21000	70000	0	2000	93000
ASIA AND AUSTRALASIA	136000	517000	2000	59000	714000
WORLD	668284	1978052	8696	350025	3005059

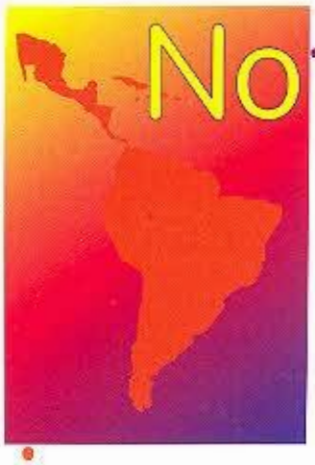
Sources: Latin America and the Caribbean; OLADE-EC, Energy-Economic Information System (SIEE)
OLADE estimates based on International Energy Annual 1989-1997
Energy Information Administration (EIA)

WORLD



LATIN AMERICA AND THE CARIBBEAN





Bolivia-Brazil Gas Pipeline
New Symbol of Energy Integration

After 17 months of construction, with an investment of US$2,015 million, the gas line between Bolivia and Brazil, one of the most important energy projects for Latin America and the Caribbean, was inaugurated by the President of Bolivia, General Hugo Banzer, and the President of Brazil, Dr. Fernando Henrique Cardoso.

The gas line will carry clean and economical energy, with high productivity, from Santa Cruz, Bolivia to the currently expanding industrial zones of Sao Paulo, Brazil.

The first shipment of gas using this project, which has a total length of 3,150 kilometers and whose total weight in pipelines amounts to 500,000 tons, involves 3.7 million cubic feet of gas per day in April 1999. Afterwards, it is expected that 6 million cubic feet per day will be sent, thus meeting 10% of Brazil's energy demand and supplying the needs of at least 470 metal, chemical, petrochemical, and other industries.

At the inaugural ceremony, held in the border town of Carmen de la Frontera, the President of Brazil, Dr. Fernando Henrique Cardoso, said the gas pipeline was a symbol and indicated that, among the expectations for integration and trade between Brazil and Bolivia, the benefits for the two economies, as well as the positive multiplier effect, would be immediate.

He assured that, as a result of the start-up of the gas line, trade would initially increase by US$100 million during the first year of its operation and that it would foster even further the integration of markets and the development of new opportunities.

"This project is a decisive step in the progressive consolidation of a new energy policy in South America and regional integration," commented the Brazilian Head of State in his address.

As for General Hugo Banzer, the President of Bolivia, he indicated that the US$7 billion that his country will be taking during the 20 years of the initial contract will help to generate jobs, develop economic and social infrastructure alongside the gas line, expand the transport network, directly attract private-sector investment and, of course, effectively integrate Bolivia with Brazil, which will help to consolidate the active involvement of Bolivia in Mercosur.

"Today, with the termination of construction of the gas line, Bolivia's status as the energy nucleus of the Southern Cone is being reasserted, and the country is deliberately offering to all countries of the region to be the focus of their energy integration," stated General Banzer. He also said that the Southern Cone is the home to the region's most industrialized areas and that, with this gas pipeline, we are also inaugurating a sustainable development approach that will achieve ecological balance and generate clean and low-cost energy in lands that are apt for both farming and tourism.