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The scope of the infrastructure deficit: how much is needed where

by Richard Freeman

A study measuring the unmet amortization cost of U.S. infrastructure since 1960, and the future cost of meeting infrastructure needs from 1984-2004, arrived at the following overall figures for required spending over the next 20 years:

Infrastructure costs, 1984-2004
(billions 1982 dollars)

Item	Cost	Per Year
Highways, streets	1,040.0–1,359.0	52–68
Bridges	95.5	4.78
Railroads	175.0–200.0	8.75–10.0
Locks, waterways	77.5–87.5	3.88– 4.38
Dams	110.5	5.53
Ports, harbors	108.7	5.44
Mfg plant, equipment	2,380.4	119.2
Airports	87.9	4.4
Electric. gen. capacity	2,795.0	139.75
Transit	206.3	10.3
Water supply, sewage treatment	635.0	31.75
New cities	**3,750.0**	**187.5**
Total	**8,666.4–10,515.8**	**433.3–525.8**

Here, we examine each element in turn. Electricity

Electricity is a more energy-intensive, organized, and divisible (by units) form of energy supply than the coal-, oil-, or nuclear-fired processes that go into producing it. An economy based on the new relativistic physics would have to vastly increase its electricity output and consumption. Lasers and other such devices consume very large amounts of electricity. While coal-fired plants, which can be erected in two to three years construction-time, may contribute additional output, most new electricity will come from nuclear-fission plants, and hopefully by the mid- to late-1990s, from fusion plants.

Assuming that by the year 2004, one thousand gigawats of nuclear-generating capacity will be added, we are adding an average of 50 gigawatts per year, which can be supplied by 50 plants of one gigawatt installed generating-capacity each. A single gigawatt nuclear plant costs $2 billion to construct, and takes 5 to 6 years if safe procedures are used; current harassing environmental restrictions, which raise construction times to 10-14 years, must be halted. The construction of 1,000 single-gigawatt plants will cost $2 trillion. For the first 6 years, no plants would be built, but production would accelerate through the last 14 years of the period such that the effect will be an average of 50 one-gigawatt plants per year.

The development phase the U.S. economy is entering will probably require an electricity throughput per person *two-and-one-half times* that currently existing. This would require 1,795.1 gigawatts above present installed generating capacity. The construction of 1,000 single-gigawatt nuclear plants will supply 1,000 gigawatts of this installed power. The remaining 795.1 gigawatts will be provided through constructing hydro-, coal-, and, to a smaller extent, oil- and gas-fired generating plants at a cost of roughly $795 billion.

Total cost of new added electricity-generating capacity: **$2.795 trillion.**

Railroads

The estimated reconstruction costs for the nation's railroads assumes that we must attain at least the levels prevailing in Western European nations. Monorail systems and "bullet trains" such as those in Japan are also needed.

The American rail system has decreased in size rapidly. In 1929, the aggregate length of rail trackage of all line-haul railroads was 249,000 miles. At the end of the depression in 1939, this had shrunk to 235,000 miles. By 1975, there were 200,000 miles. And today, the Railroad Association of America reports there are but 168,000 miles of rails. Remarkable is the fact that between 1929 and 1939, the years of the Great Depression, the United States lost 14,000 miles of track, whereas between 1975 and 1982, a smaller period of time, 31,126 miles of track were abandoned, or twice the amount of the 1929-39 period.

One hundred years ago, freight cars on the rail lines traveled at an average speed of 65 miles per hour. Today,

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because approximately half of the nation's 170,000 miles of track are at least 50 years old and beyond repair (rail experts insist that the maximum life of rail track under present technologies is 39 years), average freight car speed is a mere 25 miles per hour. Within the 17,000 miles of the Consolidated Rail network (Conrail) blanketing the northeast of the United States, over 40% of the track is under "slow order," which reduces maximum speed to 40 miles per hour.

Railroad safety experts estimate that the maximum life of a locomotive is 23 years, with at least one major overhaul. Of the 25,000 locomotives in operation today, over 30% are more than 23 years old.

The nation has 1.7 million freight cars. On the average, the rail lines use these cars only 6% of the time—22 days out of the entire year. No American industry has a capacity utilization rate as low as even 10 times that figure.

The cost of restoring the American rail system to a state of minimum operating capacity and repair is $94 billion over 10 years, the American Railroad Association reports. The cost of repairing deficiencies for the next decade is esimated to be $25 billion, or a total cost of $119 billion.

But repairing the American rail system to its 1960 levels is not sufficient. Consider the inefficiency of the American rail system. More than three-quarters of the system is powered by diesel engines. In Europe, one-half to three-quarters of the rail system is powered by electric motors. Electricity ensures greater traveling speeds, fewer breakdowns, and other benefits. Monorail systems, or high-efficiency wheeled units called "bullet trains," now carry freight (and passengers) 280 miles per hour between Tokyo and Yokahama. The bullet trains travel at seven times the average speed of American freight trains. In addition, the magnetically levitated train is a "futuristic idea" whose time has come. A computer system that tracks and deploys railway cars, cutting down on "deadweight time" when rail cars sit idle or travel empty, is also essential.

Because rail is such an excellent method of freight transport, if the American population grows by 111 million and American goods production and transport by 4 to 10 times within the next 20 years, then 50,000 to 100,000 miles of new rail ties will have to be added to the system.

The cost for electrifying and expanding the American rail system: $100 to $150 billion. Total cost of repairing, expanding, and electrifying the system: $200 to $250 billion. Since some of the repair costs of the system can be spent electrifying it, if we eliminate the double counting, the total cost of rail repair and improvement: **$175 to $200 billion.**

Water management

Water transport is the cheapest mode of goods transport, but in the United States, it has been vastly underutilized since the last century. Since Jimmy Carter expressed his fear of dams—almost as great as his fear of nuclear power—dam construction has been virtually abandoned. The water level of acquifers, such as the Ogallala, is depleted year by year. The southwest over the last five years has been plagued by droughts, yet no plan is in operation for correcting this. Finally, only the sharp drop in physical-goods volume of trade through U.S. ports since 1979, which has improved only slightly since then, has kept the inadequacy of port development from being noticed.

Locks and waterways

One of the primary forms of "internal improvements" that Alexander Hamilton had in mind when he wrote his 1789 Report on Manufactures, the nation's lock system, is made up of 184 principal locks. The average age of these locks is 40 years, and according to a National Waterways Study of the Army Corps of Engineers, 56 of these locks are 50 years old and/or technologically obsolete. As many as 54 of these may require major rehabilitation or replacement by 2003. The disrepair and congestion on the system is so great that it may prevent repair work on between 50% to 90% of the locks, which require an average of 20 years repair-work each.

The Corps of Engineers' study concludes that 70 million tons of shipping per year cannot be handled because of lock constraints, mostly affecting metals and ores, and that 100 million tons of shipping per year may be lost by the year 2003 because of the same problem. In time of war, the current state of locks would block the provision of war materiel and/or high priority industrial and agricultural goods.

The Tennessee-Tombigbee Waterway, a 232-mile navigation channel running from northeastern Mississippi into southwestern Alabama, is one of the few additions to the nation's waterway system begun in the last two decades. Undertaken in 1971, the waterway is still not completed, faces several challenges, and several miles may be chopped off its intended length. Numerous waterways need to be constructed, including a priority 80-mile canal which would connect Lake Erie in northeastern Ohio to the Ohio River running into Pittsburgh. This would create a continuous water route from Pittsburgh to Lake Erie, and thence into Cleveland which lies on Lake Erie.

The cost of making the elementary repairs in the lock system is $15 billion, according to the Army Corps of Engineers National Waterways Study. The same authority puts the cost of constructing and rehabilitating the inland waterway system, mostly on the East Coast and Midwest, at $32.5 billion. Total cost of rehabilitation of locks and waterways: $47.5 billion. In addition, higher levels of growth will require expanding the system at a cost of $30 to $40 billion (not counting the North American Water and Power Alliance project). Total cost: **$77.5 to $87.5 billion.**

Dams

The dams of the nation provide hydro-electric power, prevent flooding, supply drinking water, and allow for irrigation. The destruction of the Canyon Lake Dam in Rapid

City, South Dakota, in June 1972 exemplifies the potential great danger posed by the condition of our national system of dams. Rain started falling late in the afternoon of June 9. By nightfall, it was falling at the rate of 3 inches per hour, vastly exceeding the normal rainfall level. With no chance for absorption, rainwater accumulated rapidly in the Black Hills, quickly filling all streams and low-lying areas. Floodwaters rose rapidly, lapping against the rim of the 20-foot high earth-fill dam, constructed in 1938 by the Works Progress Administration.

Because of an inadequate spillway, the previous erosion of the embankment, soil saturation from the rainfall, and the clogging of debris into the spillway, the floodwaters overflowed the dam. The first flood wave was held back by the earth-fill restraining barrier, but a second, larger surge overtopped the dam and began scouring the spillway. A breach occurred and the floodwaters descended onto the city of Rapid City. Half the town was destroyed, 240 persons lost their lives, and 5,000 were left homeless. National Guardsmen, sent in for rescue operations, had limited mobility due to 5,000 wrecked automobiles strewn through downtown streets. Eighty blocks of streets and nine bridges were destroyed, along with approximately 1,500 buildings. Total property damage: $60 million.

In 1976, the Teton River Dam burst, killing 11 people. A year later, a dam breached in Toccoa, Georgia, killing 39 people.

An Army Corps of Engineers report on the safety of non-federal dams indicates that there are over 65,586 "significant" non-federal dams in the country (higher than 25 feet or impounding more than 50 acre-feet of water), of which 8,794 are classified as high hazard: lives and property depend on their condition. *More than a third are also rated "unsafe."*

The average cost of repairing a high hazard dam is $13.5 million. When applied to the 3,000 unsafe high-hazard dams, the cost for repairs is $40.5 billion. The cost of repairing the remaining unsafe, significant dams (not high-hazard) is $20 billion. The cost for building roughly 1,000 new dams of potentially 100 feet or higher for irrigation and hydro power is $50 billion. The total cost for dam repair and construction: **$110.5 billion.**

Ports and harbors

Most of America's great cities are port cities—New York, Houston, Los Angeles, Philadelphia, Boston, and so forth. But the ports and harbors—the 189 commercial deep-draft seaports in the United States occupy 2% of its coastline—are outmoded, too shallow to accommodate coal collier and other large vessels, and lack interface with other modes of transport. American port freight volume fell from 823.1 million long tons in 1979 to 675.5 million long tons in 1982. This decline in world trade has alone prevented the inadequacies of the ports from being felt.

The Army Corps of Engineers estimates the cost of adding needed terminal facilities to 189 deep-draft sea ports at $5 billion. This presumes a 32% increase in shipping by 1990. The cost of deepening 10 to 12 ports to the 50- to 55-foot draft range is $3.7 billion, the Corps states.

But U.S. physical goods trade should be *triple* its 1979 level by 2004, and the interface between shipping and other modes of transportation must be modernized. The efficient way to accomplish this is to institute the "Starport America" program. The program, conceived in the 1970s, calls for the creation of a fully integrated air-land-sea transport system, employing the most advanced transportation hardware, computer systems, and storage-conveyor facilities. The first Starport America was to have been built on the Gulf Coast of Mexico, probably near Houston, Texas. Subsequent Starport Americas would be located on both the East and West coasts.

The plan called for the construction of a jetport strictly earmarked for air cargo. The jetport was to be composed of 10 docking modules which could handle 15 jumbo jets each. The adjacent seaport was to be the most advanced containerized port facility, capable of handling 300 container ships in a day.

Rail integration into the Starports was planned around rail systems employing "unit trains"—approximately 100 cars permanently coupled—each having the same point of origin and destination each trip. The Starport center would also centralize truck shipments throughout the area. It is estimated that Starport's combining of unit trains with the air-sea-highway modules would rapidly bring rail-equipment utilization from the current 6% to between 70% and 80%.

The entire system would be controlled through an American Cargo Electronic Data Processing System linking all four modes into a continuous flow of cargo. It is estimated that Starport would double the through-put of the largest current port operations in the United States.

The cost of implementing Starport and enlarging America's port-handling capacity, not counting costs already included in rail and air transport: $100 billion. Inclusive of the Starport costs, the cost for repairing and modernizing America's ports and harbors: **$108.7 billion.**

Manufacturing plant and equipment

The condition of plant and equipment in America is desperate. When artificial increases in productivity are eliminated—for example, labor-force speed-up—productivity growth in American industry has been negligible for five years.

Plant and equipment are obsolete from three standpoints. First,

has outlived its average life. Second, technology of equipment is backward relative to the principles of relativistic physics—directed energy beams, fusion plasmas, and engineering in biology—which must be applied to industry to permit the rates of productivity increase required under our three critical parameters. Third, shifting more workers into manufacturing will require a large expansion in capital stock.

The service life of a piece of industrial equipment averages 11 years, that of an industrial plant 27 years. At the end of this period, they must be replaced, according to the Capital Stock Estimates for Input-Output Industries of the Department of Labor. Comparing the value of capital stock in 1960 with the required replacement schedule, by 1984, the shortfall in replacement spending for manufacturing equipment was $570.0 billion and the shortfall in replacement in manufacturing plant was $350.9 billion (in 1982 dollars). The total cost is a staggering $920.9 billion.

Some manufacturers have "extended" the life of plant 50 to 60 years (as in the case of U.S. steel plants) or the life of a machine 20 to 30 years, more than double their life expectancy period. Since these machines and plants are still in place, the cost of actually replacing them now, instead of the accumulated costs of the entire period 1960-84, is much less. Therefore, the total shortfall is placed at $600 billion.

If 50% of a labor force with only a 4% unemployment rate is shifted into productive employment, and two-thirds of that productive employment is in manufacturing, 16,762,000 new manufacturing jobs are created. Because America needs a great increase in capital goods, two-thirds of the new manufacturing jobs should be in capital-goods production, and one-third in consumer-goods production. The amortization of a capital-goods worker, i.e., the amount of plant and equipment commanded by one capital-goods worker, is $38,399. The capital amortization of a consumer-goods worker is $23,146 (all figures in 1982 constant dollars). The capital amortization, i.e., new plant and equipment built to equip 16,762,000 workers with workplaces at the capital-intensity workers in those industries currently command, is $431.3 billion for capital-goods workers, and $230.1 billion for consumer goods workers. This defines a construction program of $661.4 billion.

The total cost of replacing old manufacturing plant and equipment and creating enough new workplaces to house the presently non-productive workers who should and would be shifted into the manufacturing workforce is $1,261.4 billion.

While this replacement and creation of new workplaces will go on for the decade of 1984-1994, during the next decade, there will be expansion of the workforce because of natural growth, requiring further expansion of plant and equipment. There will also be the constant plant and equipment replacement costs for the decade 1994-2004. At the current rate of manufacturing-industry expenditure for plant and equipment, $119 billion per year for replacement and minimal expansion, this will come to $1,190 billion over the decade of 1994-2004.

The total for expansion of plant and equipment, and replacement of accumulated decrepitude plus wear and tear in the decade 1994-2004, is $2,380.4 billion. However, this is in 1982 constant dollars. Assuming a 5% annual inflation rate, the bill for manufacturing plant and equipment is $6,315.9 billion.

The shift toward adoption of machine-technology based on relativistic principles of physics will have far-ranging effects on the economy, increasing productivity by 200% to 300% between 1984-2004, and increasing output by even more. Exemplary is the shift toward laser machine tools, five times faster than existing machine tools and completing jobs at less than one-third the current cost. This, along with the expansion in the size of the manufacturing workforce, will produce the highest growth rates the United States has ever achieved.

That is truly fortunate. The accumulated obsolescence of infrastructure and industry produced by our "post-industrial" policymakers is of such a magnitude that only machine-technology capable of producing the productivity increases relativistic principles of physics will allow would permit United States to carry out its huge infrastructure projects. In other words, the cost of replacing and building infrastructure will be far too high to be met without the productivity increases relativistic technologies provide.

> *"No such expenditure could conceivably be met without the rapid transition to laser-based machine-tooling, plasma steelmaking, fusion-fission hybrids, and first-generation fusion reactors over the 20-year period, which, while it means expanded need for infrastructure, also means the higher levels of productivity required to pay for it."*

Airports

The nation's airport and air control system is largerly a product of the period immediately after World War II, which established coast-to-coast freight and passenger travel times of five hours or less. Since deregulation in the late 1970s, the air grid has been dangerously weakened. In event of war, it is uncertain how reliably the grid, airplane maintenance, and traffic control would operate.

There are 15,476 airports in the United States, and there are 3,650 airports in the National Airport System Plan. Of these, the 66 largest public airports—just 2% of all airports—serve almost 90% of the nation's passenger traffic. Federal Aviation Administration forecasts indicate that commercial aviation is expected to grow at an annual rate of 4.6% through 1993, which would increase the number of passengers from the low of 277.8 million in 1981 to 492.2 million by 1993. The Administrator of the Federal Aviation Administration stated during congressional testimony:

"Of all the things that will limit the growth of aviation, it will be concrete or asphalt—the lack of runway capability. . . . It's certain, airside congestion is going to get worse, since concrete will continue to be the primary limitation."

In 1980, the airlines spent an estimated $1 billion in added crew time and fuel, wasted more than 700 million gallons of fuel, and delayed airline passengers by 60 million hours—because of congestion.

To avert worse congestion as airport traffic doubles by the mid-1990s, $13.5 billion will have to be spent to improve and expand the nation's airports over 10 years, and an additional $20 billion in the following 10 years.

The nation's air traffic control system has evolved over 40 years, producing a mixture of equipment and technologies of many ages and types. Its vacuum tube equipment could be replaced by the far cheaper and more efficient microchip technology. The system consists of 25 enroute navigational centers, 188 terminal-area approach stations, and 442 airport-terminal control towers. It could be improved with the following additions:

1) a Microwave Landing System to replace the present VHF instrument landing system;

2) a Discrete Address Beacon System (high performance radar);

3) an Airborne Collision Avoidance System;

4) additional automation of enroute and tower air traffic control functions;

5) a Wake Vortex Avoidance System;

6) cooperative International Transoceanic Aeronautical Satellite development (AEROSAT);

7) modernization of flight service stations;

8) development of an Airport Surface Traffic Control System; and

9) implementation of Area Navigation Route (RNAV).

The cost of these improvements would be $53.9 billion.

Total cost of airport and air control system improvement and expansion: **$87.9 billion.**

Transit

Inner-city transportation is in notoriously bad condition. Exemplary is the New York City subway system, the leader in notoriety, as in so much else. In 1971, the New York City Transit Authority's older subway cars had a breakdown rate of once per 24,000 miles of operation. In 1982, the failure rate had increased to once every 6,500 miles—irrespective of whether the car was old or new.

Inner-city transit includes bus and rail (train) fleets and fixed facilities—stations, repair shops, etc. Heavy levels of bonded indebtedness, in some cases, such as New York City, dating back to the turn of the century, has constituted financial parasitism off many city transit systems. Transit maintenance is poor to disastrous as a result of city budget cuts. Fares have risen. As a result of this combination of events, between 1945 and 1965 urban transit ridership declined by 65%.

Nationally, the train-and-bus share of all work-related travel has declined from 9% in 1970 to 6% in 1980. Most of the use of transit occurs in the five most densely populated cities in the United States: New York, Chicago, Philadelphia, Washington, D.C., and Los Angeles. In New York City, one-half of all work-trips are handled by public transportation.

Given the speed with which transit could travel, and the savings on fuel and expense, it is an irrational situation for car travel to constitute 94% of all work trips. Some cities are building new transit rail systems, such as Atlanta, Baltimore, Buffalo, Miami and Washington, but these systems, with the exception of Washington, will only cover small sections of the city.

A study by the National Transportation Policy Study Commission of the Department of Transportion (June 1979) put the cost for repair and expansion of the nation's public transit system at $206.3 billion (the figure is adjusted for 1982 constant dollars and to cover the 1984-2004 time frame).

This cost does allow for expansion of service in existing cities, but does not cover transit for new cities.

Water supply and sewage treatment

The nation's sewage treatment and water supply systems are closely related in function. One purifies and pipes drinking and bathing water to homes and apartments. The other disposes of wastes, especially in water.

In Jersey City, New Jersey, two years ago, after an 80-year-old water tunnel break shut down the water system, the town's population of 300,000 lined up for nearly a week to get fresh water from National Guard supply trucks. This year, McKeesport, Pennsylvania was the home of a dyssentery epidemic; a team from the Army Corps of Engineers had to set up emergency water provisions—as if it were in a Third World country.

In many cities, water-pumping stations break down; water travels in pipes which are much older than their reliable-life expectancy. The average age of water mains in New York city is 80 years old, and the replacement schedule currently operated on is to replace each pipe once every 150 years. Incrustation in pipes blocks the flow of water by as much as 30%, and by compressing the volume of the water flow, increases the pressure in the pipes to dangerous levels. Most pipes are so badly cracked, unwanted dirty ground water is let in, while potable water leaks out of pipes. Boston, the biggest loser, estimates that it loses 15% to 25% of its water supply because of leaks. Philadelphia loses 15%, Chicago 17%, Tulsa 14%, and Kansas City 11%. The leaks not only waste water, they also cause street cave-ins and other above-ground hazards.

The cost of maintaining and slightly expanding urban water systems will be $125 billion (in 1982 dollars).

Meanwhile, 80% of all water use in the United States goes for irrigation. Especially in the Southwest and the West, where population is currently shifting, the question of water supply is critical. While in older urban areas, the deterioration of old water distribution systems is of prime concern, it is inadequate sources of supply of water, or overdrafting of underground acquifers, that is the major danger in the Southwest and Far West. A report written on Oklahoma's infrastructure states:

"Ground water presently provides 61% of total water use . . . serving about 300 communities. In addition, ground water supplies approximately 80% of the water for irrigation. . . .

"A prime source of ground water is the Ogallala Acquifer. . . . In 1977, the water stored in the acquifer was estimated at 59.9 million acre feet. If usage . . . continues at the present rate, estimated water storage . . . by 2020 will be 29 million acre feet. Although considerable water remains in the acquifer, the economic costs of pumping it could soon make its use prohibitive.

"Overdrafting [pumping out water at a faster rate than it is naturally replenished] of the Ogallala is of concern to many Oklahomans and the spectre of a return to dry-land farming becomes more real as the ground-water resource is depleted. . . .

The depletion of the Ogallala Acquifer affects other states as well. In New Mexico, 86,334 acres of land would be "converted from irrigated farming to dry farming or range due to depletion of the acquifer with obvious great losses in productivity."

The two obvious solutions to this problem are: water desalination and the North American Water and Power Alliance (NAWAPA) proposal.

The construction of a desalination plant in Yuma, Arizona, the largest of its kind, will be completed by the mid-1980s. The full-scale plant, using two different but similar processes, will have a design capacity of some 72 million gallons of desalted water per day. The water will be blended with an untreated drain water to yield about 92,000 acre-feet per year, with a quality higher than required. Desalting is accomplished by a process of reverse osmosis. Saline water is forced against a plastic membrane at a pressure of 300 to 400 pounds per square inch. Water passes through and salt is left behind. The glaring drawback is the cost: the reclaimed water will cost about $250 per acre foot, more than 30 times the cost of irrigation water in the Imperial Valley. The cost will be lowered as this and other desalination processes are perfected. Total cost of a nationwide system of desalination plants: **$20 billion.**

The large-scale diversion of water is embodied in the North American Water and Power Alliance proposal, which embodies the same bold imagination as the construction of the Hoover Dam in the 1930s (and proposed by a firm that worked on that dam, the Parsons engineering company of California). The plan would take water from the Yukon and Tanana rivers in Alaska which otherwise flow off into the Pacific, and move it south through Canada in a huge ditch-reservoir that would be called the Rocky Mountain Trench. NAWAPA would yield between 160 and 250 million acre-feet of water per year, which would pour through Idaho and then Utah further south into Arizona and New Mexico (eventually into Mexico). Tributary canals and rivers would take water eastward to the Mississippi River. A series of hydroelectric plants would generate all the power needed for pumping and provide a surplus capacity of at least 100,000 megawatts annually. The reservoir and river system would provide inland water transit. Above all, it would generate water for industrial, agricultural, and municipal use and avert the depletion of acquifers.

The NAWAPA project would take 30 years to build; an expanded version of it, bringing water eastward and further south into Texas, would cost $400 billion.

Finally, the disinfecting and disposal of America's waste is breaking down. The Council of State Planning Agencies warns that one-half of the nation's communities have waste-water treatment systems operating at full capacity (80% or more) and could not support further economic expansion. This eliminates industrial growth. The Environmental Protection Agency has compounded legitimate needs for sewage treatment and disease control by introducing a number of ridiculous harassment regulations, requiring secondary water treatment facilities which often don't result in cleaner water, but add to costs. Minus the non-necessary extras of the EPA, the cost for correcting the sewage treatment process is $90 billion.

Total cost of water supply, waste treatment, and NAWAPA: **$635 billion.**

New cities

The U.S. population will grow by 111 million people between 1984 and 2004. Sixty-five million of these people can be absorbed into existing (restored) cities, which will push the resources of these cities to the limit. But for the remaining 50 million, 25 new cities of 2 million each will have to be created from scratch or through rapid upgrading of small towns.

A city of two million would best be built by installing modular electrical grids underneath the city that can be ripped out and replaced as the city's industry shifts from low and medium industry to heavy industry. The city will need a street system, a sewer and water supply system, a transit system, a school system, a court and jail system, police, fire and sanitary systems, an energy system, and some other expenditures. It will cost $150 billion to construct each of these 25 cities. Total cost: **$3.75 trillion.** To avoid double-counting, the cost excludes the cost of an energy system, especially electricity, which is accounted for separately above. Likewise, other costs above are not counted here. Most of the costs accounted for above were infrastructure allowing one access to a city—such as highway—or repair and slight expansion of *existing* systems.

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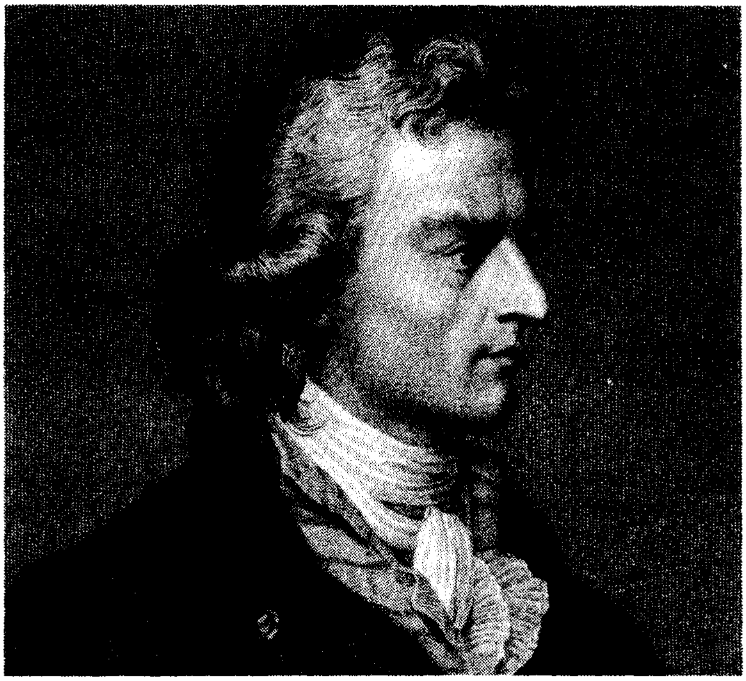

Rescue the Western Alliance!

I call upon every American who bears responsibility for the future of America's citizens, to now take responsibility for the world as well. I call upon you to throw your 'practical, pragmatic,' considerations into the circular file, and—*right now*—publicly declare your support of the international efforts of the Schiller Institute, and of myself and my husband, Lyndon LaRouche, to create a new and just order, based not on the politics of fear, but on the republican ideals so beautifully embodied in the spirit of the American Revolution, the German Classics, the Wars of Liberation against Napoleon, and Friedrich Schiller himself, who once wrote:

"And stake ye not your life thereon,
Never will your life be won!"

—Helga Zepp-LaRouche