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LATIN AMERICAN ENERGY ORGANIZATION

The Ecuadorian-Peruvian peace process: an opportunity for energy integration

Energy Magazine

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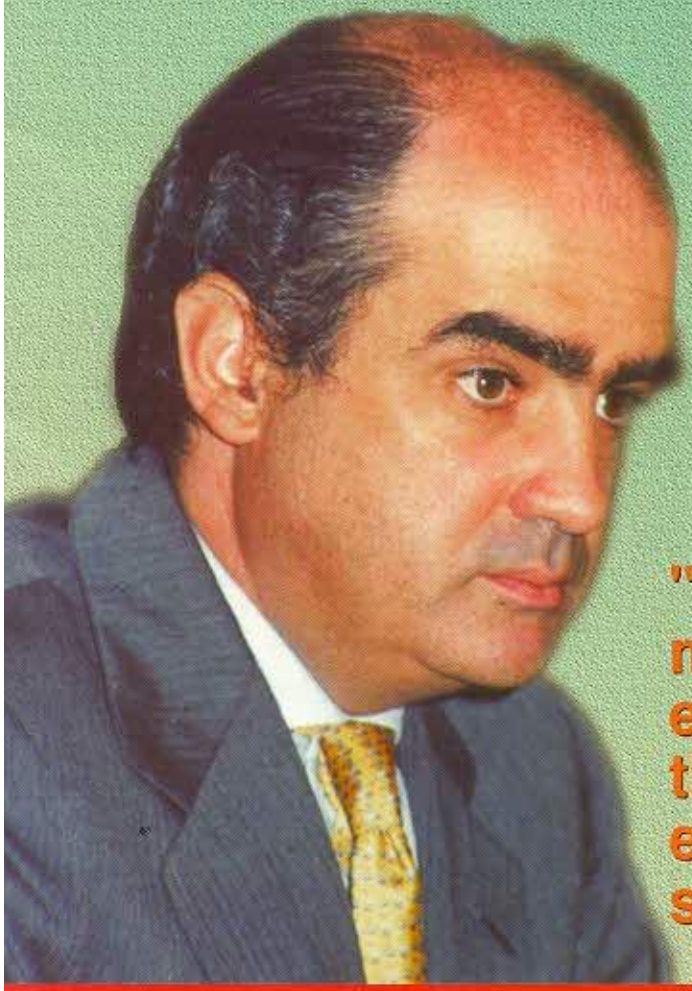

Luis Téllez

Secretary of Energy of Mexico

"Transformation and modernization of Mexico's energy sector will be the driving force behind economic growth and social development"

- Evaluation of the energy sector of Latin America and the Caribbean
- The future of refining activities in Latin America and the Caribbean

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Editorial

The energy sector transformation process taking place in Mexico over the last few years and the important steps it has taken to expand and modernize have enabled the energy sector's participation to become an essential element for the consolidation of the Mexican economy as one of the most competitive in the world.

We are honored to have Dr. Luis Téllez Kuenzler, Secretary of Energy of Mexico and promoter of the above-mentioned process, contributing to the present edition of OLADE's *Energy Magazine* with an article on "Structural Reform of the Energy Sector in Mexico," which is no doubt a unique testimony for all players involved in the energy development of Latin America and the Caribbean.

The present issue also examines the energy cooperation and integration opportunities provided by the peacemaking process that both Ecuador and Peru have been actively promoting since the signature of the Presidential Document of Brasilia on October 26, 1998, which definitively resolved the border conflicts that the two countries have had for more than 150 years.

The Binational Border Area Development Plan, which arose as a result of the peace between the two countries, has envisaged investments on the order of US$3 billion during the period 2000-2009. A large part of these investments is for energy development and complementation projects in the two countries.

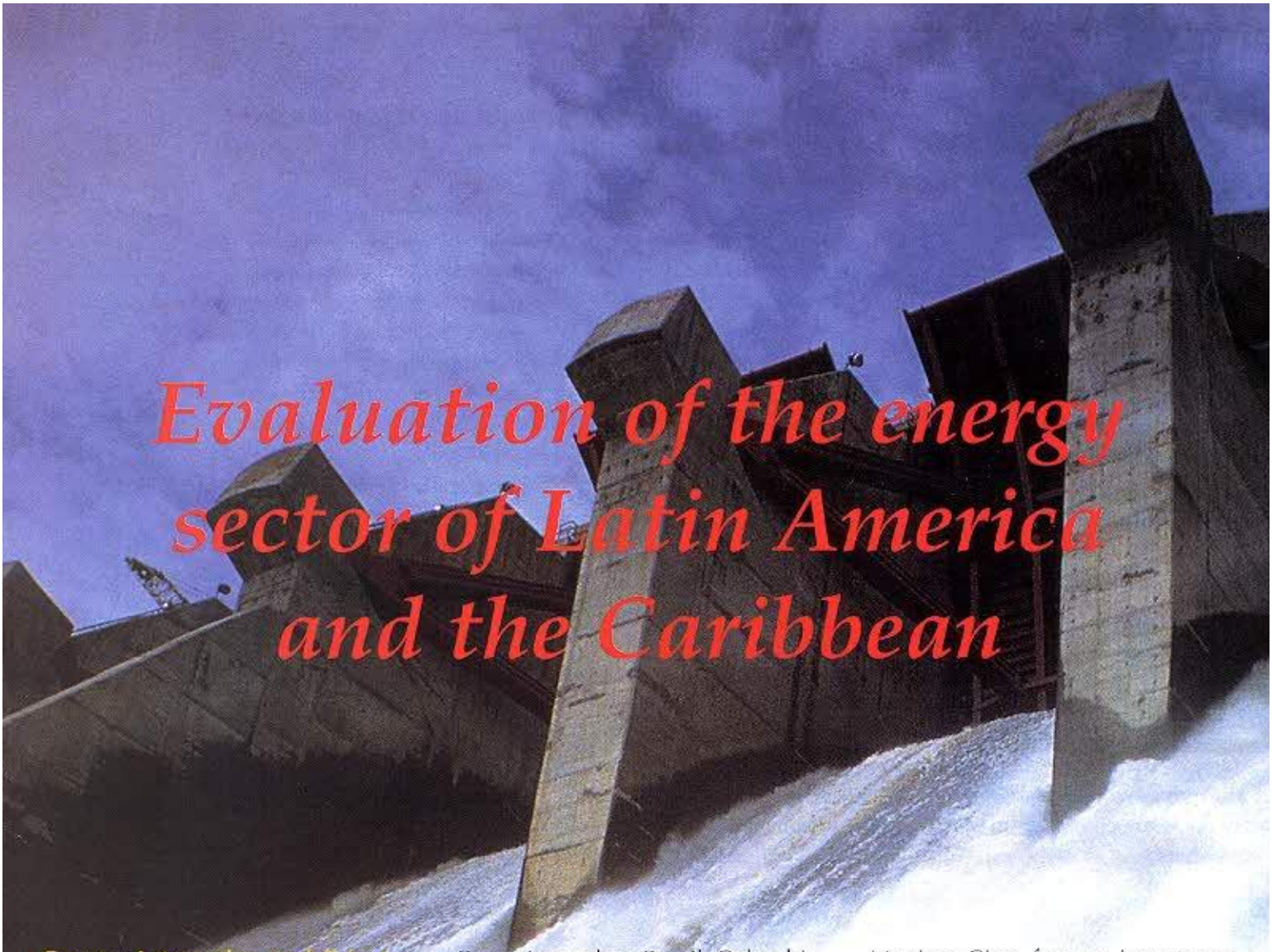
An overview of the current status of the energy sector in Latin America and the Caribbean, emphasizing the widespread trend toward sector growth, in terms of not only energy supply but also energy demand, is also part of this edition. This overview focuses on aspects involving the economy, prices, and energy policy in the region, as well as the sector's linkage to sustainable development.

There is also an article on the future of refining activities in Latin America and the Caribbean, specifically referring to the project that OLADE and the Regional Association of Oil and Natural Gas Companies of Latin America and the Caribbean (ARPEL) are carrying out with support from the World Bank, the Canadian International Development Agency (CIDA), and the oil companies PETROBRAS of Brazil, PDVSA of Venezuela, PEMEX of Mexico, PETROTRIN of Trinidad and Tobago, and REPSOL of Spain.

The above-mentioned project is aimed at identifying over the next 20 years the refineries that might have the highest profits and earnings in the region and those whose products will be having the most difficulty in competing with other sources.

On occasion of this first issue for which I am editor-in-chief of the publication, I would like to indicate to the readers of the *Energy Magazine* that, with the support of the new Editorial Board, we will be promoting a policy that grants priority to the analysis of the present energy situation and to the dissemination of the principal energy sector events in Latin America and the Caribbean, as a way of contributing to regional energy sector development, cooperation, and integration.

Dr. Julio Herrera
Executive Secretary



Evaluation of the energy sector of Latin America and the Caribbean

Greater Integration and Private-Sector Participation in the Energy Sector

Over the last few years, the energy sector of Latin America and the Caribbean has been characterized by the progress achieved in electric power sector privatization and a greater openness of the hydrocarbons sector to private-sector investments.

Large areas of the region, with a major potential for oil and gas resources, which were previously restricted to state enterprises, have been offered to private investment, for which purpose the regulatory frameworks and contracting policies were modified.

Countries such as Brazil, Colombia, Costa Rica, Cuba, and Trinidad & Tobago recently signed contracts with foreign companies to carry out oil exploration and production activities. Chile has given projects such as the oil pipeline from Santiago to Valaparaiso and Viña del Mar and the construction of the gas pipeline from Punta Arenas to the southernmost tip of Chile to private companies. In Brazil, a concession was granted to Enron and other foreign companies for the import of natural gas from Argentina. In Trinidad and Tobago, AMOCO will be investing US$230 million to develop the offshore field Amherstia, which has reserves of 2 trillion cubic meters of natural gas. Mexico has granted to a foreign company a 30-year concession for the distribution of natural gas in Mexico City, for an investment estimated to be US$125 million over the next five years.

In the electric power sector, some countries have privatized their companies after conducting a restructuring process.

Brazil has privatized six companies, with investments amounting to US$12.5 billion for the sale of shares, whereas in Uruguay, the State has approved the participation of private enterprise in the generation and marketing of electricity, with transmission and distribution remaining in the hands of the state power utility, UTE. In Ecuador, the electric power sector modernization law was ratified, and the power distribution utilities of Guatemala and El Salvador were privatized.

Panama reorganized its electric power sector creating four power generation utilities, three power distribution utilities and one transmission utility, whereas in Costa Rica the tapping of renewable energy was tapped with the development of small hydropower, wind, and geothermal plants for a total of 80 MW.

In Peru, Hydro Quebec obtained a 30-year concession for managing the 676-km Mantaro-Socabaya transmission line and four power distribution utilities were privatized for a total of US$146 million.

The Enersis consortium of Chile and Endesa of Spain received a 20-year concession for carrying 1000 MW of energy from Argentina to Brazil.

In the framework of energy integration projects, the gas pipeline between Brazil and Bolivia was inaugurate with an investment of US$2,033,000,000. This gas line will be carrying 30 million cubic meters per day. In addition, the San José Accord was renewed by the Governments of Mexico and Venezuela, where by the two countries will continue supplying crude oil and oil products, on the basis of favorable conditions, to the countries of Central America and the Caribbean. Likewise, the coastal gas pipeline connecting Aldea Brasilera, Colón (Argentina), and Paysandú of Uruguay started operating, with a carrying capacity of 0.7 million cubic meters per day. In interconnection projects, the line between Colombia and Ecuador started up, with a capacity of 30 MW and a voltage of 115 kV and 138 kV, respectively.

Energy Sector Performance in Latin America and the Caribbean

The region's energy supply and demand have been characterized by positive growth rates throughout the past decade, with an average of 3.2% for supply and 3.4% for demand. It was estimated that gross domestic supply in 1999 amounted to 4,500 MBOE (million barrels of oil equivalent) and that end-use amounted to 3,400 MBOE.

Energy supply

The principal component of primary energy supply in the region is oil, which accounts for close to 49%, compared to a 22% share for natural gas and an 8.4% share for hydroenergy for electric power generation.

Although oil is the region's major energy resource, with close to 141 billion barrels of reserves, 87% of which are located in Mexico and Venezuela, whereas 97% current production, which amounts to 9.5 million barrels per day, corresponds to six countries: 8.4% Argentina, 9.4% Brazil, 7.% Colombia, 4% Ecuador, 33.2% Mexico, and 33.8% Venezuela. There is therefore a major market for exports and imports between the region's countries and between the region and other regions of the world, as observed in Figure 1 of the Statistics Annex of the present issue of the *Energy Magazine*.

Total oil exports of the region are close to 5 million barrels per day, of which more than 85% are from Colombia, Mexico, and Venezuela, whereas imports amount to about 1.15 million barrels per day, 75% of which are accounted for by Brazil, Chile, and Peru.

In addition to oil, the participation of other primary energy supply sources such as gas, hydroenergy, and biomass (Figure 2) are also very important. In Argentina, Ecuador, Mexico, Trinidad and Tobago, and Venezuela, more than 90% of primary energy production corresponds to oil and natural gas. In Paraguay and Uruguay, countries that do not produce oil and gas, hydroenergy accounts for 64% and 72%, respectively, of total primary energy, which is complemented by biomass, which is an energy source that accounts for more than 50% of primary energy production in countries such as Cuba, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama and the Dominican Republic.

Final Energy Demand

Figure 3 of the Statistical Annex indicates that final energy demand in the region is characterized by the predominance of hydrocarbons (natural gas and oil products), which in 1999 accounted for 60% of final domestic demand, estimated at 3.4 billion barrels of oil equivalent, with biomass accounting for 15% and electricity for 13.5%.

In Argentina, Ecuador, Grenada, Jamaica, Suriname, Trinidad and Tobago, and Venezuela, hydrocarbons account for more than 70% of final energy demand owing to the high share of thermal energy consumption in industry compared to other economic sectors, whereas electricity accounts for between 6 and 15% of final consumption. In countries like El Salvador, Guatemala, Guyana, Haiti, Honduras, Nicaragua, and Paraguay, hydrocarbons account for less than 50% of final energy consumption where as biomass accounts for more than 40% owing to its high cost in the residential sector, in these countries electricity accounts for a share of less than 10%. Nevertheless, in countries like Barbados, Brazil, Costa Rica, Grenada, Jamaica, Panama, Paraguay, and Uruguay, the share of electricity amounts to between 15% and 24%.

The region's industrial sector uses 34% of energy consumption, followed by the transportation sector, with 32%, and the residential sector, with 19.5% (Figure 4), shares that have remained virtually constant since 1990.

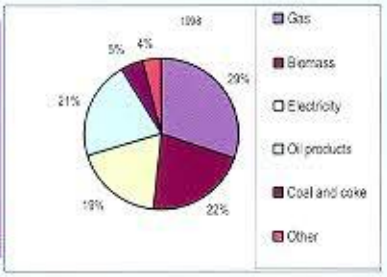
The share of energy consumption in the economic sectors fluctuates considerably. Depending on the sector with the highest share, it is possible to determine three different groups of countries. In Brazil, Cuba, Mexico, Paraguay, Suriname, Trinidad and Tobago, and Venezuela, the sector with the highest share is the industrial sector, with percentages between 34% and 66%. The transportation sector, however, is the most important in Barbados, Bolivia, Chile, Costa Rica, Ecuador, Grenada, Jamaica, and Panama, with shares ranging from 37% in Chile to 55% in Grenada. In Haiti, Nicaragua, Guatemala, Honduras, the Dominican Republic, El Salvador, Peru, Guyana, and Paraguay, the residential sector accounts for the highest percentage due to the high consumption of biomass in this sector.

Industrial Sector

At the regional level, gas appears as the principal source of energy used in industry (29%), owing to the large amounts that are consumed in

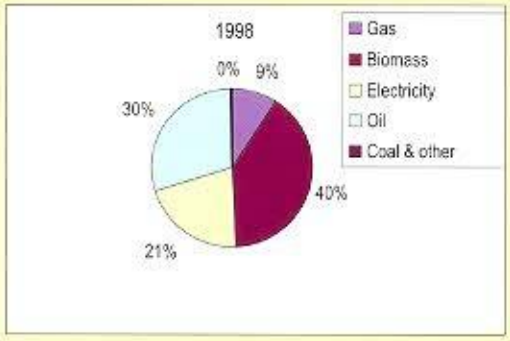
Energy Consumption in Industry by Sources (MBoe)

Energy	1990	1997	1998	%	%
Gas	210	316	334	6.01	5.91
Biomass	206	232	239	1.91	3.28
Electricity	154	196	206	3.71	4.04
Oil products	183	211	234	3.11	10.93
Coal and coke	76	51	51	-4.81	0.79
Others	26	42	44	6.73	4.03
TOTAL	854	1,049	1.108	3.31	5.66



Energy Consumption in the Residential Sector by Source (MBoe)

Energy products	1990	1997	1998	1990 - 1998 %	1997 - 1998 %
Gas	37	55	59	6.12	6.75
Biomass	255	257	258	0.19	0.39
Electricity	88	126	133	5.30	5.54
Oil products	150	183	192	3.17	5.09
Coal & other	1	1	1	1.39	7.53
TOTAL	530	623	644	2.46	3.39



Argentina, Bolivia, Brazil, Mexico, Trinidad and Tobago, and Venezuela, countries where the source with the highest percentage (except in Brazil) is the industrial sector, which has been increasing since 1990, displacing the use of biomass, oil products, and coal.

Although it has been substituted by the use of commercial sources, biomass (firewood, sugar cane bagasse, and plant waste) is an energy resources that is widely used in the industrial sector of the countries, at present accounting for close to 22% of final energy consumption in this subsector, with a positive growth in almost all countries, except for Argentina and Mexico, where its participation is below 7%, whereas in countries like Barbados, Cuba, El Salvador, Guyana, Haiti, Honduras, and Nicaragua it is over 40%.

For this subsector, oil products account for 21% share, with fuel oil consumption being higher than diesel oil consumption, but it can be observed that historically the share of the former has been declining whereas that of the latter has been increasing.

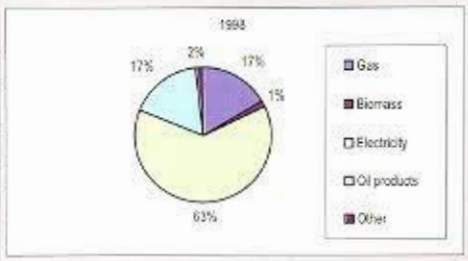
The electricity used by industry has kept its share in the region at close to 18% and always with positive growth rates, with values fluctuating between 3% and 4% on average per year. As a rule, in the countries with a higher level of industrialization and in those where there have been possible substitutions of electricity for natural gas and other fossil fuels, their share does not ostensibly fluctuate. Such is the case of Argentina, Brazil, Mexico, and Venezuela.

There is a close linkage between energy consumption in industry and the industrial GDP of the countries, with an average energy intensity of the sector for the region of 2.3 BOE for each thousand U.S. dollars of industrial GDP. Nevertheless, there are major differences between the countries owing to the type of energy sources that are consumed and to the technological development. A the country level, energy intensity varies between 0.64 BOE per US$1000 (Peru) and 14.6 BOE per US$1000 (Guyana), which means that there important energy efficiency differences among the countries.

It could be expected that the higher the energy intensity the larger the amount of emissions of pollutants. At present, average CO2 emissions from the region's industrial sector are estimated to be 0.22 Gg for each Kboe of energy consumed, whereas individually for the countries this indicator fluctuates between 0.11 for Brazil and 0.30 for Panama, with energy intensities of 1.82 and 2.61, respectively, thus confirming the direct relationship between these two variables.

Energy Consumption in the Commercial Sector by Source (MBoe)

Energy products	1990	1997	1998	1990 - 1998 %	1997 - 1998 %
Gas	15	19	19	3.62	0.05
Biomass	2	2	2	-0.43	2.06
Electricity	46	70	73	5.93	3.89
Oil products	18	19	20	1.69	3.58
Other	0	2	2	38.79	7.59
TOTAL	80	113	116	4.75	3.21



The higher share of commercial energy, especially electricity in the residential sector, implies greater welfare for the population

Residential Sector

The region's residential sector is characterized by a high share of firewood, which accounted for 40% in 1998, followed by LPG (25%), electricity (21%), and natural gas (7.9%).

Although the share of firewood in final residential consumption is quite high, as indicated in Figure 5 of the Statistical Annex, historically there has been a trend to reduce this share. Between 1990 and 1998, this share declined from 48% to 40% and was directly substituted by LPG and electricity and indirectly by natural gas. Despite the above, in countries like El Salvador, Guatemala, Guyana, Haiti, Honduras, and Nicaragua, firewood had a share of over 80%, with lower shares of electricity being recorded in these countries, between 0.8% and 8.4%, as well as lower electric power service coverage of between 45% and 70%.

A higher share of commercial energy, especially electricity in the residential sector, implies greater welfare for the population. Figure 6 provides the linkage between the human development index (IDH) calculated by the United Nations Development Programme (UNDP) for the countries of the region and their respective electric power coverages.

The countries with lower electric power coverage index and higher share of the firewood in residential energy consumption mentioned in the previous paragraph are those countries that have lower IDH, between 0.34 and 0.67, whereas countries with a higher electricity coverage are those that have higher human development indices, such as Barbados, Chile, Costa Rica, Suriname, Trinidad and Tobago, and Uruguay, whose coverage is over 97% and whose IDH is between 0.88 and 0.9.

Commercial Sector

Electricity is the principal energy product for the commercial sector. In 1998 its share amounted to 63%, following by oil products with a share of 17% (8% diesel, 4% fuel oil, 3% LPG), gas 16.7%, and others 3%.

Transportation Sector

Gasoline is the fuel that is consumed the most in the transportation sector. In 1998, it accounted for 52%, although this share has been declining since 1990, at which time it recorded a 54% share. This decline has been covered by a parallel rise in diesel and, marginally, kerosene.

The impact of this rising use of diesel has been considerable in various countries like Argentina, Bolivia, Paraguay, and Peru, where the share of this fuel increased from 6 to 13 percentage points between 1990 and 1998, proportionately substituting gasoline.

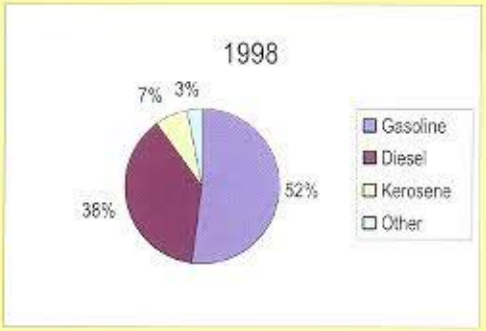
In half the countries, diesel has a higher share than gasoline, especially for Argentina and Paraguay. Kerosene has a relatively low share in all the countries, except for Cuba, Jamaica, and Suriname, where the share is 21%, 30%, and 18%, respectively.

Energy Sector and Development

This overview of the current situation of the energy sector in Latin America and the Caribbean clearly reflects that transformation and modernization processes have consolidated the sector's importance for the region's economic and social development.

Energy Consumption in the Transportation Sector by Source (Mboe)

Energy products	1990	1997	1998	1990 - 1998 %	1997 - 1998 %
Gasoline	413	530	550	3.65	3.81
Die el	278	387	406	4.84	4.94
Kerosene	49	69	72	5.03	4.85
Other	24	33	34	4.24	1.59
TOTAL	764	1,019	1,062	4.20	4.23



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A New World Perspective on Energy Regulation in Montreal in May 2000

Energy regulators and all the parties interested in their work, including policymakers, industry representatives, consumer advocates, academics and others from every part of the world will converge on Montréal in its late spring glory, May 21-24, for the World Forum on Energy Regulation. They are seizing the opportunity presented by this first truly global forum on energy regulation to meet their counterparts and look more closely at the most successful approaches in energy regulation.

Everywhere, regulators responsible for electricity and natural gas are facing unprecedented challenges, as market liberalisation changes their roles, and forces them to develop new rules and new structures. Globalisation forces them to contend with new players whose operations go far beyond any single jurisdiction. As Jean A. Guérin, President of Québec's energy board, the Régie de l'énergie, puts it: "It's a challenge to create competitive markets that are both open to the world and responsive to local needs." All face a similar urgency to get it right, however: the stakes are rising as energy prices and reliable supply become even more critical to the success of every other part of the economy.

Some 110 leading figures from North America, Eastern and Western Europe, Asia, South and Central America, Africa and Australia are confirmed as speakers at this event. More than 1,000 delegates are expected to attend. The Forum is co-hosted by the National Association of Regulatory Utility Commissioners (NARUC) of the United States, the Canadian Association of Members of Public Utility Tribunals (CAMPUT), and the Régie de l'énergie du Québec.

"This is the first time we've seen such a comprehensive global gathering of energy regulators and the time is very right," said Bob Rowe, President of the National Association of Regulatory Utility Commissioners and President of the Montana Public Service Commission. "It's an unparalleled opportunity to share our experience, findings, and fresh ideas for the 2000s". The United States is providing speakers such as James Hoecker, Chairman of the US Federal Energy Regulatory Commission, and Bill Richardson, the United States Secretary of Energy. Also from the United States, the conference will feature economist Dr. Arthur Laffer, former presidential advisor, and seminal figure in the evolution of supply-side economic policies.

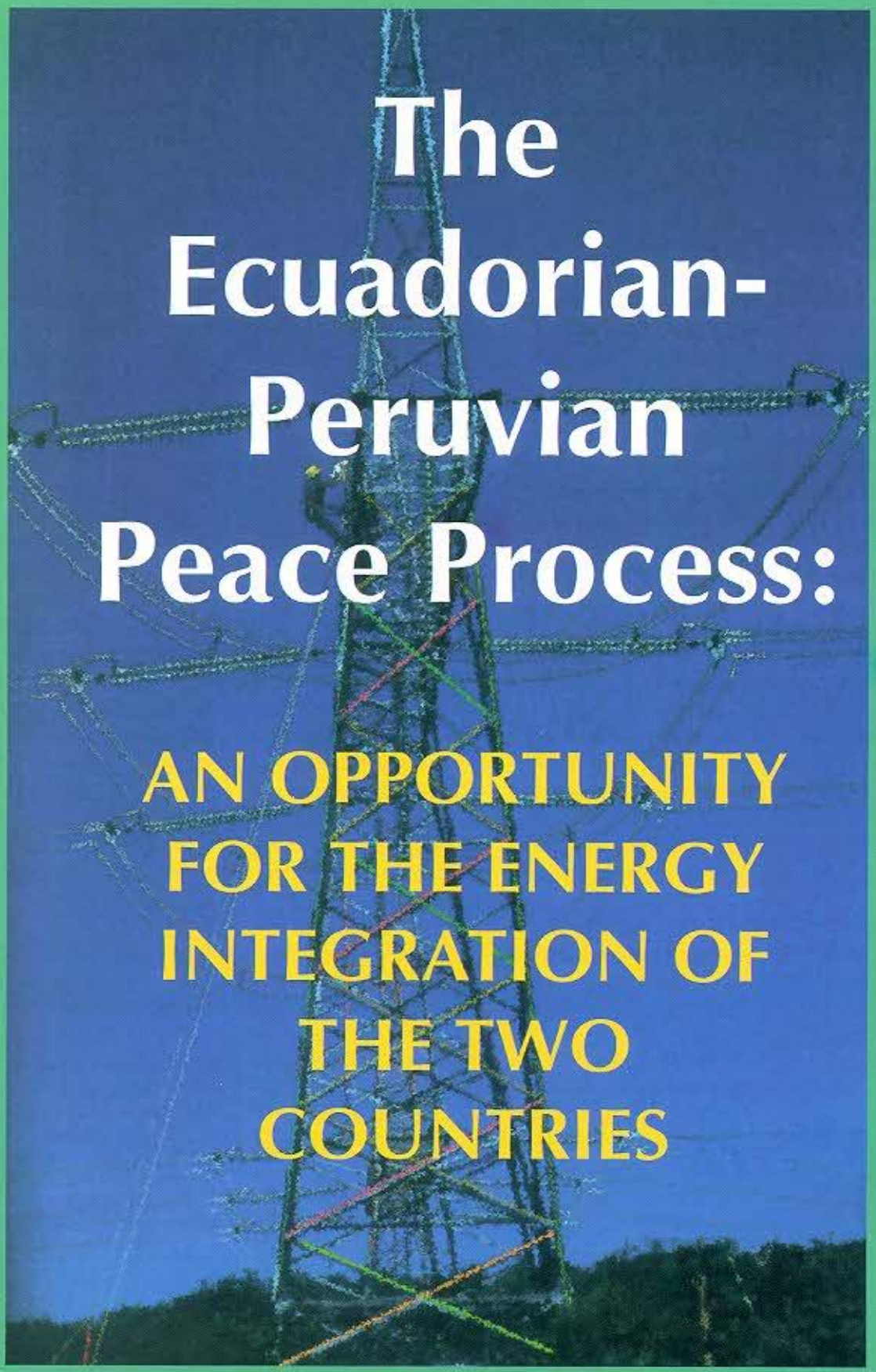
Europe, whose new electricity and natural gas directives provide another very promising approach to market liberalisation, is providing keynote speakers such as Loyola de Palacio de Valle-Lersundi, Vice-president of the European Commission and Commissioner for Energy and Transportation, and Callum McCarthy, the UK's General Director, Office of Gas and Electricity Markets.

"While there are basic needs common to all, priorities vary in each jurisdiction," noted Jean A. Guérin, the Régie de l'énergie. "Complete restructuring may be needed in some places, while in others, goals may be accomplished by preserving successful existing institutions and bringing about more gradual change." Speakers such as Professor S.L. Rao, Chairman of India's Central Electricity Regulatory Commission, Dr. Hector Olea, Chairman of Mexico's Comisión Reguladora de Energía, and Dr. Jean Constantinescu, President of Romania's National Electricity and Heat Regulatory Authority, will show the diverse range of approaches to liberalisation and globalisation.

As the demand for investment in energy development continues to burgeon in many parts of the world, senior officers from the leading global institutions concerned, including the World Bank, the International Energy Agency, and the United Nations Development Program me will provide their agencies' views on the role of economic regulation in securing energy supply development. Energy companies will also be well represented, offering perspectives ranging from China's State Power Corporation to the Enron Corporation of the United States.

"Energy regulators and the energy industry urgently need this opportunity to share success stories, best practices and pitfalls," said Paul Vlahos, Acting Chairman of the Canadian Association of Members of Public Utility Tribunals (CAMPUT). "The Forum promises to be the must-attend event of the year for people involved in energy. It should also be a great occasion to network on a global scale and build international good will."

Further details about the World Forum on Energy Regulation can be found at www.energyforum.org



The Ecuadorian-Peruvian Peace Process:

AN OPPORTUNITY FOR THE ENERGY INTEGRATION OF THE TWO COUNTRIES

On October 26, 1998, after more than three years of negotiations, the Presidents of Ecuador and Peru signed, in the city of Brasilia, a Presidential Document accepting the binding commitment of the Guarantor Countries to resolve definitively the border problems that the two countries have had for more than 150 years and which had led to severe tension and conflicts between the two countries.

As of the above-mentioned date, Ecuador and Peru have been promoting an integration process that could become a model for the future, because it has clearly demonstrated that peace and the positive impacts of understanding and cooperation are the best way to achieve development and welfare for their people, both present and future generations.

In compliance with the Presidential Document of Brasilia, in May 1999 the two countries finalized the delimitation of their boundaries. As an instrument of the same document, an Extended Border Integration, Development, and Neighborliness Agreement was consolidated. By promoting public and private investment, it will implement a Binational Border Region Development Plan, as a joint strategy for the economic integration of the border zone.

It is expected that the Plan's implementation will require, in addition to the effort of the two countries, the decisive support of the international community, as the investment needed amounts to US$3 billion over the period from 2000 to 2009.

The principal objectives of the National Border Region Development Plan are:

- Promote environmentally friendly productive and social development on the border region so that its development can match that of the rest of the country and raise the standards of living of its population.

- Promote the economic integration of the border areas and ensure a better coordination with the rest of the two countries.

- Promote the border region, conservation of biodiversity and the environment, as well as consolidate the cultural identity of the native communities living in this area.

Four basic programs have been identified in the Plan:

- Binational projects program
- National production development programs
- National social development and environment programs
- Private investment promotion program

Actions that can be promoted in the energy sector as part of the Binational Border Development Plan

The Latin American Energy Organization (OLADE) has reviewed the energy sector options being offered by the Binational Ecuadorian-Peruvian Border Development Plan and has expressed to the governments of the two countries, which are members of the Organization, its interest in making available its technical capacity and international ties to channel resources that would help to implement projects related to the energy sector.
These projects involve the tapping of hydroenergy resources, rural electrification and electric power interconnection, cooperation in oil transport to foster the development of oil and gas exploration and production, and the socioenvironmental promotion of border populations in a framework of sustainable development.

Among the Binational Projects Program, the Puyango-Tumbes Project is noteworthy. It has been a long-standing aspiration of the people living on the Ecuadorian-Peruvian border. It is aimed at jointly tapping the water of the river which in Ecuador is referred to as Puyango and in Peru as Tumbes. The building of multi-purpose dams, in addition to permitting the distribution of irrigation in an area with a huge potential for agriculture, will facilitate expanding energy supply by the construction of hydropower plants to cover a deficit calculated to be about 50%.

As a result of the new peace scenario, it has been decided that the Project should be reformulated on the basis of technical and, especially, economic criteria. Its cost is estimated to be US$321.5 million, on the basis of which an economic prefeasibility study will be conducted to define the best alternative.

It is believed that 100 MW could be generated by tapping the shared water resources of the Puyango/Tumbes river.

One of the components of the same Program involves reforestation of about 300,000 hectares of the Andean border zone, which has been undergoing the impacts of erosion over the last few years.

OLADE, thanks to experiences in projects implemented in other member countries of the Organization, can support those reforestation efforts that are linked to energy, such as the sustainable use of firewood and charcoal.

Likewise, OLADE is capable of offering its support in binational basin management and human development projects that are part of the same program and that are aimed at ensuring the technical and sustainable management of the basins of binational rivers to support ecosystem preservation. Regarding this, OLADE could provide technical assistance for the implementation of small and medium-sized hydropower generation stations, which would permit the exploitation of major resources located in seven binational basins: Catemayo-Chira, Chinchipe, Zamora-Santiago, Morona, Pastaza, Pintoyacu-Tigre, and Napo.

In the framework of the National Production Development Programs and the Social and Environmental Development Programs, with regard to the energy sector, the identification of integral production or ecological tourism programs that take into account energy self-generation through small hydropower stations, photovoltaic systems or hybrid systems, which in addition could contribute to the electrification of the rural areas of the border zone, could be considered. Environmental education campaigns focusing on the impacts of energy development on the environment could also be promoted.

Private-sector participation in border development

The countries of Latin America and the Caribbean have the private sector as the fundamental player for

their development over the last few years. Likewise, private-sector investment has become a basic element for energy sector transformation and modernization in the region.

In this context, the Binational Ecuadorian-Peruvian Border Development Plan has a Private Investment Promotion Program. It should be highlighted that private-sector investment, whether coming from national or foreign capital, will be indispensable for the area's energy development.

One scheme that is being used to attract private-sector investment is the concessions granted to companies to build, ensure maintenance, and manage infrastructure projects. Thus, the sector attracting the most interest for private-sector investors on the border area will be the electric power sector, specifically the interconnection between the two countries.

Regarding this, in 1998, an agreement was drawn up between the Ministries of Energy of Ecuador and Peru for an electric power interconnection at different voltages. At first, linkages between primary feeders and between subtransmission systems are being envisaged. For the interconnection of the national transmission systems, to be carried out in the immediate future, a linkage on the coastal area of the two countries between the towns of Milagro or Machala in Ecuador and the towns of Piura or Talara in Peru has been planned.

Other actions that could contribute to Ecuadorian-Peruvian energy integration

As for OLADE, it has reviewed the actions that could complement the cooperation and integration of the two countries in the energy sector as part of the peace process.

Thus, in the oil and gas subsector, the current situation with respect to oil exploration, production, transport, and supply in both countries was analyzed to establish the complementary projects that could be developed.

The two countries have oil production fields and potentially productive zones located on both sides of the border.

Peru has subscribed exploration and production contracts in new blocs belonging to the Marañón basin, which is the largest and with the highest production in the country, located on the Ecuadorian border. In this basin, there is Selva Norte, which has a production of about 70,000 barrels of oil per day (BPD).

A third of Ecuador's potentially oil-bearing surface is located in the border area with Peru. At present, Ecuadorian production amounts to about 380,000 BPD and the closest production fields are located at 200 kilometers from the border.

The Northern Peruvian oil pipeline Norperuano, with a length of 850 kilometers, has a carrying capacity of 200,000 BPD between the fields of Selva Norte of Peru and the sea terminal of the port of Bayovar in the Pacific Ocean. At present, about 62,000 BPD are being carried, which means that there is an unused carrying capacity of 138,000 BPD.

This capacity could be tapped by Ecuador, whose production potential is being restricted by the constraints of its crude oil transport pipeline system, although it has been promoting the construction of a heavy oil pipeline by private companies that are currently involved in exploration activities in the country.

Therefore, one of the short-term integration possibilities between Ecuador and Peru, which would benefit the two countries, would be the optimization of oil transport resources and facilities on both sides of the border to enhance and

promote development of oil and gas exploration and production.

Over the medium term, it would be advisable to undertake a comprehensive indicative planning study that would contribute to optimizing the use of energy resources of the supply and demand markets of the two countries, which could change the energy matrix, since LPG and diesel oil imports could be substituted for natural gas in the Aguaytía and Camisea fields in Peru.

In another area, as part of the Regional Energy Integration Project for the Andean Community (Andean PIER), which OLADE will be implementing as of this year with funding from the European Commission, the participation of a Peruvian city and an Ecuadorian city has been planned. They will be carrying out actions in order to reduce investment needs in the electric power sector, giving incentives for energy efficiency as a means to improve the economic and financial situation of the power utilities of these cities, while building up energy efficiency engineering capacities, and raising the awareness of users about the advisability of efficient use of electrical energy.

The inhabitant of border areas as the focus of attention for the peace process

Promoting the peace process between Ecuador and Peru necessarily involves bringing to the agenda the issue of the ancestral peoples who lived in the geographical areas located on both sides of the border, especially in the Amazon region, and who were displaced because of the conflict.

On the border zone, there are 90 native communities from Ecuador and Peru. These communities are extremely poor, are not very much involved in the market economy, and have kept their own ethnic and cultural identity. Their population thrives on hunting, fishing, and very rudimentary farming, which are complemented by trading activities, including handicrafts and medicinal plants.

Taking into consideration that a large part of the zone occupied by this population is the target of oil exploration and production and bearing in mind the will of the countries to consolidate energy sector cooperation, it would be of special interest for the Energy, Environment and Population Program (EAP) that OLADE and the World Bank are coordinating in 11 countries of the region to consider the social and environmental impact of this oil and gas cooperation on the population whose reunification should now be promoted and to contribute to the sustainability of development of all indigenous groups living in the area.

Meetings in the framework of the IDB Governors Meeting

On occasion of the Annual Meeting of the Governors of the Inter-American Development Bank (IDB) held in New Orleans, in the United States, on March 22-29, 2000, at which OLADE was represented by its Executive Secretary, the Consultative Group for Financing the Binational Ecuadorian-Peruvian Border Area Development Plan held a meeting to analyze the Plan's progress and to continue steps to formalize this non-reimbursable cooperation.

Ecuador and Peru attended the Meeting with top-level delegations, headed by their respective Ministers of Foreign Affairs, who repeatedly received expressions of support from the international community and especially from representatives of countries and cooperation agencies channeling funds to promote programs and projects that are part of the Plan.

The two countries are carrying out this exemplary peacemaking process and working together to ensure their integration and development. Together they are building their common future.

Eurolac 2000 more sustainable efficiency

Cartagena de Indias, Colombia • June 19-20, 2000

Eurolac 2000: Technical and Trade Forum for Promoting Renewable Resources and Energy Efficiency

The Energy Conference and Exhibition of Europe, Latin America and the Caribbean ***(Eurolac 2000),*** focusing of Energy Efficiency and Renewable Resources, will take place in Cartagena de Indias, Colombia, on June 19-20, 2000.

Eurolac 2000 was conceived and organized in the framework of the relationships between OLADE and the European Commission, especially bearing in mind that, over the past few years, Latin America and the Caribbean has become one of the most attractive regions for energy sector investments. Its high potential, along with the dynamic reforms that have been carried out in this sector, with clear, transparent rules, has stimulated public and private investment in the different stages of the energy chain.

The region has a very high renewable energy potential and has the possibility of economically using small-scale renewable sources of energy, such as mini hydropower plants, wind energy, and photovoltaic energy to meet the needs of a high percentage of its rural population. In addition, programs for the efficient use of energy by end-users are among the most attractive alternatives to meet regional energy requirements.

At the same time, the European Union has intensified and enlarged its cooperation activities with Latin America and the Caribbean and is involved in many areas of development in the region's countries, among which the energy sector.

In this context, OLADE and the European Commission through its Synergy Programme, have agreed to launch a series of conferences that, under the name of ***Eurolac,*** promote cooperation and the exchange of technology between Europe and Latin America and the Caribbean and foster business activities between countries and companies involved in the energy development of the two regions.

Eurolac 2000 is the first installment of the above-mentioned series of conferences. It will be addressing two topics of the utmost importance: renewable sources of energy and energy efficiency.

Organization of *Eurolac 2000*

The institutions in charge of organizing the Conference are OLADE, the Institute for Energy Diversification and Saving (IDAE) of Spain, and the National Technical University of Athens, Greece (EPU-NTUA).

The event is sponsored by the Government of the Republic of Colombia, through the Ministry of Mines and Energy and its Energy and Mining Planning Unit (UPME). In addition, it will be supported by public and private companies involved in the energy development of Europe and Latin America and the Caribbean.

Objectives

The specific objective of ***Eurolac 2000*** is to promote the development of renewable sources of energy and energy efficiency in the new competitive framework for the energy sector of Latin America and the Caribbean.

The general objectives of the Conference are:

- Promote business meetings between the Energy Ministers of Latin America and the Caribbean and businessmen of the two regions interested in investment opportunities in Latin America and the Caribbean.
- Facilitate the exchange of know-how about the development of energy efficiency and

renewables and their prospects in competitive conditions.

- Identify common areas of cooperation and promote business and financing agreements and mechanisms between entities of Europe, Latin America, and the Caribbean involved in energy efficiency and renewable sources of energy.
- Promote actions for the transfer of technology between the two regions.
- Foster the development of joint initiatives and projects between the two regions.
- Enhance the ties between entities of Europe, Latin America and the Caribbean involved in energy efficiency and renewable sources of energy.
- Organize an exhibition and trade show for energy sector goods, services, and technological breakthroughs that promote energy efficiency and renewable sources of energy.

Participants

Eurolac 2000 has been designed as a technical and business forum, with the participation of the following: Ministers and Secretaries of Energy of Europe, Latin America, and the Caribbean; representatives of companies that supply goods and services for the energy sector; cooperation agencies and financing institutions from the two regions; experts, researchers and university professors working in the areas of energy efficiency and renewables, as well as university students.

Eurolac 2000 **Topics**

The topics to be included in the Conference's Program will be addressed by leading experts from Europe, Latin America and the Caribbean. They are indicated below:

- Evolution and current status of energy efficiency and renewable sources of energy in Latin America and the Caribbean and the European Union
- Policies and legal frameworks for energy efficiency and renewables in the two regions
- Practical cases of energy efficiency improvements
- Cogeneration
- Experience of Latin America and the Caribbean and the European Union in renewables:
  - Wind energy
  - Geothermal energy
  - Biomass
  - Solar energy
  - Rural energy
  - Mini hydropower
- Financing possibilities
  - Multilateral institutions
  - Commercial banks
  - ESCOs
- Investment opportunities in Latin America and the Caribbean

Presentations of National Projects by Ministers

Alongside the technical sessions, Ministers and Secretaries of Energy are being given the opportunity to make presentations on national energy development projects to entrepreneurs, businessmen, and investors to facilitate the analysis of the region's many investment possibilities.

Commercial Presentations and Business Meetings

During ***Eurolac 2000,*** there will also be commercial presentations aimed principally at facilitating contacts and fostering specific projects, as well as promoting institutional image, products, or services.

The participants will be given the opportunity to promote trade ties and discuss business. For this purpose, at the express request of participants, private appointments and business meetings will be set up.

The business meetings will be an excellent opportunity for private and public sector entrepreneurs to establish contact with Ministers, representatives of government, international organizations and agencies, and financing institutions. The meetings will take place on the basis of previously requested and scheduled appointments made with the organizers.

Technology Exhibition and Trade Show

Eurolac 2000 will also include an Energy Industry, Technology, and Services Exhibition and Trade Show, where public and private companies that manufacture goods and equipment and energy service companies of Europe, Latin America, and the Caribbean will be participating in order to display their products and promote them on the markets of the two regions.

Meeting place for *Eurolac 2000*

The organizers and sponsors of ***Eurolac 2000*** have agreed that the best meeting place for the Conference is the city of Cartagena de Indias, not only because of the driving force behind the transformations that have highlighted Colombia as one of the countries with the most important development of its energy sector but also because of the city's beauty, its facilities and hospitality to visitors, and above all because of its historical significance for both Europe, Latin America and the Caribbean.

The participants of ***Eurolac 2000*** will be accommodated in the Cartagena Hilton, a five-star hotel where the Conference's meetings and activities will take place and which is offering special rates for those attending ***Eurolac 2000.***

Further information on Eurolac 2000 can be obtained from the organizing entities at the following addresses:

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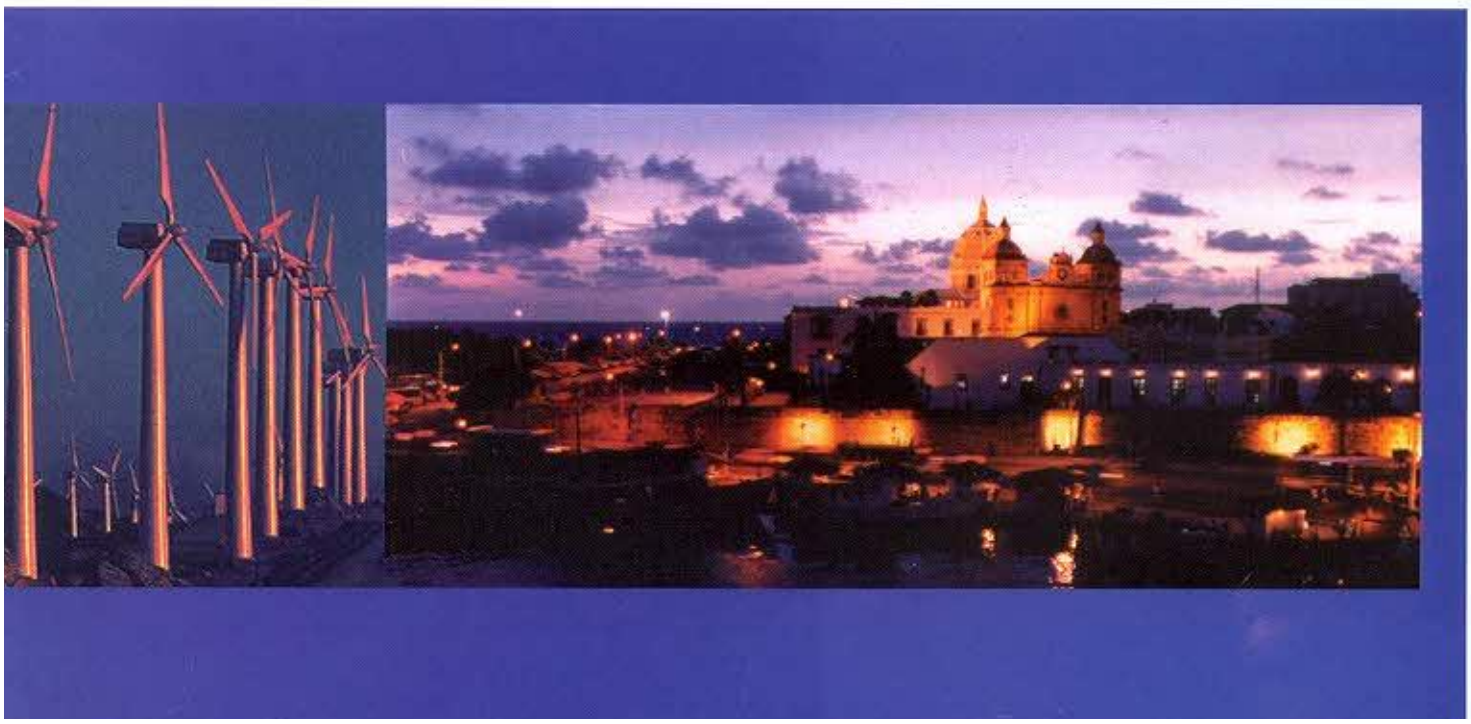


Structural Reform of the Energy Sector in Mexico

by **Luis Téllez**
Secretary of Energy of Mexico

Over the past few years, the Mexican economy has made major efforts to extend ongoing processes of domestic deregulation and trade liberalization. These efforts have given considerable impetus to the functioning of its domestic markets and have ensured greater competitiveness and foreign trade. The actions that were undertaken have undoubtedly contributed to Mexico's present ranking as one of the strongest economies of the world, with one of the most promising environments for investment. Growing and steady flows of foreign direct investment corroborate this. From 1995 to the present, Mexico has received an average of about US$10 billion per year of foreign direct investment.

The participation of the country's energy sector has been essential in this effort to transform and consolidate the Mexican economy as one of the most dynamic and competitive in the world. In order to avoid becoming an obstacle to the development of Mexico and the welfare of its inhabitants during the 21st century, over the last few years the country's energy sector has taken major strides to ensure its expansion and modernization.

In the near future, national industry will not be content with merely gaining access to nothing more than basic energy inputs. The Mexican industrial sector, as well as the services sector, will be requiring increasingly more and comprehensive energy products and services, similar to those provided in Europe, the United States, Canada, Chile or in any other market of the principal trading partners of Mexico, where the companies can purchase especially tailored energy services with higher quality and lower prices.

To a large extent, Mexico's economic and trade position in the next century will depend on the timely supply of sufficient amounts of high-quality energy inputs. On the basis of this approach, over the last few years, the Government of President Ernest Zedilllo has steadily promoted structural changes in the sector. To do this, he has relied on major reforms in this matter and on a highly dynamic investment program in which the private sector's participation has been essential.

Using the attributions legally conferred upon him, President Zedillo has undertaken important reforms in natural gas and liquefied petroleum gas. Likewise, he has proposed others reforms in the petrochemical sector and recently in the electric power sector. By taking up the challenge of rapid technological change and moving ahead with the deregulation processes currently taking place in the sector worldwide, these initiatives have striven, without exception, to incorporate the best international experiences in restructured energy sectors, without ignoring the specific circumstances of the country's energy sector. In other words, the effort for struc-

tural change of the energy sector in Mexico has sought to adopt the best in the world by adapting it to its particular reality. This effort toward structural change and investment evidently has built up the energy sector's capacity to respond to Mexico's present and future challenges.

One of the industries that has best taken up the challenge of expanding and modernizing the national energy sector and which is benefiting increasingly from change in technology and deregulation processes that is currently taking place in the sector throughout the world, has been the national natural gas industry. Between 1995 and 1996, the Government of Mexico undertook major legal reforms in this area in order obtain a transparent regulatory framework, attract private-sector involvement and promote the development of competitive markets. This reform effort introduced important amendments to Article 27 of the Constitution and opened up the sector to private-sector participation in transport, storage, and distribution activities, leaving exploration and production activities in the hands of the State.

In view of its wide range of environmental benefits and high thermal efficiency, natural gas is the fuel that has been recording the highest growth in demand in the world. It is estimated that world natural gas consumption will increase its volume almost twofold over the next 20 years, growing by about 93%. In Mexico alone, demand for this energy product over the next ten years is expected to grow at a rate of about 9% per year. This impetus stems principally from the expansion of our electric power sector based on the most modern combined cycle technology available, with this sector accounting for almost 46% of this demand. Likewise, it also has to do with the consolidation of national production facilities, our insertion into the North American free trade market and soon the European market, and stricter environmental norms.

The notable expansion of the natural gas industry in Mexico, which is indispensable to meet the growing demand for this hydrocarbon, would not have been possible without the legal reforms that began five years ago and opened up the natural gas industry to private-sector participation in the above-mentioned tasks. In this context, from 1995 to date, the Energy Regulatory Commission has granted 81 natural gas transport and distribution permits that account for cumulative investments of more than US$2.1 billion and close to 36,000 kilometers of pipelines.

Nevertheless, the progress achieved in securing greater private-sector participation in the above-mentioned activities will come to a standstill without parallel investments in gas exploration and production, which are now being made. From 1994 to date, Mexico has increased it natural gas extraction levels by 34%, from 3.6 billion to 4.8 billion cubic feet per day in 1999. Alongside this, with the implementation of the Gas Strategy Program this year, it is forecast that production capacity will increase by two thirds of what is currently available at the end of the first decade of the century. This important progress has been and will continue to be possible with the active participation of the private sector, which has facilitated the availability of natural gas in broad regions of the country and in

the majority of its urban centers, which in turn has triggered the use of cleaner and more efficient sources of energy in industrial and services activities.

In short, expansion of the natural gas industry, thanks to the active participation of the private sector in transportation, storage, and distribution, has led to a reduction in costs and greater efficiency in production processes, the generation of employment, and protection of the natural environment. The Mexican experience in this industry provides a convincing example of opportunities for expansion and investment based on modern regulatory schemes that permit mixed participation and create competitive conditions.

Although the reforms that were undertaken enable substantial progress to be made in industries like the natural gas industry, there is still much to be done in other areas of our country's energy industry. One of these areas is the electric power sector.

In 1999, the demand for electricity in Mexico grew at a rate of almost 6%, substantially higher than the gross domestic product growth rate and it is expected that it will grow at the same average rate during the next ten years. Thus it is estimated that, by the year 2007, Mexico will have increased its electric power generation capacity by at least half the capacity that it now has available. In addition, for this same year, we will need to have concluded modernization and enlargement of the electric power transmission and distribution infrastructure. The investment resources needed are enormous: almost US$46 billion at 1999 prices.

The first step taken to modernize Mexico's electric power sector was in 1992 when the Electric Power Public Service Law was amended in order to promote the participation of the private sector in electric power generation through schemes such as cogeneration, self-supply, independent production, imports, and small production. This reform, although important to the extent that it opened unprecedented space for the participation of the private sector in generation capacity expansion activities, was not sufficient in the face of the magnitude of the challenges of expansion that our country will have to tackle in this area over the medium and long terms. To the extent that these participation schemes substantially limit the participation of the private sector, because they do not give private enterprise the opportunity to deliver electric power services, the new generation capacity promoted by the 1992 reform is very small compared to the growth rates of demand for electricity. Greater participation is still lacking.

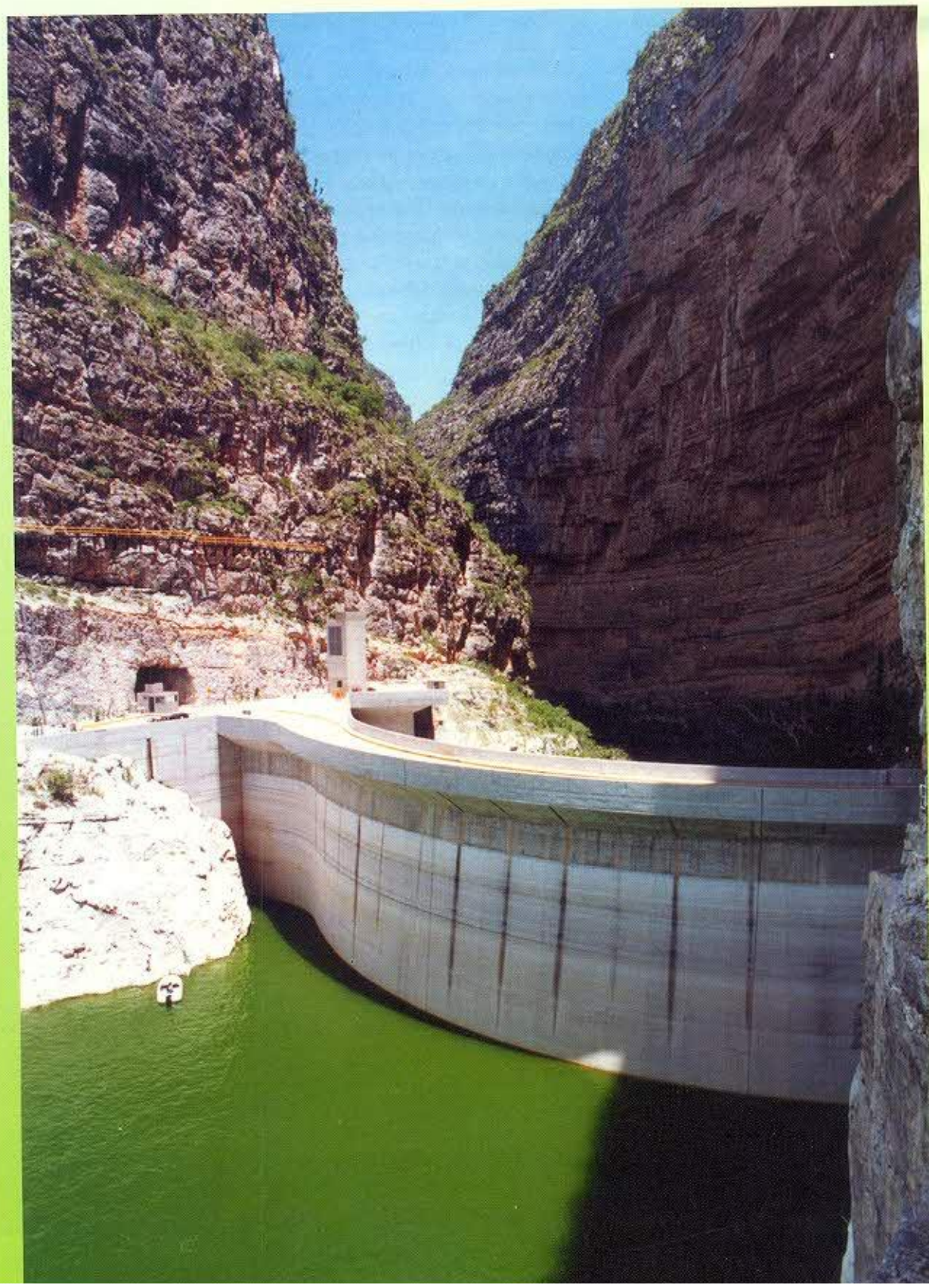
In view of the above, in February 1999, President Ernesto Zedillo submitted to Congress an initiative for structural reform in electricity, which proposes amendments to Articles 27 and 28 of the Political Constitution of the United Mexican States. The initiative intends to stay ahead of a situation that, although not as yet urgent, already involves very tight margins of maneuverability. The scheme currently in force in Mexico, by establishing a State monopoly, is not sustainable over the medium term. On the basis of the current model, fully meeting present and future needs for the sector will use up major resources that the State could use to address the pressing social lags that only the State can

"The structural change and investments have built up the energy sector's capacity to address the present and future challenges of Mexico"

handle. The participation of the private sector will guarantee expansion of the electric power sector and will release major resources for higher social spending.

The objective of the proposal is to guarantee electric power supply, under the best of quality and price conditions, which Mexico will demand in the future through:

1. The reorganization of the country's electric power industry using competitive schemes in the areas of electric power generation, marketing, and distribution, with the participation of



ution, with the participation of national and foreign investors.

2. The establishment of a competitive bulk market for electricity in which prices are freely set by supply and demand of this resource.

3. The creation of two state entities, one in charge of the system's operation and the other in charge of nuclear power generation.

4. Instrumentation of a transparent subsidy policy with explicit social welfare goals.

5. Development of a clear, transparent and predictable legal framework that provides security for private-sector investments and grants the necessary powers to the Energy Regulatory Commission, as an autonomous authority, to regulate transmission and distribution systems in terms of prices, investments and service quality for the benefit of the end-user.

This comprehensive sector reform initiative is being studied by Congress and, in view of the pressing present and future needs of Mexico's electric power industry, we trust that a favorable legislative consensus will soon be reached.

Without a doubt, the efforts made by the Federal Government toward extending its internal deregulation processes and ensuring trade liberalization have given considerable impetus to the functioning of domestic markets and have placed the country in a position of greater competitiveness and foreign trade. Nevertheless, there is still much to do in other areas of the economy as well as with respect to the fiscal regime, the banking system, and legal guarantees for investment.

The Mexican Government trusts that the steps taken to reorganize the national energy sector will contribute to improving its service standards, which in turn will enable the sector to continue performing its role as promoter of the country's economic and social development. The structural reform process is far from having concluded. In coming years, the domestic production apparatus will be requiring further upgrading of energy goods and services so that it can remain on par with the parameters of its international competitors. In this sense, Mexico should continue its transformation and modernization efforts inside its energy sector so that it continue to be a driving force behind economic growth and social development in a global environment full of challenges and opportunities.

ISOFOTON: SOLAR ENERGY FOR DEVELOPMENT

ISOFOTON S.A. develops various electrification projects in the rural zones of Latin America and the Caribbean. Nine countries of the region have welcomed the energy solutions being offered by this Spanish company, which is a pioneer in the application of solar energy systems.

ISOFOTON systems are used not only to meet energy needs in areas that, because of their difficult location, have restricted access to conventional power grids, but also to substitute part of the energy generated by conventional means, without deteriorating the environment and collaborating in ensuring the sustainable development of the places where they operate, either by training technicians and users or promoting the creation of local service companies.

José Luis Manzano, Director General of ISOFOTON S.A., says that, at present, Costa Rica, Cuba, Haiti, the Dominican Republic, Bolivia, Colombia, Chile, Ecuador and Peru are countries of Latin America and the Caribbean where the company is currently working in a wide spectrum of highly versatile projects, ranging from the installation of energy coverage systems for hospital centers in Cuba, the design, supply, and installation of photovoltaic systems for feeding large land telecommunications stations in Costa Rica and Colombia, the supply of photovoltaic systems for the rural electrification of isolated housing in Bolivia and Haiti, the supply and installation of photovoltaic systems for basic rural electrification in the most vulnerable social areas of the Dominican Republic as part of a social development assistance project, the electrification of schools in Ecuador's Integral Rural Development Programs, to integral rural electrification in Iquitos, Peru, among many others.

José Luis Manzano recalls that ISOFOTON was established in 1981, and therefore it is a pioneer in the world of solar energy. "In those years talking about photovoltaic solar energy," remembers the Director General, "was a bit like being a kamikaze." Nevertheless, probably because of its experimental focus and dedication to research, at first ISOFOTON worked exclusively with photovoltaic solar energy. Indeed, the majority of its invoices, accounting for 90% of its total sales in 1999, today still come from this sector and the rest from thermal solar energy. This type of energy source, based on the photoelectric effect of light and consisting of the direct transformation of sunlight into electricity, has a very large number of applications closely tied to socioeconomic development.

José Luis Manzano also mentioned that, when they started this venture, they were facing yet another problem. They had the necessary technology, they had the product, but they had no machinery to manufacture it on an industrial scale because it did not exist on the market. Thus, they had to design and develop the machines to cut and shape the silicon ingots, the automatic cell soldering equipment, and in short the majority of the machines needed to manufacture their products.

At present, there are 150 persons working in ISOFOTON, claims its Director General, and all share a common interest in nonpolluting and environmentally friendly renewable sources of energy. "This is a product that is sold for its technology but it is also sold for the imagination and enthusiasm that go into selling it. If you don't believe in the importance of alternative energy, then the market is very hard... Solar energy is a current reality and also a gamble for the future. There are places where you can't use anything but solar energy but there are also places where using it makes no sense. It does not have to substitute anything else, rather it has to be complementary," states José Luis Manzano.

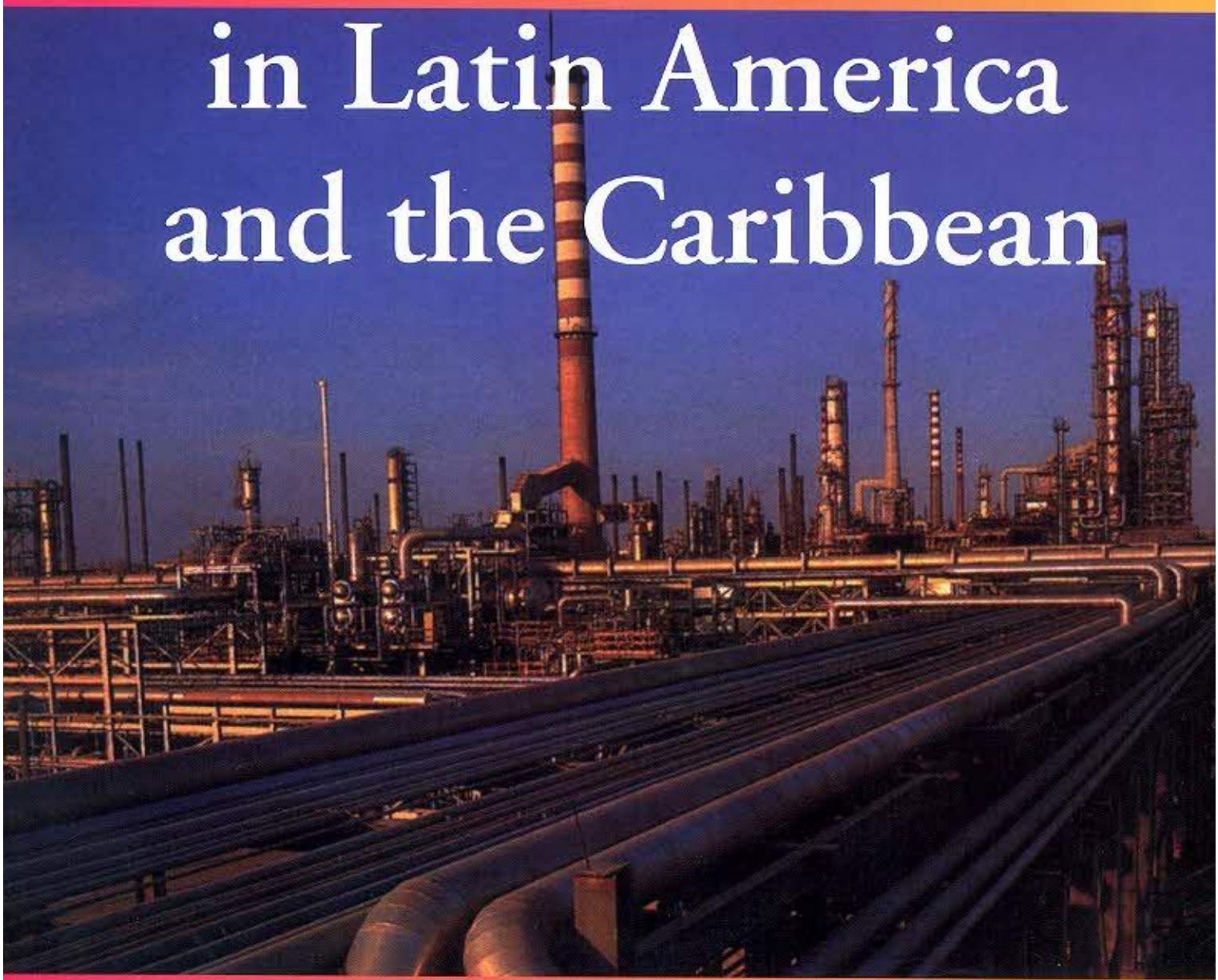
Solar energy is not sufficiently well known. Among its advantages, the minimum maintenance that a solar panel requires, despite its high technology, is noteworthy; it is enough to clean its crystal surface from time to time. The batteries, regulators, and inverters last about ten years.

Research, technological progress, and the interest in cooperating to contribute to the development of even the most remote corners of the planet have led to ISOFOTON's high growth from the very start. At present, it has branches in Colombia, Ecuador, Chile, Peru, Bolivia, United States, Tunisia, Senegal and Ghana. Its delegations are in Argentina, Uruguay, Venezuela, Mexico, Dominican Republic, Nicaragua, El Salvador, Honduras, Morocco, Mauritania, Ivory Coast, Zimbabwe, South Africa, Japan, Philippines, Thailand, Germany, the Netherlands, Switzerland, Belgium, Italy, and Ukraine.

ISOFOTON, concludes José Luis Manzano, exports 75% of its production, and its products and systems are operating in more than 50 countries of Europe, Latin America and the Caribbean, Asia, and Africa.

THE FUTURE OF REFINING ACTIVITIES

in Latin America and the Caribbean



Forecasting conducted for the first decades of the 21st century indicate that the demand for oil products in Latin America and the Caribbean will increase by 40%, principally owing to growth in the transportation sector. The same forecasting exercise asserts that, on the contrary, fuel oil consumption for thermoelectric generation will be partially substituted by natural gas.

Alongside the above-mentioned growth, it is expected that the region's refining sector will be facing even greater challenges in terms of profitability and efficiency, owing to the high level of competitiveness as a result of the liberalization trend in world markets and improvements in product quality, on the basis of growing environmental demands and new technological developments.

Refining Sector Development in Latin America and the Caribbean Project

In the face of this situation, the countries of the region requested the Latin American Energy Organization (OLADE) and the Regional Association of Oil and Natural Gas Companies of Latin America and the Caribbean (ARPEL) to conduct a study that would specify, over the long term, the impact on the profitability of the region's refineries stemming from changes in refining patterns owing to new environmental requirements and their trends, modifications in the use of installed capacity due to the redefinition of areas of influence of each refinery as a result of the liberalization, integration, and new regulations of consumption markets, and the penetration of natural gas in markets consuming refined products.

In this context, the Latin American and Caribbean Refinery Sector Development Project was set up. It will also focus on the importance and need of downstream sector reforms and the resulting restructuring that will enable the consumer to gain access to clean and economical fuels and increase intra-regional transactions. Another issue to be addressed by the Project is the impact on air quality and public health in the region's urban areas, as a result of the introduction of clean fuels.

Expected Results

The Project intends to identify, for the next 20 years, those refineries that will have the highest levels of profitability in the region and those refineries whose products will not be able to compete with the opportunity prices of products coming from other sources. It will also determine the modifications and/or expansion in capacity that will be necessary in existing installations and will quantify associated investments. The study will also indicate the incremental costs stemming from the upgrading of refineries to address new factors affecting the profitability and efficiency of these refineries: location, timeliness, capacity, and configuration to install new refineries that will respond to incremental demand during the period considered. The study will propose several alternatives for reforms and solutions to open up the market and promote investments and will recommend that those aspects of refining activity and fuel quality affecting the environment be improved. Likewise, on the basis of the results of the study, financial regulations and options for each type of ownership scheme will be proposed.

The benefits to be obtained from the Project include promoting improvements in air quality as a result of fuel quality optimization, contributing to the expansion of intra-regional transactions and regional integration as a result of greater harmonization of fuel quality standards, and identifying the economic benefits that can be achieved from rationalization of the refining sector.

Institutions Conducting and Sponsoring the Project

The Latin American and Caribbean Refinery Sector Development Project will be conducted by OLADE and ARPEL as the institutions in charge of coordinating actions with governments and oil companies and will be sponsored by the World Bank, the Canadian International Development Agency (CIDA), and the following oil companies: the Brazilian state oil company Petróleo Brasileiro S.A. (PETROBRAS), the Venezuelan state oil company Petróleos de Venezuela (PDVSA), the Mexican state oil company Petróleos Mexicanos (PEMEX), the state oil company of Trinidad and Tobago PETROTRIN, and the Spanish state oil company REPSOL.

Structure and Methodology

The Project is divided into two principal studies, involving different specializations and experiences and requiring the establishment of teams of specialized consultants. The first study will determine the schedule and magnitude of the investments required to respond to refining sector change trends. The second study will indicate what options are available to reform the downstream sector and secure funds from public or private sources, adapted to the investments that are needed.

Scope of the Work

- **Refining Sector Study**

This study includes activities to obtain forecasting for crude oil supply in the region, including distillation yields, qualities and prices, demand forecasting for products by geographical area and principal type of refined product for the period 2000-2020; the incorporation of the most important technical quality specifications for oil products and their forecasting. The following will also be studied: the trends and costs of intra-regional and international trade of oil products; analysis of parity import and export prices of oil products; and the incorporation of environmental regulations governing refinery operations.

All the information will be processed by a mixed programming model, which will be formulated to run simulations of case studies. The current situation will permit an analysis of cases where the following variables are incorporated: liberalization and opening up of consumption markets and competitive prices; incorporation of quality trends for oil products to achieve environmental goals; penetration of natural gas into oil products consumption markets; and suitable tax systems to promote competition.

In the results evaluation phase, there will be an analysis of incremental costs and benefits.

In addition, options will be developed for the financing of projects, taking into account the status of transformation processes, global competitiveness of facilities, and other relevant criteria for their economic viability, which could affect the interest of potential investors.

- **Downstream Sector Reform Study**

Part of this study is aimed at analyzing the policy being applied in the sector in each country and the possible reforms to the regulatory framework that would facilitate market competitiveness and promote the investments needed to ensure the sector's development.

The barriers there might be to intra-regional transactions stemming from the asymmetries detected in the regulatory frameworks and other technical, economic, geographical, and environmental barriers will also be studied.

Finally, another focus of the analysis will be the typical ownership schemes to attract to private sector to invest in the refining industry: shared risk partnership, concessions, and other.

- **Environmental aspect**

The positive impact on the environment as a result of the use of clean fuels and various aspects linked to this subject will be important components of the Project. In addition efficient operating and maintenance practices in the refineries will be identified. A workshop on environmental issues will also be included.

Project organization

The follow-up of project achievements and development will be in the hands of the Steering Committee, which is comprised of representatives of sponsoring institutions, except the Canadian International Development Agency. The activities will be administered by two task managers, one for the Refining Sector Study entrusted to OLADE/ARPEL, and the other for the Downstream Sector Reform Study entrusted to the World Bank. The task managers, along with a representative of ARPEL and the consulting firm COMCEPT of Canada, will set up a Technical Committee for the Project's implementation.

ECUADOR-VENEZUELA: OIL DEVELOPMENT COOPERATION

The Minister of Energy and Mines of Ecuador, Pablo Terán, reported that the Ecuadorian Government requested Venezuela to grant it an oil loan for the next two years, as a way of raising the efficiency of the oil and gas sector. The Minister traveled to Caracas in April to discuss the details of the plan but informed that the loan would consist of 28 and 38 API grade crude oil, because Ecuador has to mix crude oils of different quality to optimize transport through its oil pipeline.

The loan will help to increase the exports of Ecuadorian crude oil and will improve refining processes. Ecuador would pay Venezuela back with oil, after 24 months, once its new oil pipeline for heavy crude oil starts up.

PERU: PLANS TO EXPORT ENERGY TO ECUADOR, BOLIVIA, AND CHILE

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He specified that the construction of a high-voltage transmission line to Guayaquil in Ecuador is being studied. He asserted that it would be possible to carry out studies to interconnect and export energy to both northern Chile and Bolivia.

At the end of the year, the Peruvian Government inaugurated one of the largest hydropower stations in San Gabán in the Department of Puno, on the Bolivian border, to supply energy to the country's entire southern zone.

TRINIDAD AND TOBAGO: EXPANSION OF THE NATURAL GAS PLANT

The Prime Minister of Trinidad and Tobago, Basdeo Panday, reported that the expansion of the country's natural gas plant, which includes the process of converting natural gas into liquid gas, will increase LNG production and exports threefold, from 3 million tons currently being produced to 9 million tons by the year 2003.

BP Amoco, British Gas, and Repsol will be financing the project at a cost of US$1.1 billion. This will be the highest investment made in any single project in the history of Trinidad & Tobago, stated the Prime Minister.

The Government hopes to receive US$240 million per year over a 20-year period for LNG sales. In addition, the project will be providing 3,000 direct jobs during its construction.

ECUADOR-VENEZUELA: OIL DEVELOPMENT COOPERATION

The Minister of Energy and Mines of Ecuador, Pablo Terán, reported that the Ecuadorian Government requested Venezuela to grant it an oil loan for the next two years, as a way of raising the efficiency of the oil and gas sector. The Minister traveled to Caracas in April to discuss the details of the plan but informed that the loan would consist of 28 and 38 API grade crude oil, because Ecuador has to mix crude oils of different quality to optimize transport through its oil pipeline.

The loan will help to increase the exports of Ecuadorian crude oil and will improve refining processes. Ecuador would pay Venezuela back with oil, after 24 months, once its new oil pipeline for heavy crude oil starts up.

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FIG. 1

OIL IMPORTS AND EXPORTS BY COUNTRY
(KBPDC)

	IMPORT.	EXPORT.
ARGENTINA	23.07	324.00
BARBADOS	-	1.38
BOLIVIA	-	0.44
BRAZIL	550.24	-
COLOMBIA	-	431.41
COSTA RICA	1.04	-
CUBA	33.35	-
CHILE	181.61	-
ECUADOR	-	242.77
EL SALVADOR	18.06	-
GRENADA	-	-
GUATEMALA	15.35	22.10
GUYANA	-	-
HAITI	-	-
HONDURAS	-	-
JAMAICA	23.96	-
MEXICO	-	1718.00
NICARAGUA	17.25	-
PANAMA	45.49	-
PARAGUAY	2.68	-
PERU	94.71	42.97
DOMINICAN REP.	44.73	-
SURINAME	-	0.95
TRINIDAD & TOB.	46.10	69.30
URUGUAY	34.95	-
VENEZUELA	-	2047.92
LAC	1132.57	4901.24

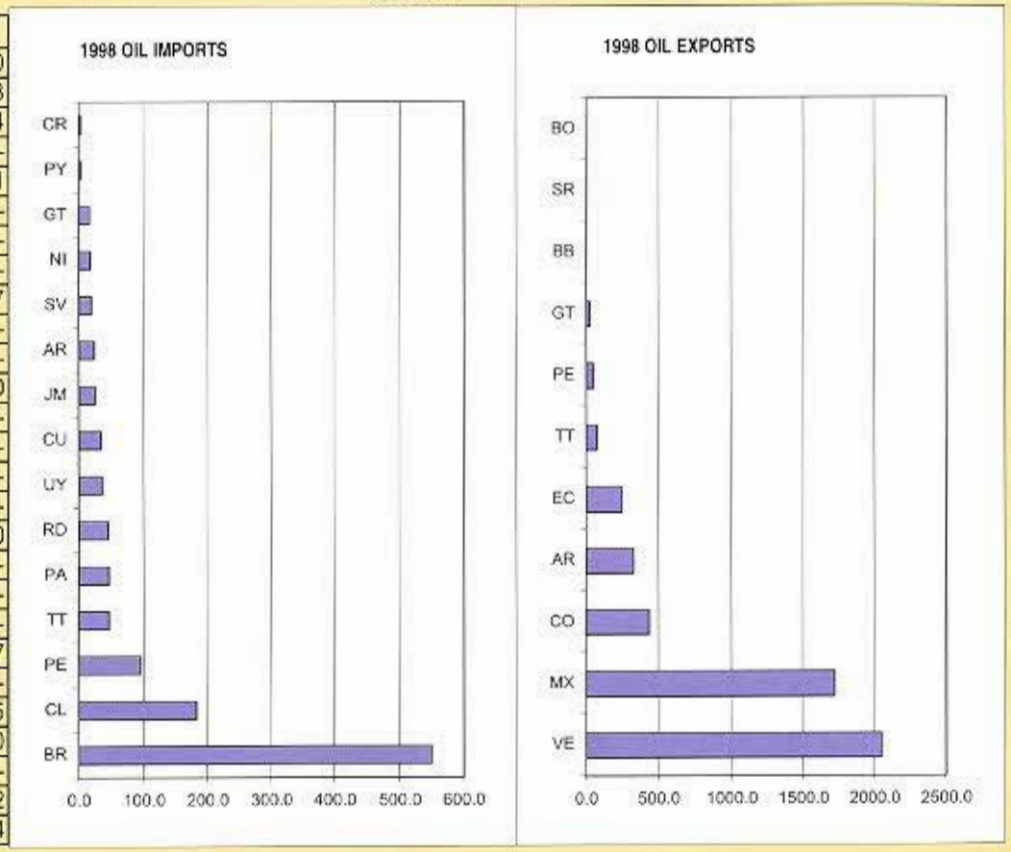


FIG. 2

PRIMARY ENERGY PRODUCTION (Kboe)

1998

	Oil	Natural gas	Coal	Hydro-energy	Geo-thermal	Nuclear	Fire-wood	Sugar cane products	Other primary
ARGENTINA	313549	231587	1063	22389	-	9979	5850	5709	9431
BARBADOS	586	221	-	-	-	-	-	267	-
BOLIVIA	13688	37445	-	3355	-	-	3189	2395	738
BRAZIL	352263	65538	13773	180533	-	143	152996	180067	24414
COLOMBIA	290722	44819	158076	23668	-	-	32889	12570	2315
COSTA RICA	-	-	-	3622	2185	-	1187	777	215
CUBA	12111	742	-	75	-	-	4111	13738	-
CHILE	1920	13337	4741	9994	-	-	28273	-	73
ECUADOR	147833	8560	-	4597	-	-	6377	1888	-
EL SALVADOR	-	-	-	2416	3289	-	8737	1821	-
GRENADA	-	-	-	-	-	-	34	3	-
GUATEMALA	9238	66	-	1286	3	-	20220	2075	23
GUYANA	-	-	-	-	-	-	1658	1355	-
HAITI	-	-	-	706	-	-	12054	476	-
HONDURAS	-	-	-	1453	-	-	11434	1047	-
JAMAICA	-	-	-	88	-	-	1995	2670	-
MEXICO	1237423	291823	55994	22589	3600	15162	53713	17348	9
NICARAGUA	-	-	-	1047	983	-	8065	1486	-
PANAMA	-	-	-	2089	-	-	2940	371	-
PARAGUAY	-	-	-	45720	-	-	13564	25	4386
PERU	41181	8438	90	10696	-	-	28194	2118	1938
DOMINICAN R.	-	-	-	1485	-	-	8228	1220	-
SURINAME	1866	-	-	947	-	-	298	-	83
TRIN & TOB.	44826	66003	-	-	-	-	-	669	-
URUGUAY	-	-	-	7087	-	-	3113	108	700
VENEZUELA	1260310	334539	39450	41049	-	-	-	-	12670
LAC	3727515	1103117	273188	386873	10059	25304	409120	250183	56995

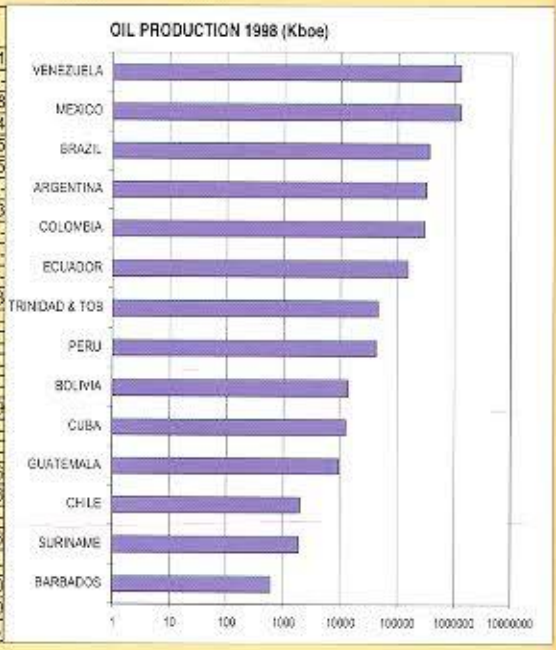


FIG. 3

FINAL ENERGY DEMAND (Kboe)

1998

	HYDRO-CARBONS	BIOMASS	ELECTRI-CITY	OTHER
ARGENTINA	257943	17737	40095	6055
BARBADOS	1058	257	408	0
BOLIVIA	14548	5900	2003	0
BRAZIL	599204	207406	184246	42113
COLOMBIA	107606	46271	21327	15190
COSTA RICA	10917	2015	3125	55
CUBA	32203	16089	7379	1564
CHILE	77157	25194	19095	8412
ECUADOR	34256	8265	4719	0
EL SALVADOR	10022	9470	2047	5
GRENADA	296	37	60	3
GUATEMALA	15341	21212	2155	0
GUYANA	2388	2647	406	0
HAITI	2753	9786	187	0
HONDURAS	7276	12362	1688	5
JAMAICA	11683	524	3607	358
MEXICO	498084	70949	81425	166682
NICARAGUA	4834	9400	926	0
PANAMA	8045	3176	2073	310
PARAGUAY	8994	17128	2732	0
PERU	46149	30474	9859	2184
DOMINICAN REP.	16906	7952	3208	0
SURINAME	4657	391	792	0
TRININDAD & TOB	40562	456	2770	0
URUGUAY	11218	3417	3619	100
VENEZUELA	252927	0	38332	58
LAC	2077026	527515	438265	243095

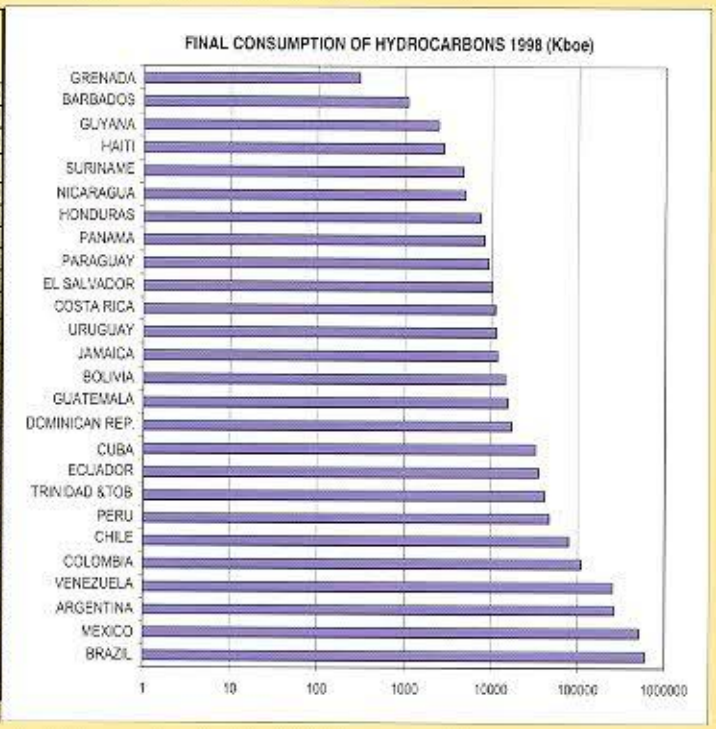


FIG. 4 ENERGY END-USE BY SECTOR (Kboe)

1998

	TRANS-PORT	INDUS-TRY	RESIDEN-TIAL	COMMER-CIAL	AGRI FISHING	OTHER
ARGENTINA	104078	89740	62529	20537	20359	
BARBADOS	752	369	227	287	5	43
BOLIVIA	8407	5749	6975	415	437	342
BRAZIL	334694	350914	140958	52781	64711	447
COLOMBIA	59069	49143	45996	7641	13038	4280
COSTA RICA	8094	3689	2329	1267	668	24
CUBA	8535	32874	5330	1775	2716	5894
CHILE	47374	45337	34773	1328	195	
ECUADOR	16388	7593	12693	3451	2507	1694
EL SALVADOR	6404	5005	9196	609	0	72
GRENADA	218	15	111	33	12	6
GUATEMALA	9800	5041	21413	1494	327	
GUYANA	948	1739	1837	64	851	2
HAITI	1642	1738	8955	303		29
HONDURAS	4300	4699	11490	637	206	
JAMAICA	6411	4021	2081	1117	1791	405
MEXICO	273224	298265	169128	0	20381	
NICARAGUA	2881	1919	8045	1022	187	106
PANAMA	5248	2810	3900	1322		
PARAGUAY	7710	10934	9496	638		
PERU	23806	13742	35633	2312	10769	66
DOMINICAN REP.	8165	5790	13192	0	273	
SURINAME	836	3869	588	167	323	
TRINIDAD & TOB	4070	19494	924	537		
URUGUAY	6040	3960	4940	1345	1418	19
VENEZUELA	103097	139621	26617	17432	547	4004
LAC	1054191	1106068	639554	118516	141721	17433

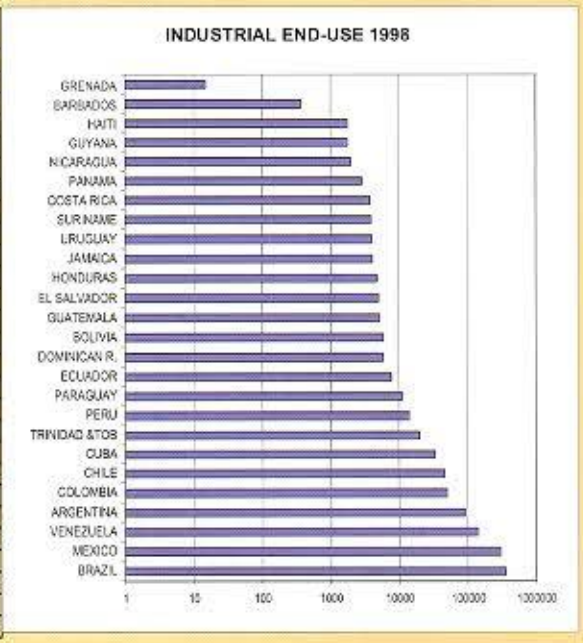


FIG. 5 SHARE OF ENERGY SOURCES IN THE RESIDENTIAL SECTOR (%)

1998

	Natural gas	Firewood	Electricity	LPG	Other	TOTAL
ARGENTINA	61.16	4.37	19.19	11.79	3.48	100
BARBADOS	5.28	0.00	57.27	31.56	5.91	100
BOLIVIA	0.17	41.66	11.37	33.80	12.99	100
BRAZIL	0.41	33.47	34.88	30.75	0.49	100
CHILE	0.00	56.10	17.08	20.20	6.62	100
COLOMBIA	6.67	59.12	19.79	10.10	4.32	100
COSTA RICA	0.00	25.88	62.44	11.07	0.61	100
CUBA	0.00	3.29	38.57	10.33	47.80	100
ECUADOR	0.00	46.51	13.93	36.36	3.20	100
EL SALVADOR	0.00	81.58	8.36	7.61	2.45	100
GRENADA	0.00	30.19	21.21	32.62	15.98	100
GUATEMALA	0.00	90.74	3.26	4.49	1.51	100
GUYANA	0.00	85.57	5.50	1.79	7.15	100
HAITI	0.00	96.22	0.80	0.64	2.33	100
HONDURAS	0.00	88.81	7.64	2.05	1.49	100
JAMAICA	0.00	25.20	25.25	25.34	24.22	100
MEXICO	0.84	31.76	17.00	40.84	9.46	100
NICARAGUA	0.00	93.98	3.47	1.46	1.09	100
PANAMA	0.00	67.83	16.17	13.81	2.19	100
PARAGUAY	0.00	76.97	16.73	5.66	0.65	100
PERU	0.00	64.63	10.56	7.56	17.25	100
DOMINICAN REP.	0.00	44.40	17.59	17.92	20.09	100
SURINAME	0.00	48.94	24.36	20.07	6.63	100
TRINIDAD & TOB.	0.00	0.00	73.63	17.55	8.82	100
URUGUAY	0.00	42.67	32.48	14.89	9.95	100
VENEZUELA	25.48	0.00	32.73	34.18	7.61	100
LAC	7.86	40.14	20.95	24.74	6.31	100

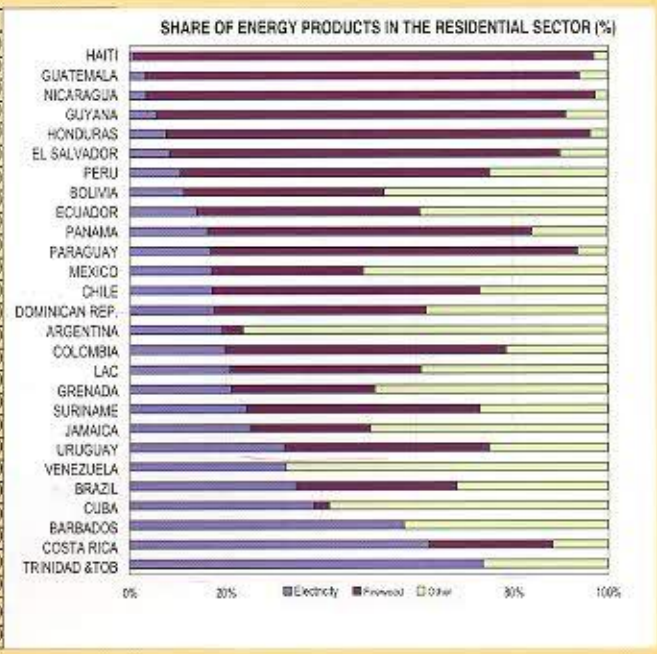


FIG. 6

	ELECTRICITY COVERAGE (%)		1995 UNDP DEVELOPMENT INDEX
ARGENTINA	94.6	AR	0.888
BARBADOS	98.0	BB	0.909
BOLIVIA	60.4	BO	0.593
BRAZIL	94.0	BR	0.809
CHILE	95.5	CL	0.893
COLOMBIA	84.2	CO	0.850
COSTA RICA	95.1	CR	0.889
CUBA	95.0	CU	0.729
ECUADOR	79.7	EC	0.767
EL SALVADOR	70.8	SV	0.604
GRENADA	82.0	GD	0.851
GUATEMALA	66.7	GT	0.615
GUYANA	64.0	GY	0.670
HAITI	45.0	HT	0.340
HONDURAS	54.5	HN	0.573
JAMAICA	70.0	JM	0.735
MEXICO	94.5	MX	0.855
NICARAGUA	55.8	NI	0.547
PANAMA	71.6	PA	0.868
PARAGUAY	74.7	PY	0.707
PERU	68.0	PE	0.729
DOMINICAN R.	84.0	RD	0.720
SURINAME	97.0	SR	0.796
TRINIDAD&TOB	97.0	TT	0.880
URUGUAY	97.3	UY	0.885
VENEZUELA	90.8	VE	0.860

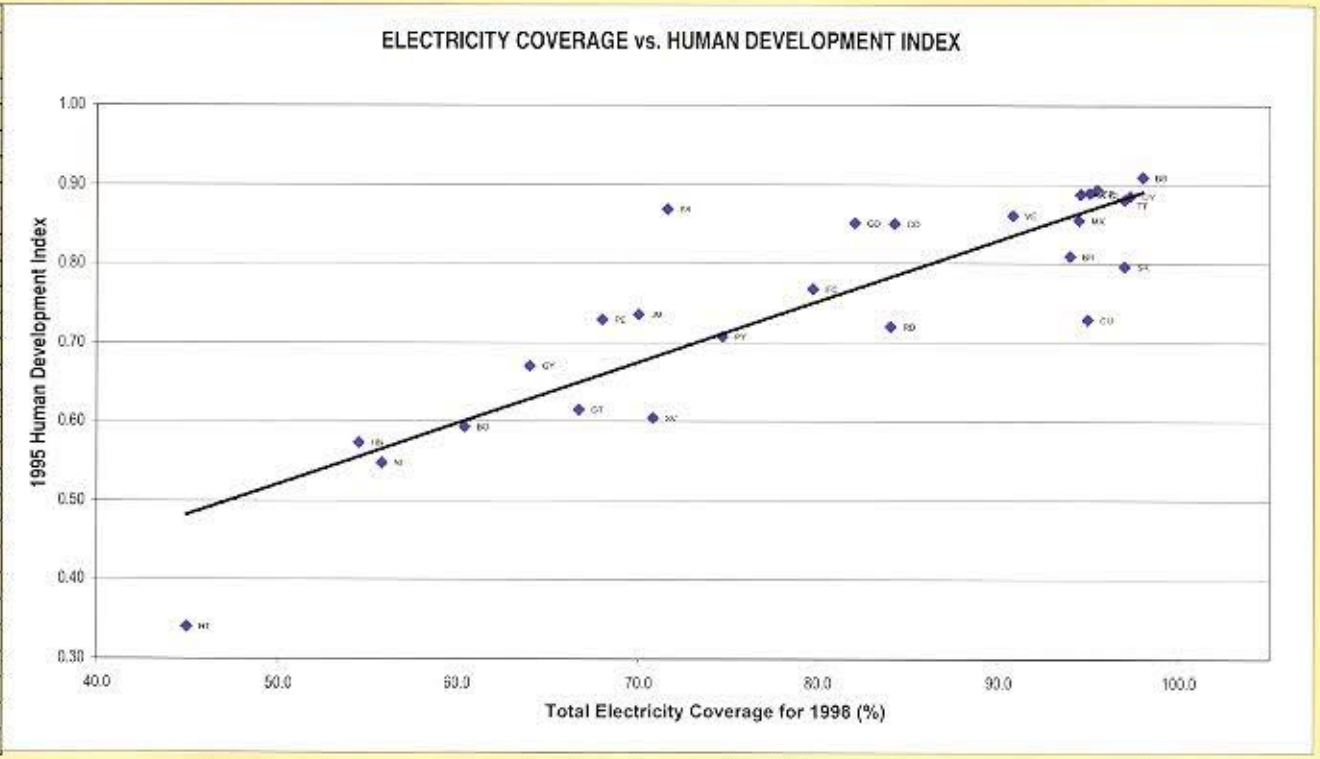
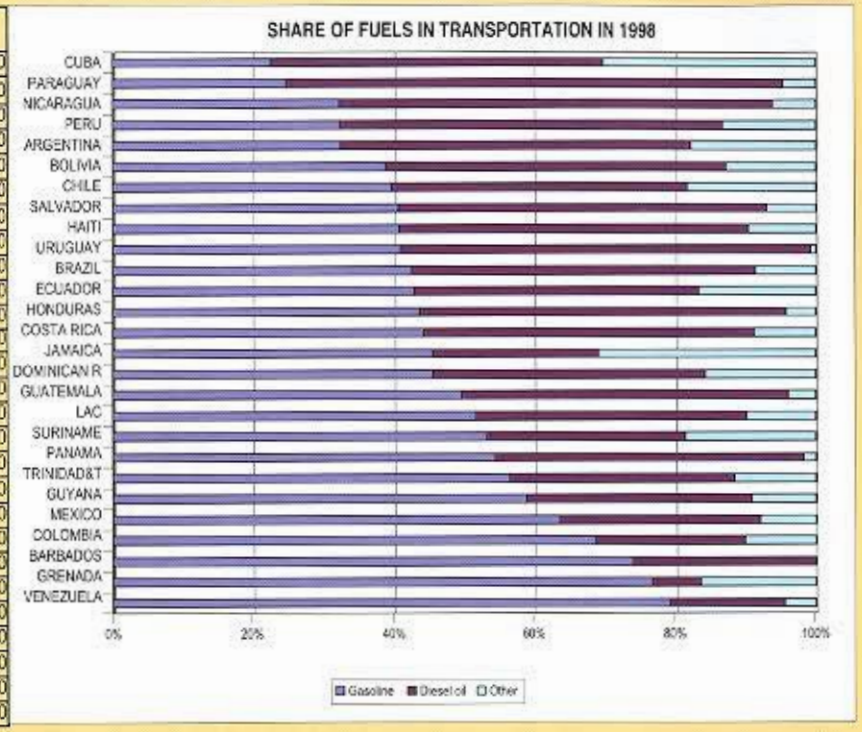
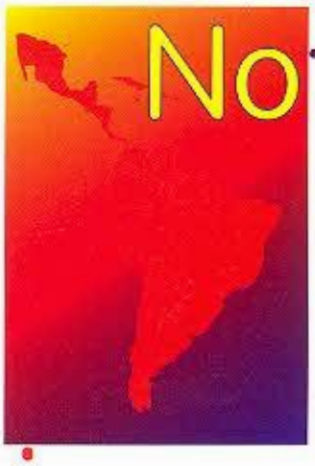


FIG.7 SHARE OF ENERGY SOURCES IN THE TRANSPORTATION SECTOR (%)

	Gasoline	Diesel oil	Kerosene and jet fuel	Fuel oil	Electricity	Other	TOTAL
ARGENTINA	32.53	49.77	9.30	0.52	0.29	7.60	100.00
BARBADOS	74.04	25.96	0.00	0.00	0.00	0.00	100.00
BOLIVIA	38.88	48.34	12.28	0.00	0.00	0.50	100.00
BRAZIL	42.52	48.92	6.57	1.62	0.22	0.16	100.00
CHILE	39.71	42.07	10.82	7.00	0.27	0.13	100.00
COLOMBIA	68.90	21.00	8.60	0.42	0.04	1.03	100.00
COSTA RICA	44.21	46.97	8.82	0.00	0.00	0.00	100.00
CUBA	22.61	47.28	21.30	8.00	0.02	0.79	100.00
ECUADOR	42.84	40.59	6.19	10.34	0.04	0.00	100.00
EL SALVADOR	40.62	52.38	7.01	0.00	0.00	0.00	100.00
GRENADA	76.89	6.83	14.91	0.00	0.00	1.37	100.00
GUATEMALA	49.71	46.38	3.83	0.00	0.00	0.07	100.00
GUYANA	59.00	31.91	9.10	0.00	0.00	0.00	100.00
HAITI	40.80	49.58	9.63	0.00	0.00	0.00	100.00
HONDURAS	43.64	52.15	4.21	0.00	0.00	0.00	100.00
JAMAICA	45.49	23.75	29.48	1.29	0.00	0.00	100.00
MEXICO	63.81	28.25	6.16	0.19	0.24	1.34	100.00
NICARAGUA	32.36	61.58	6.06	0.00	0.00	0.00	100.00
PANAMA	54.44	43.83	0.57	0.00	1.17	0.00	100.00
PARAGUAY	24.93	70.43	2.94	0.00	0.01	1.69	100.00
PERU	32.44	54.32	11.77	1.46	0.00	0.00	100.00
DOMINICAN R.	45.57	38.68	6.11	0.86	0.00	8.77	100.00
SURINAME	53.29	28.26	18.45	0.00	0.00	0.00	100.00
TRIN. & TOB	56.50	31.92	10.47	0.91	0.00	0.20	100.00
URUGUAY	40.98	58.40	0.63	0.00	0.00	0.00	100.00
VENEZUELA	79.36	16.24	2.82	0.05	0.00	1.54	100.00
AL&C	51.70	38.40	7.00	1.26	0.18	1.45	100.00





ENERGY SECRETARY OF MEXICO AND EXECUTIVE SECRETARY OF OLADE REVIEW ENERGY DEVELOPMENT TOPICS

The principal guidelines for the strategic orientation of the Latin American Energy Organization were analyzed by the Secretary of Energy of Mexico, Dr. Luis Téllez Kuenzler, and the Executive Secretary of OLADE, Dr. Julio Herrera, during the working meeting they held on April 5, 2000 in Mexico City.

At the meeting, they emphasized the need to consolidate OLADE's role as the forum for the elaboration and discussion of energy policies in Latin America and the Caribbean and to promote regional energy cooperation and integration.

Emphasis was laid on the decision to conduct a process aimed at strengthening OLADE's ties with the countries of the region that are not members of the Organization, with governments and cooperation agencies of countries from outside the region, with subregional integration agreements of Latin America and the Caribbean, international organizations, and energy companies, both public and private, inside and outside the region.

In addition to these topics, the two executives examined the Organization's current activities, especially the future projects that are part of its new strategy.

It should be underscored that Mexico is a member of the recently established Strategy and Programming Committee of OLADE, which in the immediate future will be in charge of elaborating a proposal to be submitted to the upcoming Meeting of Ministers on the following:

- Revision of the Lima Agreement (OLADE's charter)
- OLADE's action with subregional agreements
- The Organization's relationships with the Hemispheric Energy Initiative, the European Union, the Asia-Pacific Economic Cooperation and other international entities.

The meeting also addressed issues involving the results of the major structural reform in Mexico's energy sector.