'Great Enterprises' require steel output: the dimensions of economic recovery

by Marcia Merry Pepper

A competent program for global economic recovery must center on the production of energy and steel, the backbone of any modern industrial economy. Over 500 million people in the world are living at pre-Iron Age levels, that is, in countries with no measurable steel consumption at all. About two-thirds of the world's population, 3,408 million people, have an average per capita steel consumption of 44 kilograms per year, compared to over 500 kilograms a year in the advanced economies. The 44-kilogram figure defines a living standard of open fire cooking, minimal tools, and travel on foot.

To bring these millions up to the level of Mexico's average steel consumption of 100 kilograms/year per person would require an annual increase of world steel output of about 20 percent, produced over several years of economic development activity—not an impossible amount (Figures 1 and 2). In fact, this is about the same percentage of underutilization of existing steel capacities in the United States and Western Europe for the past five years.

These figures, in crude measure, show how far we are behind a breakeven steel production in relation to minimal world demand. But these calculations do not consider the vast steel inputs needed for a competent program to accomplish the global economic development tasks before us. To do this, it is necessary to create the conditions in which every nation can develop an independent steel industry. Under these circumstances, the steel sectors of the major producer nations will play a unique role—most emphatically including the United States. Today's industrialized steel producers must gear up capacity to produce the steel-intensive energy production technologies and infrastructure project inputs upon which high-technology-based developing sector economic growth depends. Thus, demand for world steel must be calculated by choosing national and international infrastructural, agricultural, and industrial development programs and determining their bills of materials.

Steel for nuclear energy

For example, nuclear power expansion is essential for all development programs. To build one light water nuclear reactor of 1,000 megawatts electrical generating capacity requires approximately 47,900 tons of carbon steel; 4,870 tons of alloy steel; and 2,030 tons of stainless. (Of nuclear technologies, light water reactors are mid-range in steel usage.) Therefore, to construct a thousand 1,000-MW light water reactors in the United States over the next 40 years—a reasonable projection of need—will require production of 47.9 million tons of carbon steel, 4.9 million tons of alloy steel, and 2.03 million tons of stainless. To manufacture another 1,500 reactors in the United States for export to the

Figure 1
World steel consumption levels, 1977

	Annual consumption of steel: Total metric tons (in millions)	Annual consumption of steel: Kilograms/ capita	Population
World	667.0	150	4,414,000,000
21 top consumer nations	516.0	512	1,006,700,000
U.S.S.R.	145.6	567	
U.S.	133.9	618	
Common Market	103.6	398	
Japan	58.2	512	
Comecon	55.0	506	
Canada	12.8	550	
Scandinavia	6.9	498	
All other nations	151.0	44	3,408,000,000
Selected nations			
Mexico	6.5	100	
China, People's Republic	32.5	38	1,012,200,000
India	10.2	16	667,800,000
Nations at Mexico's level & above (41 countries)	524.3	344	1,523,316,000
All nations below Mexico's level	142.7	.5	2,890,684,000
Low consumption nations			
Indonesia	1.2	8	148,900,000
Pakistan	.7	9	84,000,000
Afghanistan	—	—	14,699,000

Source: *World Statistics*, 1982.

Consumption means production plus imports, minus exports. Most of the figures shown were assembled by the Statistical Office of the United Nations. Although five years have past, the pattens of consumption remain relatively the same. Over 510,000,000 people have no reportable consumption of steel at all.

developing sector, whose needs require over 3,000 reactors of all types over the next 25 years to achieve a living standard on the level of Europe today, will create a demand for an additional 82.2 million tons of steel in the same ratio as above (figure 3).

The steel demand for nuclear power reactors alone will overtax the decaying U.S. steel industry. But the overall challenge is greater. Presented on the map are 13 "Great Enterprise" projects—special large-scale development projects selected for their prospects of enormous productivity gain through hydroelectric power, agricultural output, mineral wealth exploitation, and so forth. In addition, there is a continuous need for smaller-scale infrastructural projects in the developing sector, and infrastructural overhaul and major new developments in the advanced sector.

The projects shown on the map include those recommended by the LaRouche-Riemann econometric model team for further analysis, and others proposed by the Mitsubishi Research Institute in a plan released in 1977, calling for the creation of a $500 billion Global Infrastructure Fund. The Mitsubishi study identified 12 large-scale infrastructural development projects out of a total of 110 reviewed by the institute. Three of the projects identified on the map are underway.

Figure 2
World steel production levels, 1978

	Production of raw steel (thousands of metric tons)	% world production	Unused production capacity, 1978 (thousands of metric tons)
World	717,080	100	
21 major producer nations			
U.S.S.R.	151,404	21.1	
U.S.	124,287	17.3	18,900
Common Market	132,622	18.5	70,860
Japan	102,083	14.2	49,220
Comecon	59,633	8.3	
Canada	14,895	2.1	
Scandinavia	7,453	1.0	
	592,380	82.6	138,980
Significant producers			
China	31,773	4.4	
Brazil	12,202		
Spain	11,336		
India	10,096		
South Africa	7,900		
Australia	7,594		
Mexico	6,709		
North Korea	5,079		
South Korea	4,967		
	80,736	11.3	
Subtotal, major & significant producers	673,116		
All other nations	43,964	6.1	
Additional potential production	138,980	19.4	
Production level possible, 1978	856,060		

Source: *Annual Statistical Report*, 1981, American Iron & Steel Institute.

In India, there has been construction ongoing for over a decade on the Rajasthan Canal. This is part of a series of hydraulic projects, proposed by former Irrigation Minister K. L. Rao, for a National Water Management System, to be constructed over 30 years and result in vastly expanded output. The LaRouche-Riemann model team analyzed how to expand the water system even more ("The Industrialization of India: From Backwardness to Industrial Power in Forty Years," *EIR* Special Report, February 1980). However, in 1980 the government of India announced a simplified version, due to economic constraints, calling for a 20-year construction period. The Ganges-Brahmaputra River link has not yet been initiated due to ongoing discussions between Bangladesh and India.

To complete the water management system on any significant scale will require huge amounts of cement and large quantities of steel. The LaRouche-Riemann model projections specify 40 million tons of steel over a 30-year period.

The Siberian development program is proceeding in all three zones noted on the map. After the U.S. embargo on exports to the Soviet natural gas pipeline, the specialty steel requirements contracted with U.S.-connected suppliers, will instead be supplied by other firms in Europe and within the U.S.S.R.

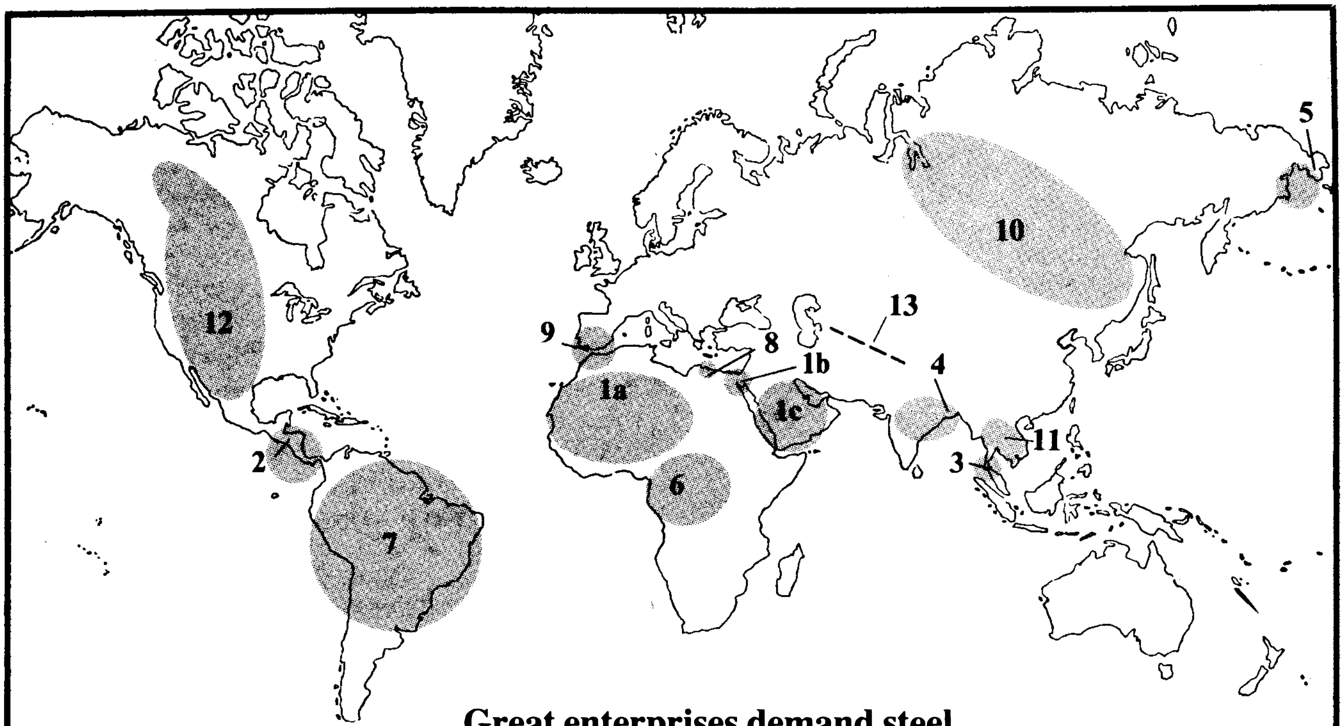
In the eastern Amazon, construction is underway on a major industrial belt—the Greater Carajás Project. The centerpieces are the development of an iron ore mine in the Serra dos Carajás—a mountain of ore estimated at 18 billion tons of 66 percent purity; and the Tucuruí Dam. Locks at Tucuruí will allow river transportation, and a 550-mile railroad is under construction to São Luis. Begun in 1980, this area is one of the largest development zones ever in world history.

Plans for the other Great Enterprise zones shown are in varying states of study and evaluation. The Mekong Delta project has been intensively studied for 20 years; the feasibility demonstrations have been completed, and technically work could start at any time. Other projects, for example the proposal to roll back the deserts of North Africa, are far less mapped out, but could call upon the arid-agriculture technology so well-developed in California, Israel, and elsewhere.

The demand for steel created by the simultaneous construction of any of these projects will necessitate continually doubling capacity. Like the India water management project, the North American Water and Power Alliance proposal needs 40 million tons over 20 years. This implies a scale of demand for the North African project of at least an equivalent amount.

To accomplish the Great Enterprise development will require extensive smaller-scale infrastructural projects throughout the developing sector, and extensive improvements in advanced-sector infrastructure.

Constructing the NAWAPA project demands extensive upgrading of the transportation network throughout North America, to handle the increased shipping flow. The estimated tonnage of steel required to put the U.S. ports and rail system into operating condition is in the range of 10 to 20 million tons over a 10-year period. The amounts of steel



Great enterprises demand steel

1a, 1b, 1c) Greening of deserts: Greening of the deserts in the Sahara, the Sinai, and the Arabian peninsula.

2) Second Panama Canal: Construction of a large canal linking the Atlantic and Pacific Oceans in Central America (e.g., Nicaragua or Panama or Mexico).

3) Kra Isthmus Canal: A 170-kilometer-long canal linking Phang-nga Bay on the west coast to the Gulf of Siam on the east coast. This would shorten by 2,400 km the sailing distance to and from the Indian Ocean.

4) Indian national water management. Series of projects involving hydroelectric power development in the Himalayas, on the upper reaches of the Brahmaputra River system; and canal systems in the Punjab and other zones, utilizing moonsoon rain reservoirs and radial wells. Sea barrier systems are projected for the huge Ganges-Brahmaputra delta, to retard flooding and salinity.

5) Control of sea current in the Bering Straits: Construction of a dam across the Bering Straits at their narrowest point (85 km wide, 45 m deep) and control the sea currents flowing from the Arctic Ocean. This would alter atmospheric conditions in the North Pacific and make the climate more temperate.

6) African central lake: Control of the flow of the Congo River by building a dam to create a vast lake in the Congo and Chad regions of central Africa to improve natural conditions in the area.

7) Hydraulic power in South America: Construction of nine dams and seven artificial lakes across the Amazon, Orinoco and Paraguay rivers. The related countries are Brazil, Venezuela, Colombia, Peru, Bolivia, Paraguay, and Argentina. Already underway, the Itaipu Dam on the Paraná River is the world's largest (12,600 megawatts, double that of the Grand Coulee Dam). The Carajás region of Brazil is slated for major industrial development, including integrated port and rail facilities. The famous mountain of iron, Serra dos Carajás, which was discovered in 1967, is estimated to have 18 billion tons of 66 percent pure ore.

8) Qattara Depression project: Construction of the canal between El Dabba and El Sira. Construction of port at El Sira. By the flow of water through the canal, electric power is generated.

9) Gibraltar Strait bridge/tunnel: Construction of a bridge/tunnel between Morocco and Spain. European and African continents are connected through the surface transportation.

10) Siberian development. Three "territorial production complexes" are underway: West Siberia, involving huge natural gas and oil extraction systems of pipelines and roads; Angara-Yenisei River basin development, in which one of the world's largest hydroelectric dams is under construction, as part of a planned new industrial zone; Baikal-Amur Mainline Railway (BAM)—a several thousand mile span, north of the Transiberian to handle huge bulk freight of coal, ore, and minerals.

11) Lower Mekong project. Plans are complete for the integrated development of the lower Mekong River basin. A system of dams, sea dykes, and waterworks can control the Mekong flow (third largest in Asia), and enable massive agricultural surpluses. The huge Ma Pong Dam, projected for the Lao-Thai border, and other dams would provide hydro-electric power.

12) North American Water and Power Alliance project (NAWAPA). Proposal to divert southward the huge volume of run-off water now flowing northward from Canada and the Yukon into Hudson's Bay. A 500 mile valley in the Canadian Rockies would be part of the channel. Project would provide 130 million acre-feet per year for U.S. irrigation; 100 million acre-feet per year for Canada and Mexico; and supply 50,000 megawatts of hydroelectric power.

13) New Silk Road: Construction of modern version of ancient "silk road" across the Eurasian continent from the central part of Europe to China.

Figure 3
Demand for steel, nuclear plants and water projects

I. Nuclear power plant production—

Demand for 1,000 new plants for the U.S. by 2020

Carbon steel	47.9 million tons
Alloy steel	4.9 million tons
Stainless steel	2.1 million tons

Demand for 1,500 new plants for export by the U.S. to the developing sector by 2020

Carbon steel	71.85 million tons
Alloy steel	7.31 million tons
Stainless steel	3.04 million tons

II. Water projects

North American Water and Power Alliance

Steel needs during 20-year construction period	40 million tons

India Water Management

Steel needs during 30-year construction period	40 million tons

Sources: "Nuclear plant construction," *Industrial Revival for the 1980s*, National Democratic Policy Committee; "NAWAPA steel demands," *EIR*, April 6, 1982; "India development projections," *The Industrialization of India*, *EIR*, Special Report, 1979.

required just to maintain the existing constricted rail and road system totals 6.3 million metric tons a year (figure 4). The Council of State Planning Agencies estimates that one out of every five bridges in this country needs to be replaced.

The LaRouche-Riemann model team analyzed a proposed program of implementing seven Great Enterprise projects and determined that fully one-third of the estimated $5 trillion required by the year 2000 should be spent on smaller-scale infrastructure projects like port development, sanitation systems, and similar essentials. Many of these developments are already underway or on the drawing boards in such Third World countries as Saudi Arabia, Brazil, and Egypt, which rank among the top five developing-sector nations investing in infrastructure at present. The LaRouche-Riemann model team has measured the positive effects of implementing selected Great Enterprise projects on productivity, growth rate of the tangible, total economy, thermodynamic efficiency (S/C − V), increased life expectancy, and population growth.

Bridge to space

Just as in the 18th century Benjamin Franklin and his networks mapped new lands and projects for population growth, and researched electricity as the power of the future, the task of the 20th century is to explore and map for colonization the next frontier of humanity: the solar system and the stars beyond. Mobilizing for global infrastructure development creates the overall leaps to succeed in space. What is required is an immediate doubling of the $12 billion now spent worldwide on space exploration—and then a tripling and quadrupling of these expenditures. By early in the 21st century, we must be ready for large-scale population shifts from Earth to colonies in the solar system, similar in scale to the late-19th-century mass immigration from Europe to the United States. A strong space effort will produce continual technological and scientific breakthroughs. We can define our development tasks of the present only by looking into the future, and counting as a great blessing the fact that we are among the first generation of humanity that has the opportunity of developing our globe as a bridge to colonize our solar system.

Meeting demand

Even the full-scale utilization of all steel capacity of the major 21 steel exporting nations, which produce 83 percent of the world's output, would be inadequate to supply just the "small-scale" infrastructural demand, not counting the schedule of "Great Enterprise" demand. The annual output of 80.7 million metric tons from the nine steel-producing nations outside the 21 advanced economies, needs to be at least quadrupled as rapidly as possible, while in addition, new steel-production centers are established on each continent.

India has two new steel plants under construction on the Bay of Bengal;
The Visakhapatnam (Visag) plant is being done with Soviet assistance. The first phase should be completed by 1983. The Paradeep plant will be completed under exclusively Indian supervision since Britain, the initiating co-developer, has pulled out.

A national growth plan just released by the Colombian government's Industrial Promotion Institute (IFI), specifies five new steel-production sites. Three are the same as those recommended by the LaRouche-Riemann development program for Colombia. Colombia's "Ruhr" should be concentrated on the Caribbean coast region from the Guajira Peninsula across to Cartagena. The peninsula has one of the world's largest coal mines, El Cerrejón, giving Colombia coal reserves estimated to be the largest in Ibero-America. Venezuela's large iron ore supplies are available by ship or rail.

The project's start-up period will require tons of steel imports from the United States or elsewhere.

Figure 4
Steel needs for U.S. rail and road maintenance

Highways	**Metric tons**
2,000 mi/year (interstate) annual repair	63,000
8,000 miles (interstate) deficit of repair	260,000
1,500 miles (interstate) unbuilt	60,000
Subtotal	323,000
Railway	
35,200 miles (annual track replacement)	6,200,000
Total	6,523,000

Source: *America in Ruins*, 1981. The Council of State Planning Agencies.