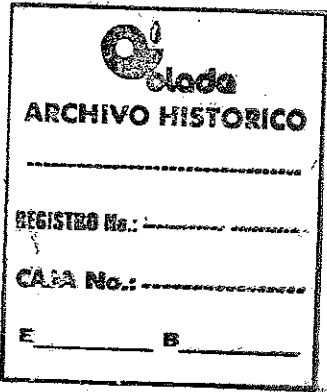




Latin America In Transition

Service quality, efficiency and environmental responsibility are key ingredients in Latin America's future as it restructures to meet its electrical capacity demands.

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Latin America

Although the power sector in Latin America and the Caribbean (LAC) has progressed substantially over the past two decades, its evolution displays symptoms of stagnation, and its financial situation is now critical. A series of problems, including poor management, low energy use efficiency, and other economic, institutional, and environmental deficiencies, has not only prevented adequate service delivery but, more important, has also obstructed its continued development.

The problems that the LAC must now face due to the ineffectiveness of the prevailing power development model have led to the widespread need for restructuring the power industry using a business management approach. This is aimed at ensuring service quality and efficiency within a framework that guarantees a tariff-setting scheme capable of covering the sector's costs and expansion and, at the same time, adequately meeting demand.

Electricity consumption in the LAC has been characterized by high demand growth elasticity with respect to gross domestic product (GDP), steady growth of per capita consumption, and the rapid increase of access to electricity, without any substantial achievements in the efficient use of energy (See Table 1).

The difficult economic situation, due to the large volume of investments that need to be made and the region's external debt servicing, has become a heavy financial burden requiring measures to improve both economic and energy efficiency.

The awareness of society regarding environmental protection and the new policies adopted by multilateral banks and technical assistance institutions regarding the environment are other factors enhancing the complexity of the situation and providing challenges the LAC power sector will have to face for its development.

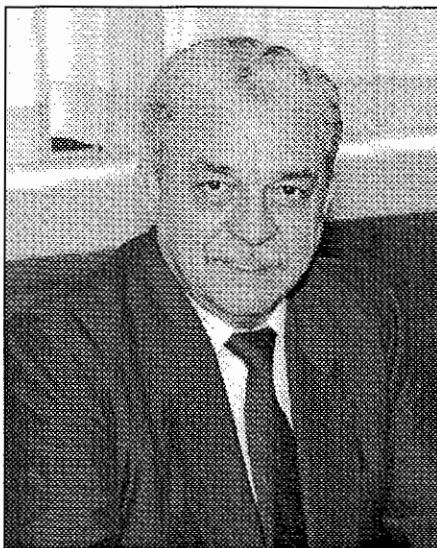
The adjustment process taking place in the power sector is based on a modernization approach. This has led to re-ordering the state's role, which has been promoted by national state, provincial, and local entities. The current outlook regarding the progress achieved by this process is summarized in several brief country synopses.

On the basis of current experience, Mexico has a state monopoly (Federal

Electricity Commission) which permits private-sector participation in power generation, subject to the delivery of all electricity generated.

The six countries of the Central American isthmus have kept power service delivery in the hands of state utilities. Nevertheless, various privatization programs are being considered, and national grids are being increasingly interconnected.

Brazil is in the process of reformulating the role of Eletrobrás, which will be complemented by the private sector to handle the system's expansion, although the state will continue to play an important role, at both the national and state level.



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Peru is currently involved in privatizing its state power utility Electroperu, which would mean that private concession-holders would be gradually incorporated into the delivery of services.

Argentina has gone further than Peru, and now a large part of generation is handled by the private sector as a result of the reorganization of the state scheme.

Chile has concluded a process involving the total privatization of generation, transmission, and distribution, on the basis of a marginal tariff scheme and a certain degree of inter-utility coordination regarding system expansion.

Finally, other countries, among them Ecuador, are conducting studies aimed at reforming the power sector with different degrees of openness to private-sector participation.

The Modern Approach

The major problems affecting the power sector in many countries of the LAC largely reflect the lack of a modern approach to the sector's role and the absence of a suitable legal and institutional structure to foster its development. The state's dual function as regulator and shareholder has allowed it to interfere in managerial and administrative decisions in which it should not be involved.

It has been observed that a characteristic of the 1980s has been the loss of managerial autonomy, owing to a growing bureaucracy and increasing political intrusiveness in the management of power utilities, including tariff-setting. Operation of power sector utilities should be evaluated according to the results obtained, and their executives should be held accountable for their performance.

The lack of adequate maintenance has also led to an impairment of the power system's generation capacity in most of the region's countries and is at the root of high fuel costs, lower generation reserve levels, and power supply rationing with high losses for the economies and deterioration of living conditions.

The complexity of operating hydrothermal systems, heightened by recent droughts, has been underestimated; this has required the introduction of new hydrological analysis and risk management methods, as well as upgrading and even decommissioning obsolete units to pave the way for new stations that take advantage of recent technological breakthroughs.

Low efficiency in the use of electric power is apparent in the region. This is due to the application of end-use equipment in residential, commercial and services sectors with high specific consumption of energy, the obsolescence of industrial facilities, and consumer behavior patterns that are far removed from optimal levels of efficiency.

Another challenge involves financing investments during the next few years. The coordinated participation of all the

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INDICATORS	UNITS	YEARS				
		1980	1990	1993	2000	2010
Installed Capacity	GW	92.5	158.7	167.5	200.3	289.3
Hydro Power/Total Power	%	52.7	58.5	58.9	64.0	56.0
Electric Power Production	TWh	357.2	597.7	686.3	933.4	1319.7
Hydro Prod./Total Prod.	%	60.1	65.8	72.6	72.6	61.0
Electricity Consumption	TWh	297.8	486.2	558.3	737.7	1110.9
Per Capita Consumption	KWh per person	835.6	1104.2	1192.5	1370.1	1724.5
Population	Pop. in Mil.	357.8	443.4	468.1	538.4	644.2
Gross Domestic Product	Bil. of \$	711.8	811.7	943.0	1166.5	1615.9

Table 1: Electricity generation and consumption in LAC.

INDICATORS	1980-1990 Percent*	1990-2000 Percent*	2000-2010 Percent*
Population	2.17	1.96	1.81
Gross Domestic Product	1.32	3.69	3.31
Installed Capacity	5.55	2.36	3.74
Hydraulic Capacity	6.65	3.28	2.37
Production of Electricity	5.02	4.26	4.18
Hydraulic Production	5.98	5.29	2.38

Table 2: Economic, population and power sector indicators.

*Each percentage is actual or estimated growth for specified time periods.

sector's players is required. Regarding this, any proposal aimed at resolving the problem should include the search for economic and energy efficiency, wider participation of the private sector, and a new role for the state in sector management, as well as a larger contribution from multilateral banks.

Power losses in the LAC have reached high levels — in some cases close to 30 percent of generation, with an average of 17 percent. This situation has been motivated by organizational and administrative deficiencies in power utilities and low investment in distribution.

Understanding Needs

According to estimates by the Latin American Energy Organization (OLADE), electric power demand in the LAC will grow at an annual average rate of 4.26 percent between 1990 and 2000, slightly under the rate of 5.02 percent for the region from 1980 and 1990. This evolution of demand is based on an annual average GDP growth rate of 3.69 percent in the same

period and takes into account past trends of energy source substitution and penetration. These trends indicate a decline in energy intensity and a rise in per capita consumption (Table 2).

The application of policies for the efficient use and substitution of energy will permit the reduction of electricity consumption growth rates and thus installed capacity requirements. It is estimated that if electric power savings and substitution on the order of 5.9 percent are achieved for the year 2000, the annual growth rate of consumption will decline to 3.7 percent.

Without taking into account energy conservation policies, capacity additions between 1990 to 2000 are expected to be 41.6 GW. Of this, about 85 percent will be hydropower; 12 percent will be oil products, natural gas and plants using coal; and the rest will be geothermal and nuclear plants under construction (Table 3). By applying programs for the efficient use of energy and energy substitution, power recovery, and reduction of power losses, supply requirements could be reduced by about 20 percent, with the resulting benefit for the economy of the

region's countries.

Investment requirements for the electric power sector for 1990 to 2000, in view of current consumption patterns and trends, will amount to nearly \$19 billion a year (U.S. dollars). About 88 percent of this will be concentrated in six countries of the region: Argentina, Brazil, Chile, Colombia, Mexico and Venezuela.

Power Options

The importance of energy/economic efficiency lies in its capacity to permit a greater internal generation of funds and to displace investment requirements so the sector can become more competitive while delivering a service that provides earnings.

Rising competition in the power industry should not jeopardize supply security over either the short or the long term, nor should it affect the advantages associated with public service.

The entire process is complex and dynamic, and there is still much to be done. There are no blanket solutions or miracles. Miracles will only be possible to the extent that efforts are deployed to make them occur.

The objectives to be achieved include the free circulation of electricity, supply security and greater competitiveness. Competition and market forces are the means that have been selected to ensure reaching the basic goal of supply security.

The solution to finance sector investments involves combining several options that have to be integrally implemented. The total volume of investments would decline to \$17 billion owing to the drop in installed capacity requirements as a result of energy-conservation measures. Long-run marginal cost tariffs and the reduction of costs would permit servicing the sector's debt and would provide a net internal generation of resources on the order of \$11.4 billion. Under these conditions, the annual deficit in terms of financing, taking into account the contribution of customers —for extending lines, networks, connections, and meters— would be about \$.3 billion. If contributions from multilateral banks amount to \$1.4 billion, the outstanding balance of \$1.6 billion required could be covered by contributions from internal and external savings.

Because traditional financing is no

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INSTALLED CAPACITY-GW	YEARS			ADDITIONS	
	1990	2000	2010	1990-2000	2000-2010
Hydropower	92.8	128.2	162.0	35.4	33.8
Steam-Driven Thermal	51.1	53.0	97.5	1.9	44.5
Gas-Fired	7.2	10.5	18.4	3.3	7.9
Diesel-Fired	3.9	3.5	2.9	-0.4	-0.6
Geothermal	0.9	2.0	3.5	1.1	1.5
Nuclear	2.8	3.1	5.0	0.3	1.9
Total	158.7	200.3	289.3	41.6	89.0

Table 3: Installed capacity and projected additions in LAC through 2010.

longer valid, sector utilities will need to act as private enterprises and reach out to capital markets, both domestic and international. The development of domestic capital markets is essential for an economy geared to fostering the broad participation of market forces. Nevertheless, obtaining resources from the domestic market requires efforts by the countries to promote sound finances in the sector's utilities, as well as to continue with the stabilization process that has already begun and to sustain economic growth.

Since domestic capital market resources are insufficient, the sector will have to resort to international capital markets; but they must do so cautiously owing to exchange rate risks and the high competitiveness that restricts access to these resources. It is important to point out that the capital cost for the sector will greatly depend on institutional capacity, the application of clear and stable rules of the game for the sector, the restructuring of utilities according to sound business and managerial principles, and the establishment of macroeconomic goals that the governments can achieve and maintain over time.

Private Investment

In order to improve the LAC's power sector, the state's role needs to be reformed, including the broader participation of private-sector initiatives in generation, transmission and distribution of electricity. This should take place within the current overall trend of openness toward more competitive markets, involving the application of typical private-sector commercial practices in power utilities, which does not necessarily imply the privatization of all assets

that are now in the hands of the state.

Although the characteristics and scope of private enterprise activities will depend on the specific situation of each case, the private sector can make a considerable contribution in terms of capital and technology in virtually all sector activities. In any case, the participation of private investment in the power utilities of the LAC will still require some time, since many additional efforts are required in exchange rates, regulatory guarantees, and suitable legislation, and above all an environment of stability and security to attract a higher amount of private capital to the sector.

Nevertheless, to do this, the severe constraints stemming from various sector policies—the absence of regulatory agencies, underdeveloped stock markets, or the poor credit rating of some countries, among others—have to be surmounted.

In the power sector, the regulatory framework defines the economic structure and the rules of the game for developing activities and establishing standards for performance of economic agents.

Private capital, interested in a rapid return on its capital investment, will tend to install thermoelectric stations, where the cost is closely linked to the kilowatt hours produced. But the idea is not to merely produce and sell; pressure must be exerted by consumers and the regulator so that, by rationalizing consumption, generation can be reduced, costs will fall, and pollution mitigated.

Conditions For Financing

At present, various factors indicate that the sector has entered into a phase

of change and stepped up its pace. Macroeconomic adjustment processes will free the restrictions that have obstructed investments. Also, the depletion of capacity surpluses, the termination of projects, and the recovery of demand have required new undertakings. Finally, structural reforms in the energy sector will facilitate the participation of multilateral banks.

Investment requirements are so large that correct tariff policies will have to be established, expansion programs will have to be revised, efficiency and productivity will have to be enhanced, energy conservation and rational use of energy will have to be promoted, and direct capital contributions and financing from national and international markets will be used.

In the immediate future, priority must be given to social issues. Establishment of an adequate infrastructure should become part of a development strategy involving social investments, especially in education and health; macroeconomic stability; integration with the world economy; and a suitable economic and legal environment, as well as an infrastructure that fosters a business approach to the sector's operation.

It has been observed that it is possible to substantially increase the real income of the lowest-income groups by implementing programs that foster the substitution of biomass for more efficient energy products, such as electricity for lighting and liquefied petroleum gas for heating and cooking.

The Transition Phase

The state's participation in the energy sector of Latin American countries is wide-ranging, and virtually all possible alternatives have been applied. Nevertheless, the growing competitiveness of markets and the effect of financial constraints are orienting the sector toward more rational resource-allocation schemes, based on technical and economic feasibility and the profitability of investment projects.

In those Latin American countries that have opted to maintain strong state control over resources and energy companies, it is expected there will be a gradual opening up toward partnerships with private capital in specific projects, without impairing the regulatory and

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executive role of state agencies.

In those countries that have initiated reform processes aimed at separating the regulatory role of the state from the operational role of energy companies, the state should focus its actions in the energy sector on functions such as designing energy policies to achieve long-term sectoral objectives, organizing suitable regulatory frameworks, and promoting reliable capital markets and mobilizing financial resources, especially for the implementation of large-scale projects during the initial transition phase.

In any of the above-mentioned cases, the state should rely on a highly professional, motivated, and more efficient public sector, as this will help to ensure transparency of the system and will per-

mit rapid decision making.

On the basis of international and regional experience, it has been observed that reality moves more rapidly than regulatory frameworks. Therefore, sufficiently flexible, regulatory standards should be established to enable automatic feedback mechanisms to steadily improve service quality.

There are two ways to fully incorporate socio-environmental considerations in electricity generation and transport projects so that they will be acceptable to society and compatible with the physical and biotic environment. Nevertheless, the inclusion of environmental costs in new projects will require an additional effort in allocating the scarce financial resources that are available and which should be provided

by multilateral banks. Higher efficiency in the production and use of electricity in the region is a prerequisite for sustainable development.

Finally, the prevailing conviction is that the best environmental plan for developing countries requires the elimination of poverty, the major source of environmental deterioration; to do this, it is indispensable to increase energy production in all its forms and to use this energy more efficiently. ■

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