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BOTTLENECKS IN ENERGY TRADE AND COOPERATION:

LESSONS FROM EXPERIENCE IN THE LATIN AMERICAN REGION

Chakib Khelil
Energy Unit Chief
Infrastructure and Energy Division
Latin America & the Caribbean Region
Technical Department
World Bank

ABSTRACT

The paper examines the bottlenecks, other than the technical and economic feasibility of energy trade projects, which have prevented in the past a greater development of energy trade in the Latin American (LA) region.
Despite large energy reserves and substantial self sufficiency, the LA region only trades in 3% of its supply in natural gas and electricity and imports from outside the region more than 30% of its requirements for petroleum products and coal. The paper concludes that the major bottlenecks are to be found in the LA countries energy policy and strategy followed since 1973, their institutional set-up which emphasized state management of energy resources and petroleum products pricing and electricity tariff setting policies. Most countries in the region are undergoing economic adjustment programs where these bottlenecks will be reduced or eliminated altogether. Consequently economic interregional trade in energy should see a major development in the future with the support of the private sector, multilateral and official credit agencies.

INTRODUCTION

The world is undergoing major political changes with the collapse of the socialist block as a national and regional political and economic power, and the development of the western dominated large regional power blocks. As a result of this trend, cooperation between and integration of Latin American (LA) countries appears to take a new significant relevance both politically and economically. And within this context, the energy sector has been traditionally regarded as an economic activity where much progress could be achieved.

Interregional energy trade and cooperation in the LA countries has been limited in the past to the financial facilities provided by some major oil producers to importers[1], joint oil development between Colombia and Ecuador, exports of natural gas from Bolivia to Argentina, binational hydroelectric projects[2] and other electric power interconnections, primarily in the southern cone subregion and central America.

The large LA continent is globally self-sufficient in energy and generates exports of oil and coal. Energy self sufficiency is however unevenly distributed; except for Mexico, Venezuela, Ecuador, Trinidad & Tobago, Colombia and to a certain extent Argentina, the rest of the LA countries are net importers of energy.

In terms of specific energy sources, only about 62% and 64% of imports of crude/oil products and coal, respectively, originate in the region. On the other hand, intraregional trade in natural gas[3] and electricity[4] have been quite limited. Natural gas and coal proved reserves to production ratios (75 and 504 years respectively) are very high but each supply only 18% and 3% of the total primary energy requirements of the region. While the hydroelectric potential of the region is recognized as one of the highest in the world, hydroelectricity accounts for only 18% of the total primary energy requirements of the region.

In light of the large energy reserves and self sufficiency of the LA region, the question then arises why the level of interregional trade in energy has been so disappointing. An analysis of several interregional energy trade projects (petroleum products, coal, natural gas and electricity) show that, even when they were technically and economically well justified, the projects suffered considerable delays. Consequently the purpose of this work is to examine the major bottlenecks, other than the necessary technical and economic feasibility requirement of specific projects, that have prevented in the past a more rapid development of interregional energy trade and cooperation in the LA region. First, however, the paper presents a general economic overview of the LA region and its energy situation and future prospects.

LATIN AMERICA ECONOMIC OVERVIEW

The LA region covers an area equal to 15% of the world surface from Mexico to Chile and has a population of 413 million (8% of total) and a GNP of US$752 billion (5% of world) in 1988 (Table 1). About 80% of the region's GNP originates in four leading economies of the region : Brazil, Mexico, Argentina and Venezuela. These are also the largest energy producers of

the region (83%). Brazil represents the largest economy with US$311 billion (41% of the region) followed closely by Mexico with US$148 billion. While the LA countries economies grew at an average rate of 5.7% and 6% in the 1960's and 1970's, some suffered stagnation and others a decline during the "lost decade" of the 1980's compared to a slightly better growth on average in all developing countries.

The LA foreign debt is high, representing US$365 billion (1988). The total debt service as a percentage of exports in 1988 were 36% for Argentina, 42% for Brazil, and 43.5% for Mexico. The 1980's were also marked in certain countries by periods of hyperinflation (Argentina 290.5%, Bolivia 482.8% and Brazil 188.7% over the 1980-88 period). The energy sector was responsible for a large percentage of the public sector investments (about 30%) and the public debt (20.0%) according to OLADE (1988).

The LA region countries are now enacting policies supporting growth of their economies in the 1990's primarily through increased new investments and exports. Consequently most countries are encouraging more open economies, a reduced role of the state in the economy and a larger involvement of the private sector under a market environment promoting open competition. Despite their large debt overhang, the LA economies overall are expected to achieve moderate growth in the 1990's. Because of the high ratio of energy consumption to economic growth[5] and the investment and debt constraints facing the LA countries, the satisfaction of energy requirements would need a new approach putting greater reliance on energy efficiency improvement and greater participation of the private sector. Otherwise, unavailability of reliable and low cost energy would constrain economic growth. Seen under this perspective, the interregional energy trade and cooperation option appears to take an important significance.

LATIN AMERICA ENERGY SITUATION

Table 2 shows the region to be globally energy self-sufficient in 1987 and an exporter of oil and coal outside the region . At the same time though, about 38% and 36% of oil and coal requirements respectively were imported from outside the region.

Out of the total primary commercial energy requirements, oil met 58%, natural gas 18%, Hydro/Other 19% and coal 5%. Gross energy reserves are unequally distributed with 90% of the reserves located in 6 countries (Brazil 24%, Mexico 20%, Venezuela 19%, Colombia 15%, Argentina 8% and Chile 6%).

Table 3 shows the commercial energy indicators of the LA countries. Per capita energy consumption varies between a low of 57 Kg of oil equivalent for Haiti to a high of 5255 for Trinidad and Tobago while energy consumption per unit of GDP varies between a low of 0.15 Kg of oil equivalent per US$ for Haiti to a high of 0.80 for Jamaica. While in some countries (para. on fuelwood) fuelwood is a major energy source for residential consumers and thus explain the low levels of their commercial energy, in others (Jamaica, Trinidad and Tobago) high levels are explained by the existence of energy intensive industries. The low level of energy consumption compared to developed countries demonstrates that there is room for more per capita energy expansion in most countries which should not exclude that a major effort should be made, especially in oil exporting

countries, to improve their energy efficiency use.

Energy consumption to GDP growth ratio averaged 1.7 over the period 1980-1987 while the corresponding ratio for oil, coal, natural gas and hydroelectricity averaged respectively 0.8, 4.0,4.0 and 3.7. Consequently, a moderate economic growth in the LA region would be accompanied by a much more rapid growth of coal, natural gas and hydroelectricity than oil use.

Supply and Consumption of Oil

Proven crude oil reserves (12.7% of world) are second only to those of the Middle East in terms of reserves and life of reserves (35.4 years), with Mexico and Venezuela having 90% of the region total. Oil production amount to 6.5 MBD (11% of the world). Since 1973 there were major reserves and production increases in Mexico, Brazil, Colombia and Venezuela with slight declines in Argentina, Bolivia, Chile, and Trinidad & Tobago. Oil supply would globally increase by 1% to 1.5% a year until 1995. Increases are expected primarily in Colombia, Brazil, Venezuela and slightly in Argentina due to expected larger investments in the sector .

The region consumes about 4.4 MBD (7.5% of the world) shared evenly among importers and exporters. Since 1973 growth in oil consumption lagged behind that of electricity and natural gas which substituted for oil. Oil demand in the region however is expected to pick up with economic growth and increase at 2% to 3% a year over the 1990-1995 period.

Refinery runs total 5.7 MBD of net products. There is a lack of refinery cracking capabilities in a number of LA countries with refineries. This is the main reason for the imbalances between the demand and supply of petroleum products in the region. Net importers are Brazil, Costa Rica, Chile, Guatemala, Nicaragua and Uruguay while net exporters of crude but importers of products are Colombia, Ecuador and Peru. Net exporters of crude and fuel oil are Argentina, Mexico, Trinidad & Tobago and Venezuela. The region export/import balance of crude and petroleum products is as follows:

	LA Region (1985)			
	MBD			
	Crude	Products	Total	Total (1989)
Exports	2.47	1.90	4.37	3.65
Imports	1.47	0.36	1.83	1.46
	+1.00	+1.54	2.54	2.19

The exports are mainly to the USA (1986) supplied by Mexico, Venezuela, Trinidad and Tobago, Ecuador, Peru, and Colombia.

Natural Gas Supply and Consumption

The natural gas reserves were estimated at 6316 BCM in 1987, about 6% of the world total with a R/P of 75 years (Khelil, 1990) much higher than world level. The largest reserves are in Mexico and Venezuela with respectively 2.2% and 1.8% of world total.

Natural gas production net of reinjection averaged about 85 BCM in 1987 with 82% produced by Mexico (27.4 BCM), Argentina (20.7 BCM) and Venezuela (21.8 BCM). Average commercial utilization was about 82% compared with world average of 84%. Table 4 and 5 illustrate the potential natural gas supply and markets by the year 2000 (Khelil, 1990). It is expected that supply would increase in all natural gas producing countries to meet their projected demand. The data show that Colombia and Brazil would probably either need to import or cut down on natural gas use.

In terms of the development of a natural gas market, Latin America is about the stage Europe was 30 years ago : there are very large potential markets for natural gas in Argentina, Brazil, Venezuela and Mexico, and strategically well located natural gas reserves in countries such as Argentina, Bolivia, Peru, Venezuela and Colombia. In addition, the USA will remain well into the twenty first century a large potential market (Huntington, 1990) for natural gas exports from the LA region. The following illustrates one probable scenario for interregional gas trade (Million m3/year) in the southern cone LA countries:

IMPORTERS	EXPORTERS		
	Argentina	Bolivia	TOTAL
Argentina	--	2200*	2200
Brazil	1100	1100**	2200
Chile	365	--	365
Uruguay	365	--	365
TOTAL	1830	3300	5130

* Sales contract in place since 1977 has been extended to 2002
** Project being implemented as a gas pipeline/power to export electricity at the border

The southern cone countries will thus constitute the most dynamic natural gas market in the next 20 years; but in the long term, the giant Peruvian natural gas reserves would be tapped to supplement the Brazilian natural gas market requirements as well as exports in the form of LNG to the USA or Far East. The Venezuelan enormous gas reserves would underpin a major development of the local natural gas market and possible exports to Colombia but would also justify an

LNG export project oriented towards the US market. Already Venezuela has been discussing with Shell, Exxon and Mitsubishi the possibility of a joint venture, even though this requires an amendment of the present Venezuelan petroleum legislation.

Coal Supply and Consumption

Coal consumption has increased from 8.6 MTOE in 1973 to 20.2 MTOE in 1987, 90% of which is in Brazil, Colombia and Mexico, and satisfies about 5% of the total primary energy requirements. Colombia is the major coal exporter (7MTOE in 1987) to the USA and Europe. Exports from the region total about 12.5 millions tons of coal (7.9 MTOE). Despite large reserves of coal (504 years at 1989 consumption), the region imported 38% of its coal requirements (Table 1) from outside the region. Coal consumption growth which averaged 6.0% a year during the 1980-1987 period should maintain this rate during the 1990-1995 period. Consequently there is considerable room for expansion of the interregional coal trade.

Electricity Supply and Consumption

Electricity generation more than doubled between 1973 and 1987 (194,397 GWH to 520,292 GWH) with hydroelectricity contributing 63% of the total. Consumption (12.8% of world) is concentrated in the residential and industrial sectors (94% of the total). Installed capacity total 65 GW (1985) out of a total installable hydroelectric potential of 328-806 GW (35% of world total). Brazil has the largest installable capacity (213GW) with also the highest rate of harnessing resources (23.5%). Argentina, Brazil, Cuba and Mexico have nuclear power generation with a total of 1531 MW in operation and 6931 MW under construction (1986).

Interregional trade in electricity represents only 3% of the total generated in 1987, mainly in the form of imports by Brazil and Argentina from Uruguay and Paraguay.

Firewood

Firewood represents about 14.5% of the total primary energy (TPE) production with an average growth rate of 5.7%. Firewood represented more than 40% of the total primary energy production in El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama and the Dominican Republic. Current economic situation has led to growth in consumption, thus contributing to an aggravation of the problems of deforestation, erosion and degradation of hydrographic basins. Residential/commercial/publicsectors consumed about 75% of the total firewood in 1984.

Biomass

Alcohol made from sugar cane has developed as a fuel in transportation mainly in Brazil. By 1988 Alcohol constituted about 20% of total transport fuel requirements after a rapid growth (38% a year over 1975-1988 period). Alcohol substituted for gasoline used in passengers cars but required large government subsidies.

ISSUES IN INTERREGIONAL ENERGY TRADE

Energy Policy and Strategy

After the 1973 oil crisis, energy policy objectives of the LA oil importing countries were generally to achieve energy self-sufficiency mainly through oil substitution by electricity. This was generally justified on the assumption

that high oil prices would prevail in the future. For oil exporting countries, this meant more reliance on oil resources to satisfy their energy needs since they generally benefitted from the high oil prices.

Substitution policies followed by Brazil, for example, meant replacing imported fuel oil by electricity even if that meant subsidizing industries to promote the use of electricity and an Alcohol program that meant a more costly fuel than gasoline. It was also at that time that Brazil considered natural gas imports from both Algeria and Bolivia. While imports from Algeria fell through, a firm contract for imports (to start in 1993) from Bolivia was signed only recently. Argentina promoted the use of natural gas to replace fuel oil used in industry and power generation and complemented its production with natural gas imports in 1977 from Bolivia.

The LA countries relied heavily on state enterprises or regulated market mechanisms to achieve those policy objectives. There was a lack of consideration of all possible energy sources in energy planning, available either locally or regionally. Energy planning were not consistent with the macroeconomic constraints and did not take into account uncertainty of oil prices and risk associated with certain energy options. Locally produced natural gas and coal, in some countries, were not given the same importance as power or petroleum in energy planning; and even much less if coal and natural gas were produced in a neighboring country.

High tariffs and other barriers for imports imposed by governments, combined with the monopoly of state enterprise on imports of coal, natural gas, petroleum products and electricity made trade through a third party impossible.

Following the 1973 crisis, there was a perceived risk in the region in relying and being dependent (gas pipeline or power interconnection) on neighbors for part of one country's energy needs without having a meaningful leverage for countering any possible threat of energy cutoffs.

Institutional Set Up

The State played a dominant role in energy through highly centralized institutions (Ministries, National Oil Companies, National Electricity Companies). The state cumulated the policy and the regulatory roles as well as the functions of the only shareholder in the state controlled energy enterprises. Except in upstream and some downstream activities in the petroleum sector, the private sector did not play any major role in the provision of energy services.

In the petroleum and gas sector the national oil company (NOC) was delegated the regulatory role in terms of award of contract areas to the private sector or in terms of gas imports.

Consequently large investments were carried out as part of the public sector investments program and led to a large portion of the public debt being due to the energy sector (OLADE,1988). This would weigh very heavily in the future against a major involvement of the public sector in investments required in regional projects.

Also because of this institutional set up, the involvement in interregional trade of a large

number of different players with different objectives creates complex problems in achieving an agreement and causes considerable delays. For example, the different players could be the Ministry of Foreign Affairs, Ministry of Industry and Commerce, Ministry of Energy, Ministry of Finance, the State enterprises plus in certain countries local private sector engineering and civil works companies. Each player attempts to maximize or protect its perceived interests which could involve among others: maximizing the industrial added value in the country, solving balance of payments between countries, safeguarding political interests, avoiding losing monopoly powers on imports or simply not financially attractive for a state entity. Imports of natural gas to Brazil from Bolivia and from Argentina to Chile are examples of economically attractive projects which have been entangled for several years by these type of problems.

Regulatory Role of the State Enterprises

Conflict of interest between objectives of the state enterprises which are to maximize benefits from oil resources (NOC) or electricity (Electricity state entity) and the State which may be to achieve low cost energy for the economy under macroeconomic constraints (for example expand natural gas reserves rather than only oil or less costly thermal plants rather than hydroelectricity) has constituted an obstacle, albeit little understood, in interregional trade.

In certain countries, because the state energy enterprises had monopoly powers but were financially constrained, they did not orient their investments to small or less economic energy resources which otherwise could have been developed by the private sector. For the same reasons, imports of natural gas were opposed by state enterprises, which at the same time did not have the financial resources to develop local gas reserves. Finally, there may also be a conflict situation if the state enterprise negotiates its budget with the government and turns around to negotiate costs of the private sector. In this case even if higher payments (still well below international prices) to the private companies would be justified to increase reserves and production from the country's objectives point of view, the state enterprises objective is to limit its cost and consequently payments to the companies.

Pricing and Tariff Setting

Governments in the region have used petroleum products pricing and electricity tariff setting as a tool for generating fiscal resources, adjusting for "social inequity" through energy taxation and subsidies but was generally perceived as a major parameter in fueling inflation. Consequently the pricing and tariff policy became highly politicized in most LA countries. This led governments to take over tariff and price setting and circumvent commissions previously set up for that purpose.

A recent study by OLADE (1990) shows that petroleum products prices increases are only responsible for a very small increase in production cost and inflation. For example a 100% increase in petroleum products prices is shown to be responsible for only 4% on average of production costs increases.

Pricing of energy in most countries did not reflect economic costs (Kosmo, 1989) leading to

subsidization of large sectors of the economy and difficult financial situation for most public energy enterprises. These were not able to carry out needed investments to increase production capacity and the required infrastructure. Like all other energy sources natural gas prices, for example, were kept low both at the wellhead and the consumers resulting in lack of incentives to expand reserves and distribution systems. The following shows the magnitude of energy subsidies relative to energy exports and total exports values (1985) in some selected LA countries :

Country	Energy				
	Subsidies	Exports	Subsidies	Exports	Subsidies
	(Million US$)		as % of Energy Exports	as a % of total Exports	
Bolivia (1983)	224	329	68	42	29
Ecuador	370	2000	19	64	12
Mexico	5000	15000	33	70	23
Peru	301	410	73	20	15
Venezuela	1900	13000	15	95	14

Source: Kosmo, 1989

Non economic energy pricing and tariff setting are major obstacles to interregional trade:

First, they limit expansion of reserves or generation through uneconomic wellhead (oil & gas) and generation (electricity) prices and consequently opportunities of exports of surplus energy;

Second, vested interest group pressure builds up in the form of local interest groups who have grown accustomed to subsidized prices (power companies, industries, residential consumers) and who would not favor exports in view of the dwindling of reserves, accelerated moreover by a lack of new discoveries and an uncontrolled demand;

Third, there is a sharp conflict between locally subsidized prices/tariffs and exports/imports prices usually sold/purchased at opportunity costs which raises issues of which of the Government, the state enterprise or the consumer should bear the cost. In the case of imports of natural gas from Bolivia, Gas Del Estado of Argentina had to bear the difference in cost between imported and locally produced natural gas which was finally passed on to the Government through non payment of certain taxes . In general this issue raises a conflict of interest between the state enterprise (prefers to export and avoid imports) and the state (political/social considerations); and

Fourth, they unduly complicate any negotiations for trade because of misunderstandings on differences between local subsidized prices and the negotiated prices which usually reflect the netback value of the energy sold.

Economic Adjustment and Recent Policy Changes in the Energy Sector

Recently several countries (Chile and to some extent Argentina, Jamaica and Ecuador) have adjusted some of their past policies in the energy sector and are implementing policy measures to provide autonomy to the state enterprises, reduce the state role in the energy sector, implement pricing and tariff policies based on economic principles and provide an environment of open competition through deregulation of pricing (petroleum) and elimination of barriers to entry in order to allow a strong involvement of the private sector.

Chile has, for example, totally privatized its electricity sector except for transmission and distribution which remain regulated as a common carrier and a natural monopoly, respectively. There is open competition in generation and the sale of electricity to large consumers. Electricity tariffs reflect short run marginal costs and are determined through a priory agreed automatic formula and adjustment mechanism, thus minimizing political interference with tariff setting. Subsidies are targeted directly to those consumers in need through treasury transfers and not tariff subsidies. Ex-refinery petroleum products prices are at international parity import prices while imports and exports have been freed to allow competition in the supply, wholesale and retail distribution of petroleum products.

Most LA countries are undergoing adjustment policies which require them, among other measures, to reduce public sector investments and debt, a large part of which is in fact attributable to the energy sector. As a result of this, implementation by the state enterprises of major infrastructure projects of the types carried out in the past (binational hydroelectric schemes and gas pipelines) will be very difficult to justify in the future on macroeconomic grounds. While this may appear as an obstacle to energy trade at first, it may provide however an opportunity for the countries involved to encourage a more active participation of their local private sector in carrying out the required infrastructure projects in association with foreign partners.

While adjustment policies would also appear at first glance to inhibit energy trade because of scarcity of foreign currency to pay for imports of energy, this may not be a big obstacle since in reality countries with a large economy (Brazil) or an already growing economy (Chile) are potential purchasers of energy within the framework of new projects and consequently energy trade in these cases would not constitute an unsurmountable problem. As a matter of fact, imports of natural gas from Argentina to Chile is being actively pursued by a consortium of private Chilean and Argentinian companies.

Financing of such interregional projects appear also at first to pose difficult problems. However economically attractive interregional projects (oil/gas, coal and thermal/hydroelectric development, transmission and transportation) which provide economies of scale, greater reliability in the provision of energy, more rational uses of regional resources and fuels savings should find a very receptive ear in multilateral and other official financial agencies. For example the ongoing Bolivia to Brazil gas pipeline/power project, despite its

complexity in terms of implementation arrangements and large financial requirements, has drawn the support of several official financing agencies.

CONCLUSIONS

1. Even though the region as a whole is energy self-sufficient and exports both petroleum and coal, only about 62 % of its imports of oil products and 64% of its coal imports originate in the region. Intraregional trade in other energy sources (natural gas and electricity) have been quite limited (3%) compared to the overall supply. This cannot be explained entirely by the lack of technical and economically justified energy trade projects in petroleum products, natural gas, coal and electricity. In fact even technically and economically justified energy trade projects have suffered considerable delays in the past.

2. At the same time that the region is overly dependent on oil (58 %) compared to other developing regions of the world, natural gas and coal which have large reserves to production ratios (75 and 504 years respectively) supply only 18% and 5% of the total primary energy requirements of the region. Consequently there appears to be significant room for future growth of natural gas and coal. There is also considerable room for expansion of interregional trade in petroleum products and electricity.

3. The 1980's was called the lost decade for the LA countries in general. The region has suffered from negative growth, high inflationary pressures and a large debt overhang. In particular, a large part of the public sector investments and debt had its origin in the energy sector. Most countries in the region are now implementing adjustment policies that would reduce the role and the size of the state in the economy, open the economy to investments and trade, put in place pricing and tariff policies based on economic principles and encourage private sector investments. These policies would appear to promote less involvement than in the past of the state sector in large investments such as those required in interregional energy trade projects.

4. Other than the technical and economic justification of energy trade projects, there have been major policy bottlenecks which have prevented a greater development in the LA energy trade:

(i) in terms of energy policy and strategy there was (a) a conflict between the energy import substitution policy followed by most countries after 1973 and regional energy trade, (b) a lack of consideration for natural gas and coal as equal alternatives to oil and hydroelectricity in energy planning locally and much less regionally, (c) a lack of consistency of energy planning with macroeconomic policies taking into account the uncertainty of oil prices and risk associated with large hydroelectric investments, (d) high tariffs and other barriers to imports of energy products and (e) the perceived risk associated with energy dependency.

(ii) in terms of the institutional set up, (a) the state, through its major role in energy and other entities responsible for foreign policy, commerce, industry, etc... made negotiations on energy trade more complex by expanding them beyond their economic objectives and (b) the monopoly powers state enterprises had on imports of energy was a major deterrent to possible imports for many legitimate reasons

among which: state enterprises would become only a middle man reaping only a fee and sometimes losses in the process, imports were not financially as rewarding as, say oil development, and imports meant less financial resources from the state to develop local resources.

(iii) in terms of **petroleum products pricing and electricity tariff setting** non economic energy pricing is a major obstacle to interregional trade by (a) limiting expansion of reserves or generation and consequently opportunities of exports of surplus energy, (b) creating a lobby of local interest groups grown accustomed to subsidized prices (power companies, industries, residential consumers) opposed to exports in view of the dwindling of reserves accelerated by both a lack of new discoveries and an uncontrolled demand, (c) creating a sharp conflict between locally subsidized prices/tariffs and exports/imports economic prices which raises issues which of the Government, the state enterprise or the consumer should bear the difference in cost, (d) raising a conflict of interest between the state enterprise (prefers to export but avoids imports) and the state (political/social considerations) and (e) unduly complicating negotiations for trade because of the contrast with higher export/import prices.

5. Most countries in the region are undergoing economic adjustment programs where the role and the weight of the state in the economy is being reviewed, policies are being implemented for a more open economy that would encourage competition in a free market environment and where the private sector would have a major involvement. Chile and Mexico have already progressed in this direction to be followed soon by Argentina and others. In this context, economic policies would drive and orient energy policies, the role of the state as a policy maker would be strengthened while its regulatory role would be assumed by independent agencies, and state enterprises would finally be able to compete with private entities without undue interference by the government. Under these conditions, interregional trade and cooperation should thrive because several bottlenecks mentioned above would be reduced or disappear altogether in time. Economically attractive investments in interregional projects would find considerable support for financing by private sector, multilateral and official credit agencies.

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TABLE 1. Major Latin American Economic Statistics (1988)

Country	Population (Million)	GNP US$ (Billion)	GNP/Capita US$	GDP Growth % (80-88)	Rate of of Inflation (80-88) %	Total External Debt US$ Billion	% Exports
Low Income Economies							
Haiti*	6	2.3	380	-0.2	7.9	0.7	8.8
Middle Income Economies							
Bolivia*	7	4.0	570	-1.6	482.8	4.7	32.9
Brazil *	144	311.0	2160	2.9	188.7	101.4	42.0
Chile *	13	19.6	1510	1.9	20.8	16.1	19.1
Colombia	32	37.8	1180	3.4	24.1	15.4	42.3
Costa Rica*	3	5.1	1690	2.4	26.9	3.8	19.9
Dom. Rep.*	7	5.0	720	2.2	16.8	3.3	14.4
El Salvad.*	5	4.7	940	-0.0	16.8	1.7	18.8
Ecuador	10	11.2	1120	2.0	31.2	9.4	21.4
Guatemala*	9	8.1	900	-0.2	13.3	2.2	27.2
Honduras *	5	4.3	860	1.7	4.7	2.8	28.6
Jamaica *	2	2.1	1070	0.6	18.7	3.6	24.8
Mexico	84	147.8	1760	0.5	73.8	88.7	43.5
Nicaragua *	4	n.a.	n.a.	-0.3	86.6	6.7	n.a.
Panama *	2	4.2	2120	2.6	3.3	3.6	0.2
Paraguay *	4	4.7	1180	1.7	22.1	2.1	24.6
Peru	21	27.3	1300	1.1	119.1	13.9	8.7
Upper Middle Income Economies							
Argentina	32	80.6	2520	-0.2	290.5	49.5	36.0
Trinidad & T	1	3.3	3350	-6.1	5.3	1.7	9.2
Uruguay *	3	7.4	2470	-0.4	57.0	3.0	30.3
Venezuela	19	61.8	3250	0.9	13.0	30.3	39.7
Total	413	752.3	1840			364.6	

* Oil Importers. The rest have a balanced oil supply or are exporters

Source : World Bank Development Report (1990)

TABLE 2. Latin American Region Primary Energy Requirements (1987)

	Million Tons of Oil Equivalent(MTOE)						
	Coal	Oil	Gas	Nuclear	Hyd./Other	Elect.	Total
Indigenous Prod.	17555	356973	70485	1645	73735	--	520393
Imports	9260	88110	2163	--	----	1518	101051
Exports	-6766	-200575	-1731	--	----	-186	-209258
Intl. Marin. Bunk.	---	-7940	---	--	----	----	- 7940
Stock Change (+/-)	178	-2462	- 190	--	----	----	- 2474
Total	20227	234106	70728	1645	73735	1332	401772
Percent	5	58	18	0.4	18.3	0.3	100

Source : IEA, 1989

TABLE 3. Latin America Region Commercial Energy Indicators
(1988)

Country	Energy Consumption Per Capita (Kg of Oil Equivalent)	Energy Consumption Per Unit GDP (Kg of OE/US$)	Energy Imports as a Percentage of Merchandise Export
Low Income Economies			
Haiti*	57	0.15	13
Middle Income Economies			
Bolivia*	249	0.44	3
Brazil *	1627	0.75	13
Chile *	832	0.55	4
Colombia	755	0.64	4
Costa Rica*	557	0.33	12
Dom. Rep.*	332	0.46	36
El Salvad.*	215	0.23	14
Ecuador	573	0.51	3
Guatemala*	168	0.19	14
Honduras *	203	0.24	14
Jamaica *	855	0.80	22
Mexico	1305	0.74	1
Nicaragua *	252	n.a.	42
Panama *	1627	0.77	57
Paraguay *	224	0.19	12
Peru	478	0.37	1
Upper Middle Income Economies			
Argentina	1523	0.60	4
Trinidad & T	5255	1.57	10
Uruguay *	769	0.31	10
Venezuela	2354	0.72	0
Total			

* Oil Importers. The rest have a balanced oil supply or are exporters

Source : World Bank Development Report (1990)

TABLE 4. Natural Gas Reserves and Supply in the LA Region

Country	Supply (BCM)*		Reserves (BCM)			Reserves/Supply Ratio in Years	
	1987	2000	Annual** Additions	1987	2000	1987	2000
Argentina (1)	20.7	31.2	15.2	682	542	33	17
Bolivia(2)	2.4	3.5	2.9	144	143	41	41
Bolivia(3)	2.4	5.9	2.9	144	128	41	22
Brazil	3.2	11.7	10.8	106	107	33	9(4)
Chile	0.2	0.5	1.4	142	156	710	312(7)
Colombia	3.4	10.7	3.0	109	56	32	5(4)
Mexico	27.4	73.4	88.0	2166	2655	79	36
Peru	0.7	1.3	15.4	24	211	34(5)	162(6)
Trin. & Tob.	4.9	11.5	5.9	297	267	61	23
Venezuela	21.8	61.1	217.4	2646	4933	121	81
Total	84.7	215.6	360.0	6316	9266	75	43

* Billion Cubic Meters of Natural Gas
** Annual Historical Incremental Reserves of Natural Gas

1. Asssumes imports from Bolivia beyond 1992 but excludes possible exports to either Brazil or Chile.
2. Includes present exports to Argentina but not to Brazil
3. Assumes equal volumes of exports to Argentina and Brazil
4. This level of reserves is not considered adequate by industry standards
5. Excludes newly discovered reserves of Camisea field
6. Includes Camisea field reserves
7. Methanol exports included

Source : Khelil, 1990

TABLE 5. Natural Gas Demand by the Year 2000 and Potential Market (MTOE)

Country	M A R K E T S											
	Residential			Industrial			Power			Total		
	Pot.*	Demand**	%	Pot.	Dem.	%	Pot.	Dem.	%	Pot.	Dem.	%
Argentina	11.3	8.5	60	8.3	7.8	72	6.8	6.8	24	26.4	23.1	43
Bolivia	0.6	0.05	5	0.8	0.8	85	1.0	0.1	12	2.4	0.9	34
Brazil	19.5	0.4	1	46.0	6.7	9	15.1	-	-	80.6	7.1	6
Chile	0.9	0.3	19	1.9	0.1	3	0.6	-	-	3.4	0.4	8
Colombia	2.4	0.3	5	5.5	2.8	40	4.9	4.9	22	12.8	8.0	23
Mexico	27.4	2.4	7	77.8	42.7	49	60.4	4.6	6	165.6	49.7	25
Peru	1.8	0.05	2	2.4	0.7	21	1.4	0.3	5	5.6	1.0	9
Trin.& Tob.	-	-	-	6.2	6.2	93	1.8	1.8	98	8.0	8.0	94
Venezuela	4.7	0.5	6	25.6	25.6	80	18.2	5.6	11	48.5	32.1	35
Total	68.6	12.5	11	174.5	93.8	42	110.2	24.1	7	353.3	130.4	19

* Market in MTOE which could potentially be satisfied with natural gas.
** Estimated demand for natural gas in MTOE and as a percentage of the total sector (residential, industrial, power) energy market.

Source : Khelil, 1990

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ENDNOTES

1. San Jose and Caricom accords provides financing facilities by oil exporters (Mexico, Venezuela, Trinidad) to several Central American and Caribbean countries.

2. Salto Grande (1890MW) between Uruguay and Argentina. Itaipu (12600MW) between Brazil and Paraguay. Yacyreta (under construction - 3000MW) between Argentina and Paraguay.

3. Natural gas trade is estimated at 3% of the region's generation.

4. Electricity trade is estimated at about 3% of the region's generation.

5. This ratio (World Bank, 1990) averaged 1.7 for the LA region compared to a low of 0.03 (USA) and high of 0.45 (Japan) during the period 1980-1987.