EIR Operation Juárez

The great infrastructure projects: transportation

Part 16
Ibero-American integration

Infrastructure is not an industry that produces wealth directly, but it "produces" something more important: productivity. To become an economic superpower, Ibero-America will need 200,000 kilometers of new railroads, as well as ports, canals, hydraulic projects, nuclear energy, and a second interoceanic canal.

This installment begins Chapter 6 of our exclusive English-language serialization of the Schiller Institute's book, *Ibero-American Integration: 100 Million New Jobs by the Year 2000!* The book was published last September in Spanish. It was prepared by an international team of experts elaborating Lyndon LaRouche's proposal to free the continent of economic dependency and spark a worldwide economic recovery, "Operation Juárez."

Numbering of the figures, tables, and maps follows that of the book.

Despite decades of talk about Ibero-American integration, virtually nothing has been done to construct the physical infrastructure without which integration cannot exist. The role of transportation, of power, of great water works, and of urban infrastructure, has always been crucial to economic development, from the days of the Greeks and before, and has never been more so than today.

In the prevailing environment of "free market" cost accounting economics, the true role of infrastructure is usually obscured. Infrastructural investments cannot "pay for themselves" in a cost accounting sense, and be covered by "user fees," as the World Bank would prefer. Infrastructure investment doesn't create products; it creates productivity itself. It imparts efficiency and productivity to the goods-producing sectors of the economy, in nonlinear and usually nonmeasurable, but nonetheless very real, ways. Transportation creates markets for producers where none existed before; it permits larger-scale, and hence more efficient, production to service these larger markets; it lowers costs, thus increasing reinvestable profits; and it creates innumerable opportunities for business to flourish that wouldn't exist without it. Electric power likewise enhances industrial productivity in many ways—by providing focused and more versatile energy, by making possible a vast array of new industrial processes—despite the fact that no tangible trace of the energy provided turns up in the finished product.

Figure 6-1 shows the correlation between investment in infrastructure, in constant dollars, in the United States between 1970 and 1980, and industrial and agricultural productivity, measured as a ratio of net profit to the combined costs of labor and capital. Not only is the correlation extremely close, with rises and falls in productivity following by a year or so rises and falls in infrastructure investment, but also the overall pattern, which reached its high point in the mid-1960s, corresponds to the known period of greatest vitality in the U.S. economy, when NASA was the great project that fueled the greatest rate of technological advance in recent American economic history, before that advance was derailed in the 1970s.

Ibero-America requires several trillion dollars, expended over the next 30 years, for railroads, roads, electric power, water management, and urban construction, if it is ever to escape the vicious circle of underdevelopment of which it is still victim. The 19th-century construction of a canal network, followed by the construction of the transcontinental railways in the United States, is an appropriate model for the type of great projects that must both capture the imagination of the citizens of all of Ibero-America, and fulfill the function of creating the economic and physical basis for sustained growth through integration. The limited experience in Brazil and Mexico with such great projects, such as the Itaipu Dam and Mexico's superport construction, must be generalized and vastly expanded.

These "great projects" should concentrate on four areas of economic infrastructure:

1) transportation, including water transport, ports, railway systems, air-transport systems, highway systems, and the efficient interface among these systems and the warehousing and related materials-handling features of transportation as a whole;

2) water-management, including irrigation, hydroelectric power stations, navigable canals, and the supply of water for urban and industrial consumption;

3) energy production and distribution systems; and

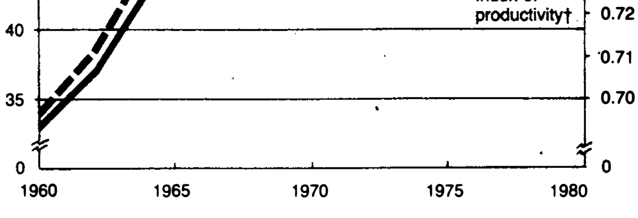
4) urban infrastructure.

The launching of great development projects is also of the utmost political importance for the Ibero-American Common Market nations. The great projects will employ literally millions of people currently unemployed and underemployed, between now and the year 2000, and in the process train them for the higher-skilled jobs which will dominate the Ibero-American job market in the 21st century.

These new construction workers, most of them youths, will have to be politically mobilized to achieve these inspiring nation-building goals, and organized and deployed in brigades to open up the continent's new frontiers.

FIGURE 6-1

Index of productivity and investment in infrastructure in the United States 1960-1980



*Billions of 1972 dollars.
†Economic surplus as percentage of capital plus labor costs (definition taken from LaRouche-Riemann econometric model).

Great transportation projects

Ibero-America's transportation network has never overcome its colonial origins as a raw materials extractor conveyor belt to transport mineral and agricultural wealth from the interior to the metropolitan centers of Europe and the United States. Neither roads nor inland waterways, and least of all railroads, connect the nations of South America to each other, or to Central America and Mexico. Only within Argentina, Mexico, and Brazil is there any significant internal railroad network. Most other rail spurs lead only from inland mining regions to coastal export ports, usually on narrow-gauge track incommensurate with whatever other rail lines exist.

The only ostensible effort to link the continent by road, the so-called Pan-American Highway, was never completed, and is in bad repair along much of its length. Only a tiny fraction of potential inland waterway transport is utilized, largely for lack of projects to bypass rapids and link adjoining river basins. The entire interior of the continent of South America, including millions of square kilometers, even excluding the primary Amazon jungle region, is all but empty, with extremely low population densities, while the vast majority of all the people live within a few hundred kilometers of the coast. And even ocean-borne trade, the immediately available means of transport among the countries of the continent, is underdeveloped, existing primarily to ship out primary products and provide the manufactured goods that the continent doesn't produce itself.

The lack of such a continental transportation system was painfully brought to light in 1982, during the Malvinas war, when Venezuela and other countries tried to provide Argentina with critical military and logistical supplies, only to discover that there are no cargo ships that travel directly between Caracas and Buenos Aires.

For reasons of both sovereignty and development, Ibero-America must build extensive rail systems that are rectified, double tracked, and eventually electrified. A modern highway system must also be built. The major river systems must be made navigable, and air transport improved. A second inter-oceanic canal must be constructed, as well as large, deep-water ports. And all of these must be integrated around nodal points for the efficient transshipment of goods and passengers.

If Ibero-America is to attain the development targets outlined in Chapter 5, it must vastly expand its transportation carrying capacity. Statistics on total freight cargo moved by truck, rail, and inland waterway are notoriously unreliable, but by combining data from several sources we have been able to estimate total ton-kilometers of freight moved in Ibero-America at 925 billion in 1985. Applying criteria derived from examining the experience of developed countries of varying industrial and demographic densities, we have estimated an approximate eightfold increase in ton-kilometers to be the most likely requirement for non-oceanic cargo transport by the year 2015, as shown in Figure 6-1. This reflects an average 7.2% annual growth rate of transport during this period, against a 10.0% average annual growth of Gross National Product as a whole. In all likelihood, in the first few years, transport needs will grow more rapidly than the 7.2% average, as the sectors receiving the greatest emphasis will be heavy industry, agriculture, and construction materials, which generate large quantities of bulk commodities that must travel long distances. Later, as more and more of manufacturing becomes capital goods and high technology that are more value-intensive and less transport-intensive, the rate of growth of transport needs will slow.

Table 6-1 shows the expected shifts in proportions of cargo carried by each of the three major modes of transportation. While truck transport will continue to grow, the percentage of total freight going by truck will drop from 70% today to around 44% by 2015, while that going by rail will rise from 22% to 40%, and by inland water arteries from 8% to 16% during this time period. The reasons for these shifts are straightforward. On the one hand, Ibero-America will be generating vast quantities of bulk commodities—minerals, semi-finished intermediate goods, and agricultural products—which will be traveling long distances, for which water transport is the cheapest mode, and rail the second, as indicated in **Table 6-2.**

On the other hand, advances during the past 15 years in computerized intermodal transport, involving large-scale use of containers, makes possible the efficient use of rail for the bulk of all manufactured goods traveling more than 200-300 kilometers. By reversing the post-World War II historical trend away from rail to truck, Ibero-America will both pioneer a new era in mass transport, and save the equivalent of tens of billions of dollars or more in conserved, scarce fossil fuel, while freeing millions of skilled workers, otherwise required to drive trucks, for more productive employment.

The ideal approach to setting up an entire cargo transportation system is for ports, cities, and inland cargo generating centers (mines, agricultural regions, large factory complexes) to be linked in such a way as to minimize cargo handling. The starport idea, detailed below, turns ports into efficient termini for rail lines, inland waterways (or canals), and coastal water transportation. The cargo rail lines do not need to pass through the center of cities, but rather should feed into nodal points located just outside major urban areas: large transshipment barns where container cargo is quickly off-loaded onto waiting trucks whose final destination is the city. The rail lines will go directly to larger heavy industry and capital goods plants, which generally should be constructed on the outskirts of the new cities to be developed.

Transportation should be practically conceived in terms of a giant "conveyor belt," upon whose efficiency depends the efficiency of the rest of the economy. Inefficient transportation is high-cost transportation which is not only inflationary, but wastes resources, slows up the shipment of goods, disrupts production schedules, and generates bottlenecks.

TABLE 6-1

Projection of non-maritime cargo transportation in Ibero-America, 1985-2015

Type of transport	1985 Ton-kilometers (billions)	1985 Percentage of total	Rate of annual growth 1985-2015	2015 Ton-kilometers (billions)	2015 Percentage of total
Truck	650	70%	5.6%	3,300	44%
Railways	200	22%	9.4%	3,000	40%
Internal waterways	75	8%	9.7%	1,200	16%
Total	**925**	**100%**	**7.2%**	**7,500**	**100%**

TABLE 6-2

Comparison of costs of different modes of transportation

Mode	Cents per ton-mile
Airplane	22.0
Truck	6.0-8.0
Railways	0.5-1.5
Pipeline	0.2-0.5
Barge and towboat	0.2-0.3
Cargo ship	0.1-0.4
Grain ship	0.03-0.06

Source: David Bess, Marine Transportation.

MAP 6-1

Principal railroads, existing and proposed

We will now detail the major great infrastructure projects, focusing on rails and waterways, to meet the needs of the 21st century.

Railroads

The "Sonora to Patagonia" railroad must finally be built, which means that the ideas for a Pan-American Railroad that have been proposed but consistently sabotaged, must now be implemented. Such a railroad is not only necessary to link the continent by land for efficient transport among the existing population centers. It is also the only way that existing sparsely populated regions will ever grow. In the United States in the 19th century, people followed the canals and later the railroads, settling near these arteries and founding towns and cities near their junction points, knowing that they could get their products to market and could purchase the manufactured goods they needed. The railroad preceded the "market demand" for its services, creating both the market and the demand.

The fact is that there is not a single country in Ibero-America today that possesses a railroad network as dense as that of the United States in 1860, and the entire current railroad network of all Ibero-America (104,768 kilometers) does not even match that of the United States in 1875 (119,220 kilometers), even though the U.S. landmass is less than half that of Ibero-America. Furthermore, most of the existing railroad network in Ibero-America, with the exception of Brazil's, was built before 1930.

One of the most shocking legacies of colonialism is the fact that it is physically impossible to directly link up the existing railways of any two Ibero-American countries, as each system was constructed with a different track gauge. **Table 6-3** speaks for itself.

TABLE 6-3
Ibero-American railway network, by gauge of track, 1984
(in kilometers)

	Width of track, in meters					
	1.676	1.600	1.435	1.067	1.000	0.914
Argentina	20,545	-	2,772	-	10,655	-
Bolivia	-	-	-	3,538	-	-
Brazil	-	3,472	194	-	25,784	-
Colombia	-	-	150	-	-	2,688
Costa Rica	-	-	-	950	-	-
Chile	4,311	-	-	341	3,958	-
Ecuador	-	-	-	965	-	-
El Salvador	-	-	-	-	-	600
Guatemala	-	-	-	-	-	750
Honduras	-	-	-	472	-	447
Mexico	-	-	14,913	-	-	397
Nicaragua	-	-	-	287	-	-
Panama	-	-	-	-	-	376
Paraguay	-	-	441	-	-	-
Peru	-	-	1,782	-	-	345
Uruguay	-	-	3,001	-	-	-
Venezuela	-	-	634	-	-	-
Total	**24,856**	**3,472**	**23,887**	**3,015**	**43,935**	**5,603**

One can conclude from the above that one of the first necessary steps to be taken is to link up the rail systems of North and South America with a trunkline railroad, the construction of tributary lines, and the inter-connection of existing rail systems where feasible.

The main North-South trunkline railroad should establish a Mexico City-Buenos Aires axis (**Map 6-1**). The existing studies indicate that it should run from Mexico down through Central America alongside the Pan-American Highway; cut through the still-unpenetrated Darien Gap; go up the Magdalena River valley to Bogotá; from there go south to Santa Cruz, along the Eastern piedmont of the Andes; and from there hook up with the existing rail networks of Bolivia, Brazil, Argentina, and Chile. Its southern terminal point should be Punta Arenas, Chile, which will require the construction of a new line south from Córdoba.

The plans for such a "Pan-American Railroad" go back to the 1870s, and its construction was made a priority during the first Pan-American conference, held in 1890 in Washington, D.C. Engineering surveys were conducted for the line, which were completed by 1893, and published with detailed feasibility studies in 1895. The trajectory we propose follows a proposal made by engineers Juan A. Briano and Verne L. Havens after further detailed studies in the 1920s. This route conforms closely to the center of the South American landmass; and it avoids the Andes Mountains by traveling mostly through level land in the Eastern piedmont of the Andes. Thus, it is properly denominated the Central Continental Line.

A second North-South trunkline, a Western Continental Line, should proceed from Caracas in a westerly direction, entering Colombia and crossing the Central Continental Trunkline upon leaving Panama, descending in a southwesterly direction along the Colombian Pacific Coast and continuing south to Guayaquil, Chiclayo, and Lima, until joining the current Chilean coastal railway.

High speed rail transportation for both passengers and freight is also immediately necessary for Mexico and the Southern Cone, because of the large amount of traffic that already exists there and the expected rate of growth of those subregions. The principal Mexican high-speed corridor should run East-West from Veracruz to Manzanillo, through Mexico City—which would encompass nearly two-thirds of the country's total industrial activity. Three North-South branch lines which link the center of the country to the U.S. border should also be improved: a) Mexico City-Monterrey-Nuevo Laredo; b) Mexico City-Torreón-Ciudad Juárez; c) Manzanillo-Hermosillo-Mexicali. In all of these cases, there are existing railroads; they must simply be double-tracked, electrified, and rectified for high-speed transport. As for the Southern Cone Corridor, it should connect Rio de Janeiro, São Paulo, Buenos Aires, and Valparaíso.

In a second stage of land transportation development, the railroad grid would be extended by constructing:

- several east-west spurs running across the Andes;
- a line from Ciudad Guayana, Venezuela to Villavicencio, Colombia, which would run south of the Andes and open up the entire Llanos area of those two countries;
- a north-south route from Santa Fe, Argentina to Asunción, Paraguay, and into the Mutum region of Bolivia;
- and a third north-south trunkline that would parallel the Atlantic coast of South America.

The electrification of existing rail lines would be carried out in conjunction with the development of electric generating plants for Ibero-America's overall industrial needs. And where the first two trunk lines do not parallel existing sections of the Pan-American Highway, new roadways would be constructed adjacent to the railroads and within the same right-of-way, along which would also extend oil and gas pipelines, as well as electrical and communications transmission lines.

The third stage would involve the expansion of both railroad and highway capacities, including the double-tracking of the existing rail lines. By this time the rail and road network would be integrated with an extensive inland waterways network for barge transportation of bulk commodities, as described below.

The location of the entire land transport system must be planned so as to facilitate the rapid industrialization of Ibero-America, while at the same time opening up currently inaccessible regions which are favorable to human settlement.

The new trunkline railroads must be designed to high geometric standards for at least 85% of their length; that is, they should be built as straight and level as possible. Trains should be able to travel at speeds of 200 kilometers per hour. Such a policy would enable the railroads to operate at low costs per ton-mile for freight.

Given the different track gauges used on the existing 104,768 kilometers of track, it will be necessary to use a double-gauge system overall during the first stage of construction of the continental railway, in order to have trains in operation as soon as possible. The two standard gauges that should be utilized are 1.435 meters and 1.00 meters. Most of the trackage in Ibero-America—43,935 kilometers in Argentina, Bolivia, Brazil, and Chile—now runs on the 1.00-meter gauge. The 1.435-meter gauge is standard in most other countries, including Mexico, Paraguay, Peru, Uruguay, and Venezuela.

Eventually, the entire system from Mexico to Patagonia should be converted to a 1.435 meter gauge, since that gauge offers the best combination of high-speed and heavy load capabilities. Since it is the most extensively used standard gauge in the world, large numbers of locomotives and rolling stock are also immediately available for use on it.

The best solution to the problem of a double gauge track system is to build rail lines with three rails throughout the Southern Cone, through which it would be possible to run trains equipped with either of the two standards (this is already common practice in Brazil). From Mexico to Santa Cruz, Bolivia, installing the double-gauge system would be no problem. However, from Santa Cruz southward, the rail lines to São Paulo, Buenos Aires, and Chile utilize the 1.00-meter gauge, making it necessary to lay a third track on these routes.

The material requirements and costs for this proposed rail system are of course substantial, but they are achievable. Experts estimate that it takes approximately 180 tons of steel, 2,000 cement or wood crossties, and about 100 man-days to construct an average kilometer of track, and that the cost will average about $6,000 per kilometer on level land, including normal bridge construction costs. These figures would hold for the railroad running on the eastern slope of the Andes, where there are no great rivers to cross and the land is relatively flat. Higher construction costs, of over $1 million per kilometer, would prevail if the line were built to the highest geometric standards, and at points where major bridges and tunnels are required.

The Central Continental Railroad would have a total length of nearly 15,000 kilometers, from northern Mexico down to

TABLE 6-4
Projection of railway parameters 1985-2015

	Kilometers of rail	Density of rail network*	Total cargo†	Intensity of use‡
France	36,944	67.5	57.0	1,543
South Africa	35,730	29.3	35.7	2,800
United States	300,000	30.1	1,363.0	4,543
Soviet Union	141,525	6.3	3,440.0	24,300
Argentina	34,172	12.3	14.0	400
Brazil	29,946	3.5	80.0	2,671
Mexico	19,953	10.1	60.0	3,000
Ibero-America 1985	**106,627**	**5.3**	**200.0**	**1,876**
Ibero-America 2015	**100,000**			
New routes				
Transcontinental	40,000			
National	60,000			
Total routes	**206,627**	**10.4**	**3,000.0**	**15,000**
Double tracked	100,000			
Electrified	100,000			

*km of road per 1,000 square km of land
† billions of ton-kilometers
‡ thousands of ton-kilometers per km of road
Sources: Janes World Railways, International Road Transport, ECLA, and World Bank.

Punta Arenas. Along this route, about 5,000 kilometers of adequate track already exist, of which 2,500 kilometers are of the 1.00 meter gauge, and will therefore need to have a third rail laid. On the remaining 10,000 kilometers of route, entirely new track will have to be laid. Utilizing the cost and materials figures cited above, it can be estimated that the construction of the Central Continental Line will cost approximately $6-7 billion, require about 2 million tons of high-quality steel, and involve 3,500 man-years of labor. Such a line could be surveyed, planned and built in 5-7 years, if a crash program were initiated jointly by the republics of Ibero-America.

The other principal components of Phase 1 of the Common Market railroad and highway program, are the construction of the Western Continental Line and high-speed systems in the Mexican and Southern Cone corridors. It can be roughly estimated that these additional projects would cost again as much as the Central Continental line, and require equivalent amounts of materials and labor. Thus the entire proposed first phase of an ambitious railroad project that would open up the entirety of the subcontinent to development, would require only 4-5 million tons of steel and 7,000 man-years of labor; and cost under $15 billion—which is less than half the illegitimate interest payments which are being looted from Ibero-America every year under International Monetary Fund tutelage.

All told, the new continental lines will probably total about 40,000 kilometers of new route length. In addition to this construction, a minimum of 60,000 kilometers, and possibly more, will need to be added to the rail grids of the individual countries. Every major city and industrial center must be connected by relatively direct routes to the national railway grids, and for most countries this implies a major addition to the national rail grids. **Table 6-4** shows the comparative density of track between Ibero-America and several other countries. Apart from the Soviet case, the densities per thousand square kilometer of total area run from 30 to 60, compared to at most 10 in the most dense countries of Ibero-America, and only 5 for the continental average. Adding 100,000 kilometers of route length would bring the density only to 10.4, and may prove to be inadequate, but further studies will need to determine precise needs for the year 2015.

In addition to added route length, it can be estimated that at least half of the new total (existing rail lines plus additional lines) will need to be double-tracked, adding an additional 100,000 kilometers of track length. Further, most of these lines and some of the remaining single track lines are projected to be electrified, to increase efficiency and economize fossil fuel. While it is impossible to derive accurate cost estimates for certain other major components of the rail system, such as electrification, rolling stock, enhanced maintenance, and the contingency costs for the higher-cost sections of track across the Amazon and the Andes, such investments will add up to several times the cost of the rail system itself, or $120 billion. A rough estimate of total costs over 30 years could come to the range of $500 billion. The payback to the economy will be several fold greater over the same period in enhanced efficiency, lower costs, and the ability to move large cargoes that otherwise could not be moved at all.

Roadways

The national warehousing terminal system mentioned above in connection with intermodal transport will substantially change the role of trucking. The principle is that most truck transport will be confined to trips under 300 kilometers, and of these most routes will in fact be no more than the distance between intermodal transshipment terminals and the major cities. The terminals will include warehouse facilities where manufacturing items can be stored in parts, for truck distribution to urban consumption points.

The employment of trucks capable of transporting containers direct from the rail terminals makes this procedure eminently more efficient than having trucks make a trip of hundreds or thousands of kilometers, as is currently done in the United States, for instance. New designs for bringing trucked cargo into urban centers also need to be developed, including mini-depots within the city, centrally located in shopping centers; underground terminals for unloading trucks within the city, to eliminate surface road congestion; and special truck roads to minimize truck congestion of the urban road network.

Despite this shift of emphasis for trucking from long to short haul, it will still be necessary to invest greatly in the Ibero-American road network. First of all, it will take 10-20 years to properly develop the rail and waterway networks to the point that they can transport all of the cargo properly in their domain, before which time trucking will have to take up the slack. Second, some long-distance trucking will also be necessary, and along the major industrial corridors truck traffic will always be very heavy, requiring superhighways of four, and even six, lanes to accommodate it. While countries such as Mexico and Brazil have extended their road networks a great deal in the last 15 years, and have accelerated schedules for paving the more important sections, the pace is not adequate to meet the demand.

Apart from general maintenance, there are three major tasks to be met by the road investment program. The first is to identify the major interurban corridors that must be made into high-speed four-lane limited access superhighways. The second is to link the more isolated agricultural regions to the national and regional markets. The third is to surmount the several types of geographic barriers by special methods. For example, new ways must be found to construct safe, year-round roadways across the Andes, including modern methods of tunnel construction and techniques for preventing landslides along steep mountain slopes. Similarly, very wide expanses of the Amazon and Parana rivers must be spanned by road and railways, and year-round roadways constructed through extended, swampy jungle areas.