The shopping list for Mexico's development

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I. Introduction

In the next 20 years, Mexico can use the strategy of trading its oil, a 20th-century technology, for 21st-century technologies like advanced capital goods and nuclear energy, and in this way transform Mexico into a fully industrialized nation. In an earlier study prepared by the Fusion Energy Foundation (FEF) and the Mexican Association for Fusion Energy (AMEF), printed in this magazine, we demonstrated how this "oil-for-technology" approach could achieve such ambitious goals.

The present report elaborates on that study, and features two key aspects of a detailed program to achieve this transition to an industrialized nation: 1) assessments of the technologies required in each sector of the productive economy; and 2) the imports of strategic capital goods required to make this transition.

The result of our study, using the computerized LaRouche-Riemann model of the Mexican economy, is the elaboration of a "shopping list" for Mexico for the 1980s, a list of capital goods imports which Mexico requires if it is to embark on a successful program of industrial development. This shopping list, of course, has the greatest importance for the industrialized countries, like the United States, that will be called on to provide the high-technology exports to meet Mexico's gigantic demand.

Our calculations indicate that Mexico will need to import $150 billion in capital goods over the next decade, $100 billion of which can be provided by the United States, if we maintain our current two-thirds share of the Mexican market. This translates into *one million new jobs* over the next ten years, concentrated in high-technology sectors, and a rebuilding of critical U.S. industries whose survival at this point depends on exports. In 1982 alone, for example, Mexico will have a $15.4 billion shopping list for capital goods (see Figure 6), only $5 billion of which can be met by domestic Mexican suppliers. If the United States were to win contracts on two-thirds of the remaining $10.4 billion Mexico will import, the United States would not only gain $7 billion in badly needed foreign exchange, but would also create over 58,000 new high-skill jobs—in just one year.

And this leaves out the multiplier effect on the U.S. economy of receiving $7 billion in capital goods export orders; it also doesn't consider other categories of exports to Mexico (such as food and consumer goods) that would increase significantly under an overall oil-for-technology accord.

What such an agreement would mean for Mexico is no less dramatic. Our study rigorously demonstrates the possibility of Mexico's successful development from a raw-materials exporting country into a full member of the community of industrialized nations. We have shown that this development can be substantially completed within 20 years, and have outlined an investment strategy to accomplish this.

Figure 1 summarizes the proposed three-tier strategy. We begin with a deployment of Mexico's currently available technical expertise, primarily her oil reserves, directed toward achieving an intermediate stage of industrial technology. These intermediate technologies are chosen so that they, in turn, lay the basis for full-scale industrial elaboration by the year 2000.

The three-tier, 20-year strategy requires that the implementation of the capital goods import policy be directed with military precision. To ensure the success of this investment strategy, capital goods must be imported in the initial stages of the program to begin to build Mexico's own capital goods industry, and to ensure the rapid growth of the petroleum sector. In the intermediate stages, heavy industry and major transportation projects will dominate the requirements of the Mexican import bill, while the Mexican capital goods industry itself shifts from agricultural equipment and metal fabrication to heavy boiler construction and heavy equipment fabrication. In the final phase, Mexico's investment must concentrate on the elaboration of a fully developed capital goods industry, which will leave Mexico, in the year 2000, with an economy that is broadly based and nearly self-sufficient in the critical areas of capital- and technology-intensive goods.

The present situation

Mexico today has an industrial sector grossly distorted by large consumer goods production. Figure 2

shows this situation graphically: Mexico is one of the only major industrial or developing countries with more than 50 percent of its industrial output in consumer goods. Mexico's predicament is further indicated by the limited range of capital goods that can be manufactured domestically. Correcting this structural distortion requires a rapid rebuilding of the capital goods sector in Mexico.

In the short term, Mexico's demand for capital goods is estimated to rise at a rate of 14 percent per year, significantly higher than the rate projected for industry as a whole (12 percent per year) or the economy (11 percent). Because of the lead time required for manpower training and construction, Mexico's capital goods sector cannot be expected to grow at faster than 14 percent for the first decade, so that by 1985 the proportional dependence on imported capital goods will be as large as in 1982. At this point, however, the second phase of the proposed investment strategy begins to pay off, the growth rate in the capital goods sector accelerates to 17 percent, and Mexico will be able to reach a level of about 40 percent of its domestic demand for capital goods. In the late 1990s, with this sector now growing at more than 18 percent per year, Mexico will be able to supply over half its capital goods requirements domestically. The magnitude of that accomplishment is impressive: a 24-fold increase in domestic production, and a 14-fold increase in domestic demand.

The massive imports of capital goods represent Mexico's ticket for industrialization, and can easily be financed by oil exports. Using the figure of $35 per barrel, the projected output figures and export estimates from our program show that Mexico's export earnings will generously provide for the import of capital goods in the large quantities required, at least until the late 1990s. By that time, the overall development of the Mexican economy will have substantially reduced the relative role of oil exports in Mexico's foreign trade.

This development is the most important indicator of a qualitative change which the Mexican economy will have gone through—that of shifting from a raw-materials exporting country to an industrialized nation.

The method of the three-tier strategy

To accomplish the goal of the rapid industrialization of Mexico, we have assembled a profile of the key sectors of the Mexican economy in their present state, and plotted a path of capital investment for each as part of the national industrialization strategy. This process of sequential investment occurs in three distinct phases:

1) A rapid growth of the extractive sectors. Exemplified by the aggressive exploitation of oil resources by Pemex, the same strategy should be applied to nonferrous metals and capital-intensive agriculture. This first phase of capital investment lays the basis for the second stage of higher industrial development; without this phase, the inherited distortions of the Mexican economy

Figure 1

Three stages of Mexico's development

	Phase I (1982-86)	Phase II (1987-93)	Phase III (1994-2000)
Target growth area	Agriculture Petroleum	Steel Chemicals	Capital goods
Electricity	Oil-fired power plants		Nuclear plants
Water projects	Groundwater recharge Southern area dams		Canals Northern area pumping
Transportation/ Construction	Rectify existing railroads, trucks Construct superports Construct plants	Build new railroads Upgrade highways Start new ports	Maximize railroad efficiency, add roads Start airports, ports
Capital goods	Farm equipment Steel furnaces Metal fabrication Small capital goods	Construction equipment, boilers Material-handling equipment	Motor vehicles Reactor vessels Specialized industrial machinery

Source: FEF/AMEF

would rapidly bog down any sectors that might have made progress. Several comparative scenarios analyzed using the LaRouche-Riemann econometric model show this effect dramatically in the case of agriculture. If the initial period of industrialization does not accomplish the interrelated goals of eradication of subsistence agriculture and establishment of a primary metals base, Mexico's further progress becomes impossible.

This first phase serves, in a positive sense, to provide the critical inputs for successful development; the aggressive exploitation and export of oil provides the funds for import of capital goods; the development of a high-productivity agriculture sector makes Mexico self-sufficient in food; and the primary metals industrial base serves as part of the foundation for the broader industrialization to be undertaken in the second and third phases.

2) The second phase of industrial investment must concentrate on the full-scale development of basic heavy industry in Mexico. Using the initial investments in steel and nonferrous metals begun in the first phase, Mexico must develop the capability to produce large amounts of the critical raw materials for an industrialized country—primary metals and chemicals. This phase, projected to begin in the mid-1980s and continue to the early 1990s, puts Mexico irrevocably on the road to industrialization. Accompanying the large-capacity metal and chemical industries are the more important manpower changes reflected in the achievement by 1990 of large-scale urbanization and acculturation of the Mexican peasantry, and their replacement in the countryside by modern, highly productive farmers.

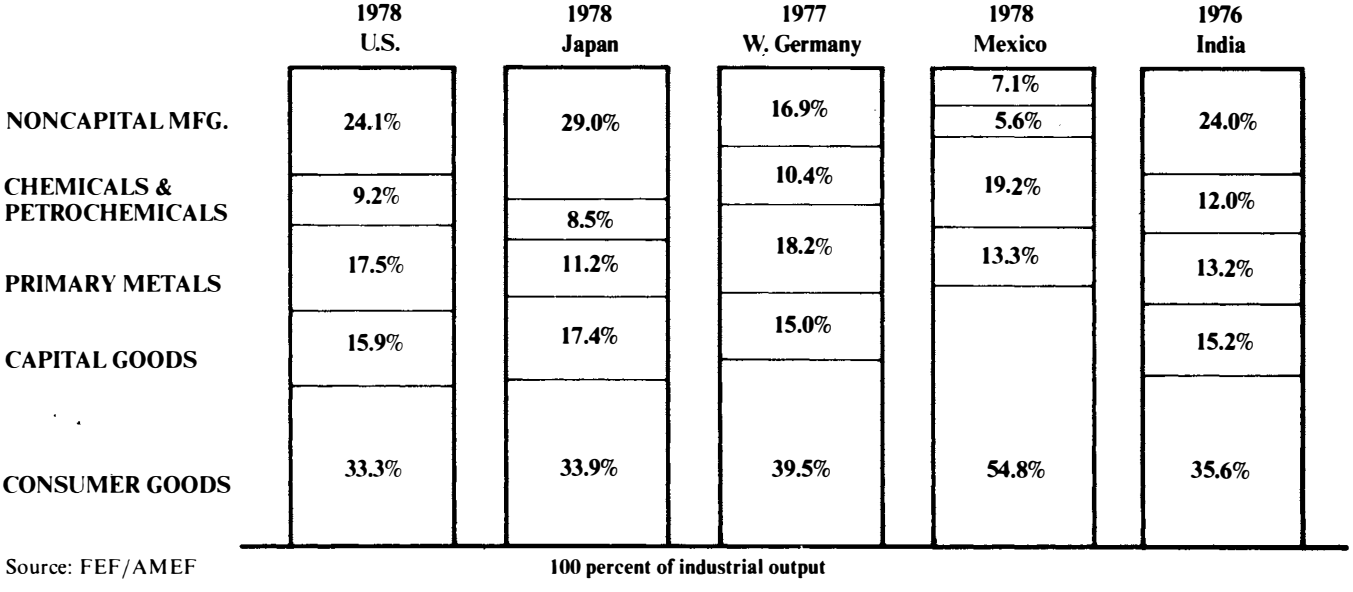
3) In the third phase of investment, Mexico can use the industrial base constructed during the preceding six years to begin development of the highest technological levels of industry and manpower. Especially critical in this regard are the nuclear industries. The machine tool, materials, and automation requirements for the nuclear industry make it the centerpiece of the third phase of industrialization, in the same way that petroleum was the key to the first phase and steel the key to the second.

As summarized in Figure 1, this three-phase development strategy in industry implies a paralleled progress in infrastructure. To realize the investments projected in the first phase of this program, the present crippling bottlenecks in transportation must be overcome.

Over this same period, the energy production capabilities of the Mexican economy will be evolving toward a greater emphasis on nuclear electricity generation and process heat. This nuclear capacity in the late 1990s has, however, immediate implications for the capital goods imports necessary to lay the groundwork *now* for a healthy nuclear industry in 15 years.

Finally, the capital goods industry in Mexico will change significantly over the course of this three-phase program. Mexico's capital goods industry is now concentrated in the areas of small capital goods and electrical goods. Its relative dominance will change in

Figure 2
Profile of industrial structure, international comparison



Source: FEF/AMEF

Figure 3

Agriculture sector goals

Goals	1980	1985	1990	2000
Cultivated land (in million hectares)				
Fully irrigated	5.4	6.0	7.0	10.0
Supplemental	—	1.0	1.5	5.0
Rainfed	8.0	8.0	8.0	6.5
Subsistence	6.0	4.4	2.9	0.5
Total	19.4	19.4	19.4	22.0
Total without subsistence	13.4	15.0	16.5	21.5
Food production (million metric tons/year)				
Grain	20.0	40.5	66.0	126.0
Animal protein	0.6	1.2	2.4	5.0
Requirements:				
Farm machinery (horsepower/hectare)	0.7	1.2	2.4	2.7
Fertilizer (million metric tons/year)	1.6	2.5	3.6	6.8
Irrigation water (billion cubic meters/year)	50.0	86.5	103.0	167.0
Farm improvements (billions of 1980 U.S. dollars/year)	—	$2.2	$2.3	$2.8

Source: FEF/AMEF

the first phase of the program, during which the fabricated metals and large capital goods sections will be the larger fraction of capital goods output.

In the final phase of the industrialization of Mexico, the high-technology section of the capital goods industry assumes strategic significance.

II. The steel sector

The overall goal for the Mexican steel industry, indicative of the whole primary metals sector, is the augmentation of Mexico's significant present steel output by a factor of 11.6 by the year 2000, representing an average annual growth rate of 12 percent.

Technology assessment

There are several advanced technological features of modern steel production that must be introduced as rapidly as possible into the Mexican steel sector. Mexico must not try to replicate the historical development of the steel industry—it must always use the most advanced available technologies to construct a steel industry. There are no prerequisities in industrial development—the most advanced available technology is always the "appropriate" technology.

In the initial stage of the industrial development program the electric arc technology can be developed. This technology, using high energy-density, allows for the processing of scrap steel, which will be of increasing importance in subsequent stages of the program. On the basis of this electric arc technology and the existing conventional plants, Mexico can, in the second phase, build full-scale continuous casting plants. Each of these plants, with output of 7 to 10 million tons, will produce not only steel, but also skilled manpower required for the transition into
gy characteristic of the third phase of the industrialization program.

We strongly recommend using the most advanced steel chemistry for these new plants, the HYL technology for direct reduction, and the use of nuclear-produced process heat. Mexico's pioneering role in the development of the HYL process—leading to its successful introduction in Venezuela and Brazil, as well as Mexico—should be taken advantage of.

The development and perfection of nuclear steel-making, especially advanced in Japan, should be the next step in the advancement of steel-making and toward the development of a clean, fossil-fuel-free steel technology.

By the end of this 20-year investment program,

Figure 4

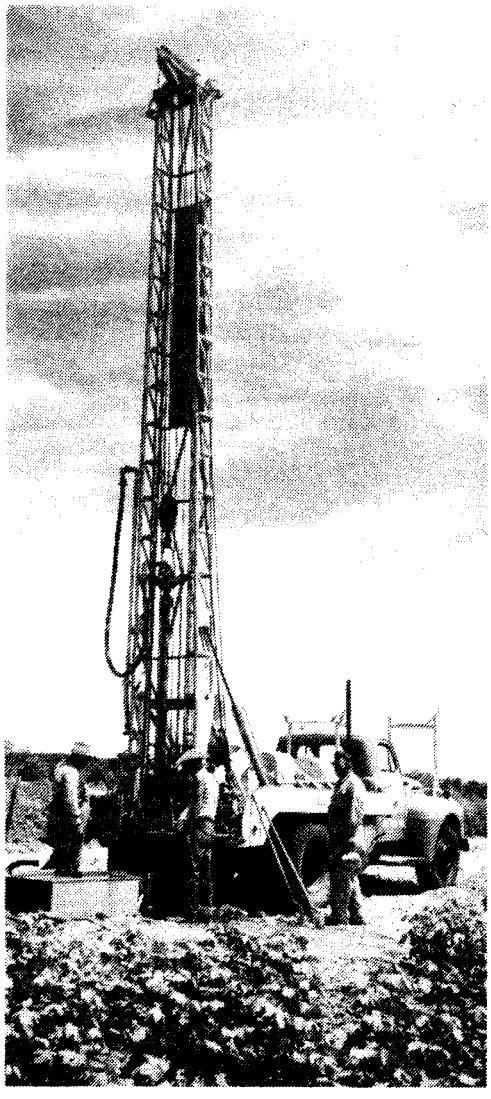
Agriculture sector shopping list

(cumulative 1982-1985)

	Units	Total value	Value of imports*
Farm machinery			
Tractors, average 90 hp			
Additions	110,000		
Replacements	74,300		
Total	184,300	$1,660	$ 830
Combines & harvesters			
Additions	36,200		
Replacements	2,000		
Total	38,200	1,062	905
Tilling machines			
Additions	182,500		
Replacements	123,500		
Total	306,000	500	400
Farm trucks			
Additions	59,500		
Replacements	40,200		
Total	99,700	1,600	160
Fixed improvements			
Farm irrigation (thousand hectares)	5,400	2000	400
Farm drainage and erosion control (thousand hectares)	5,400	667	67
Farmstead upgrade (number of farms)	30,000	2,200	1,650
Total spending		**$9,689**	**$4,412**

* millions of 1980 U.S. dollars

Source: FEF/AMEF



Mexican engineers and metallurgists must have developed the expertise to begin the transition to a plasma-based primary metals industry. Using the various plasma processes now available (for example, the arc furnaces and electric plasma furnaces), the problems of a fusion-powered plasma furnace and plasma torch can be solved.

Shopping list for 1982-1985

The immediate capital goods requirements for Mexico's steel industry will involve the acquisition of two direct reduction plants of approximately 5 million tons per year capacity, and the initial siting and design for the direct reduction plants to be brought on line later.

Using standard figures for the design of steel plants, the shopping list for the steel sector was calculated in terms of furnaces, heavy machinery, electrical equipment, and so on. These figures were then included in the cumulative figures for these categories that appear in Figure 6. Mexico's own capital goods industry will supply very little of the steel sector's requirements until the period after 1990.

III. The agriculture sector

The goal for agricultural development in Mexico is the achievement of self-sufficiency and net export capability within the next 20 years. The production targets are 126 million tons per year grain and 5.0 million tons per year animal protein by the year 2000, representing increases of six- and thirty-fold over current levels. The goals and material requirements for this task are shown in Figure 3.

The key to increasing the production of Mexican agriculture is the rapid elimination of subsistence agri-

Figure 5

Capital goods average annual rates of growth

	1980-1985	1985-1990	1990-2000
Large capital goods[1]	16%	17%	20%
Small capital goods[2]	16	17	20
High-technology goods[3]	60	21	20
Electrical goods[4]	10	17	15

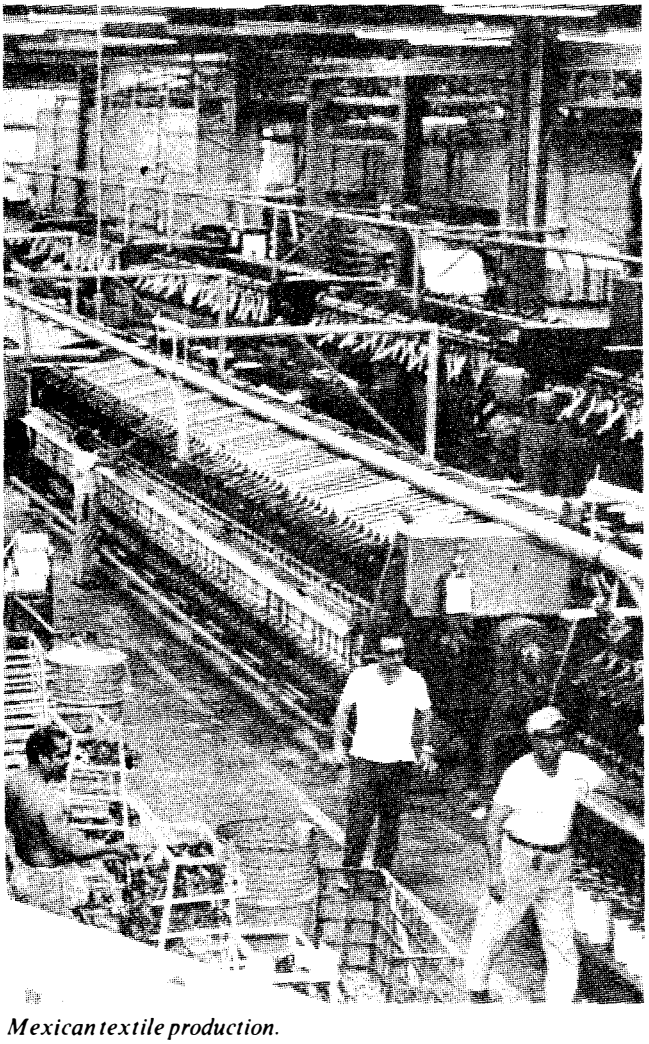
[1]Turbines, engines, construction equipment, farm equipment, materials-handling equipment, machinery, etc.

[2]Metal-fabricating machinery, machine shops products, bearings, gears, etc.

[3]Machine tools, industrial and precision instruments, etc.

[4]Generators, transformers, switchgear, motors, pumps, etc.

Source: FEF/AMEF



Mexican textile production.

culture. At present, the unirrigated, unmechanized farming sector represents a net drain on the economy, as well as absorbing the energies of 13 million workers who will be urgently needed for the anticipated expansion of industrial production. Therefore, rather than dissipating resources to ameliorate conditions in the least productive areas, investment must be concentrated in areas of high return, which will lead to the greatest increase in food production.

Although the technology of Mexican agriculture will develop its own charateristics, the U.S. farming sector can serve both as a preliminary model and a *minimum* level of acceptable technology against which to judge suggested innovations.

During the first 10 years of the program, development will be focused on the 13.5 million hectares of cropland which already receive sufficient water, either through irrigation or from rainfall above 700 millimeters per year, with an increase in intensively cultivated land of only 3 million hectares. Over this period, the numbers of tractors, harvesters, cultivators and other types of farm machinery in use will reach levels equivalent to those of the United States on a per hectare basis. Fertilizer use will double; and pesticides, improved irrigation systems, and improved seed and animal stocks will all be brought in.

During the second decade, the area under irrigation will be substantially increased, using both full and supplemental irrigation schedules to overcome "natural limits" to the available cropland. By 2000, over 21 million hectares will be under intensive agriculture, with each addition being brought up to the highest standards of efficiency and productivity. This expansion in irrigation will require a total of 170 billion cubic meters of water per year, and the installation of 40 gigawatts of pumping power to move it. Therefore, the successful completion of the second phase will depend not only on the previous development of the agriculture sector itself, but on major investment in water projects. The abundant water of the south must be captured and transported to the north, then raised to the arid plateaus of the north. Simultaneously, the ground water, which is currently being drawn down at a significant rate (3 billion cubic meters per year) must be recharged by increased permeability to natural rain and river flow. These ambitious projects can be accomplished by the use of peaceful nuclear explosions, which provide the immediate capability for massive earth-moving projects. As a signatory to the Nuclear Non-Proliferation Treaty, Mexico has the right to receive aid in these areas from the United States, aid which the U.S. has the obligation to supply.

Figure 4 gives the cumulative requirements for capital investments in agriculture, as well as the portion of that total that will have to be imported. For example,

Mexico produces tractors now, but not enough or of sufficiently large size to meet her own needs. The same is true for other agricultural implements, with particular deficiencies in the high-technology end of the spectrum. Thus, import requirements for 1982 include approximately two-thirds of the 46,000 tractors needed in that year, and three-quarters of the other agricultural machines.

Prefabricated buildings for farmsteads will be unavailable domestically, but small pumps and piping for improvements in local irrigation systems can be purchased from Mexican suppliers. However, the large pumps that will be necessary as the water projects are developed are not now made in Mexico.

IV. The electricity sector

Our program estimates that Mexican electricity capacity will grow from the current 11.0 gigawatts to 150 gigawatts by the year 2000.

Technology assessment

The map on page 30 portrays the geographic placement of Mexico's major industrial development projects. The energy component of these sites is grouped around three principal technologies: conventional petroleum deposits used for thermal electrical generation and steel-making (concentrated in the southern parts of the country); natural gas MHD-plex installations in the north and northeast, and nuclear-agricultural (nuplex) installations in the north and northwest. These three technologies are approximately coexistent with the three phases of Mexican investment over the course of the program, and provide a nested set of technologies and technical expertise for energy development.

The key to the successful development of Mexico's energy sources is to plan "backward" from nuclear.

In the United States, as well as in France, Germany and Japan, the state-of-the-art commercially available nuclear power plant is the Light Water Cooled Reactor (LWR). This type of reactor is by far the most commonly built plant in the world today, and accounts for between 85 and 90 percent of all electricity from nuclear power plants now in operation. These plants therefore also represent the reactor type that has the greatest amount of operating experience overall, and are not only designed and built by the above-named countries, but also by the Soviet Union, Italy and Sweden.

The remaining 10 to 15 percent of the world's nuclear electric-generating capacity is made up primarily of either the Gas-Cooled Reactor (GCR), the Heavy Water Reactor (HWR), and to a lesser extent the Liquid Metal Fast Breeder Reactor (LMFBR). The LMFBR is an advanced technology reactor and is not yet considered to be commercially available, although it will be soon, at least in France and the U.S.S.R.

The HWR is now built only by India and Canada,

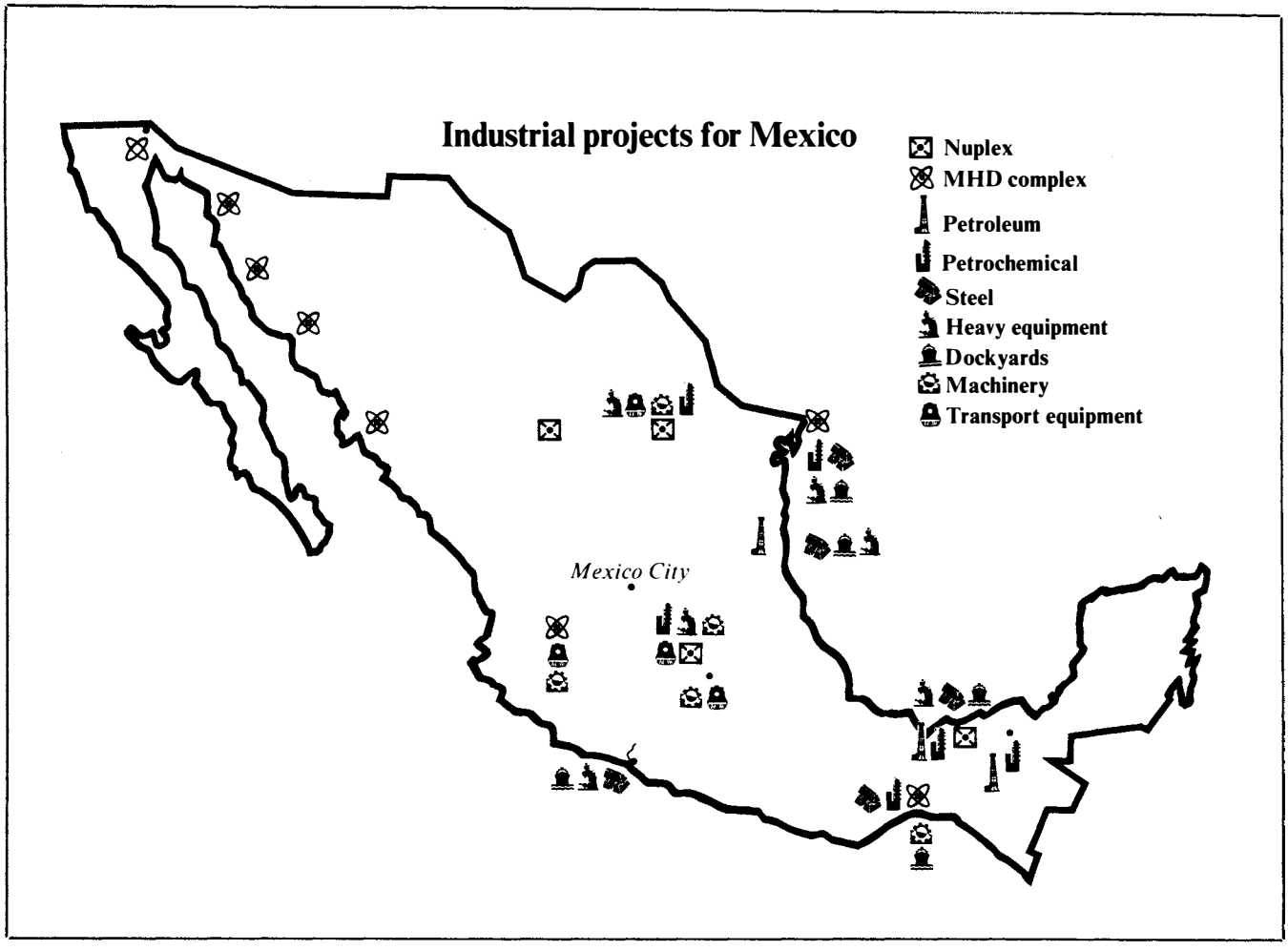
Figure 6

Mexico's total shopping list of capital goods

(billions of U.S. dollars)

	1982	1985	1990	2000
Small capital goods	$ 4,000	$ 5,880	$11,460	$ 37,800
Agricultural and construction machinery	2,960	3,240	5,560	23,740
Trucks	1,900	2,040	3,750	7,000
Electrical goods	1,400	2,130	4,080	13,000
Materials handling and specialized machinery	1,100	1,590	2,750	8,300
Locomotives and railroad cars	1,050	1,050	2,000	7,000
Pumps	700	920	1,790	4,300
Engines and turbines	665	740	1,840	6,700
Furnaces	385	430	870	2,100
Boilers	360	400	1,840	4,350
Machine tools	330	460	950	4,200
Computers, measurement and control devices	300	380	830	2,900
Total	**$15,430**	**$19,620**	**$38,260**	**$122,050**

Source: FEF/AMEF



where it is called the CANDU. There are now only 14 of these power plants in operation, generating a total of about 5,590 megawatts, with most of these in Canada. Overall, electricity for CANDUs is on the order of 10 to 15 percent more expensive than from LWRs, but it has worked well in both Canada and India, as well as in the few other countries where it has been sold.

Another reactor type which is coming on line is the High-Temperature Gas-Cooled Reactor (HTGR). At this time produced only in the U.S. and Germany, this reactor has the advantage of producing a very high temperature gas that can be used directly as a heat source for many industrial and agricultural production processes. Because of this, it is an ideal reactor to be used as the central energy source for the future agro-industrial complexes, often referred to as Nuplexes.

The nuclear component of Mexico's electricity program must be accelerated during the first period, if the infrastructure and skilled manpower required for the later stages of industrialization are to be in place. The two LWR reactors now under construction should be finished as quickly as possible, and the siting plans and design studies for 18 reactors to be constructed in the 10 years following 1985 should be undertaken.

Our proposal is that about 75 percent of this increased capacity come from the LWR, since this is the reactor that is most tested and most widely produced, thus increasing Mexico's flexibility. The remaining 25 percent can be a mix of CANDUs and HTGRs, with perhaps a LMFBR coming on line around 1995.

During the successive five-year period, the number of nuclear plants coming on line will more than double, reaching a total of 45 gigawatts by the year 2000.

IV. The transportation sector

Over the coming 20 years, the transportation system of Mexico must expand its capacity approximately tenfold. Import tonnage will rise from 18 to 175 million tons per year over the period covered by the development plan, and total freight moved from 140 to 1,350 billion ton-kilometers.

Technology assessment

The high-intensity development of the four superports now under way in Mexico is exemplary of the appropriate strategy for transportation development.

For the internal transportation system to function at the same level as the superports, the railroad network must be greatly upgraded and expanded by 40,000 kilometers; a series of barge canals must be made available for bulk freight movement; and the highway and air traffic networks must be improved.

For the internal transportation system, immediate action must be taken to deal with the rail car bottleneck that is now cutting rail transport efficiency below even that which would be expected from the existing rolling stock. Large numbers of cars must be purchased and a system of car tracking implemented. After these emergency measures, the next task will be the improvement of existing track and equipment maintenance. The rectification and double-tracking of existing lines can begin with little lead time for engineering studies, and can be carried out very rapidly by employing many contractors on the same line.

In the following phase, between 1988 and 1992, the emphasis will be placed on the construction of new railroad lines and the repair and upgrading of the highways. In the last phase, the emphasis will shift again, in part to the "consumer" transportation facilities, such as new roads and air traffic improvements. With the matching development of additional superports, Mexico can carry forward its resolve to "make the Gulf of Mexico into a new Mediterranean."

V. The capital goods sector

Mexico's transition to industrialized nation status depends on the rapid, broad-based growth of the capital goods sector. Figure 5 shows the growth rates for the various types of capital goods which will be required for this industrialization.

Technology assessment

Mexico's capital goods industry today is small ($2.76 billion) and heavily concentrated in the small and generic capital goods. The most critical sections of the capital goods industry, the machines that make other machines (machine tools) are almost nonexistent: in 1979 there were only $13 million worth of machine tools domestically produced in Mexico.

Particularly critical will be the development of the high-technology section of the capital goods sector. Here the production of low-precision machine tools and electronic control devices will be the primary objective of the first phase of investment. In the second stage, numerically controlled, high-precision tools must be initiated, with an eye to Mexico's developing its own capacity to produce programmable machine tools and robots. Japan has perfected the technique of using the machine tool industry as the cutting edge of advanced industrial development, a strategy which will be appropriate for the Mexican economy during the third phase of industrial development.

Capital goods shopping list

In 1982 a total of $675 million must be spent on imports of capital goods by the capital goods sector itself, if the necessary momentum toward industrialization is to be created. Of this, approximately $50 million will go to the high-technology sector, with major concentrations in the machine tool section. At least one large, state-of-the-art machine tool line should be built, as well as a series of smaller, simpler plants. The electronics component of the capital goods sector is unique in requiring a relatively large amount of unskilled labor.

During this first period, equipment must also be ordered for the construction of furnace plants, including one copper-refining furnace and one steel-refining furnace.

VI. Can the U.S. meet Mexico's demand?

Mexico's total shopping list for capital goods is presented in Figure 6, covering from the present until the year 2000. Mexico's capital goods import and

Figure 7

Capital goods consumption and import requirements

(billions of U.S. dollars)

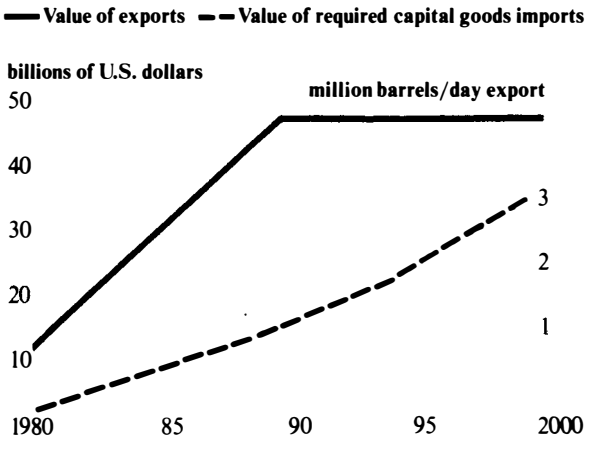
Year	Total demand	Amount imported	Amount produced domestically	Percent of total produced domestically	U.S. jobs generated*
1980	$ 7.75	$ 5.0	$ 2.75	36%	28,000
1985	19.6	14.1	5.5	28	79,000
1990	38.3	26.2	12.1	32	147,000
2000	122.1	54.9	67.2	55	309,000

*Assuming U.S. provides two-thirds of the amount imported

Source: FEF/AMEF

Figure 8

Projected oil revenues and total capital goods import requirement, 1980-2000



Source: FEF/AMEF

consumption statistics for this same period are summarized in Figure 7.

The requirements for capital goods quantified and projected in these figures raise two important issues for Mexican industrial development: the payment for these imports, and the ability of the advanced sector to supply the capital goods. The import financing capability, discussed above, is summarized in Figure 8 where the oil revenue generated by an aggressive petroleum exploitation program is seen to easily cover the costs of the capital goods imports. The capability of the advanced sector to supply Mexico's capital goods requirements is more problematic.

Figure 9

U.S. ability to meet Mexican capital goods demand

(millions of U.S. dollars)

Selected items	1982 Mexican demand	U.S. idle capacity*
Agricultural machinery	$2,960	$5,953
Drilling machinery	280	0
Turbines	665	807
Railroad equipment	1,050	55
Trucks	1,900	1,906

*"Full capacity" defined as 90 percent capacity

Source: FEF/AMEF

During 1980, the Mexican market was the most dynamic and healthy export market for U.S. goods anywhere in the world. While U.S. trade overall declined, and suffered with almost every country in the world, U.S.-Mexican trade increased 49 percent from 1979 to 1980! Mexico now accounts for almost 8 percent of the total U.S. exports, compared with a figure of 4 percent in 1977.

But the United States is going to have difficulty keeping pace with Mexico's rates of growth. Although difficult to calculate precisely, Figure 9 presents an estimate of the export capacity of the U.S. economy for the year 1982, based on putting existing idle capacity into production for export. On this basis, we find a wide divergence in the abilities of various U.S. capital goods sectors to meet Mexican import needs.

As Figure 9 summarizes, the U.S. farm machinery industry can easily expand to meet Mexican import needs. In drilling equipment, however, one of Mexico's most pressing needs, given the strategic role of the petroleum sector in subsequent investment, the United States has no spare capacity. Deliveries for drilling rigs are already backed up many months for U.S. customers.

By contrast, in turbines for electricity production, which Mexico also requires in large numbers in the early parts of the program, U.S. capacity utilization rates are under 60 percent, so that Mexico's requirements could easily be met.

The most profound qualitative impact on the U.S. economy of vastly expanded trade with Mexico will be in the revitalization of essential sectors of the U.S. economy which have been decimated by lack of capital investment, falling domestic demand, restrictive regulation, and growing obsolescence. The nuclear industry and the machine tool industry are two of the financially weakest sectors of the U.S. economy. A program for the rapid industrialization of Mexico would provide both of these sectors with a growing market, spurring production in sectors of the U.S. economy absolutely vital for continued U.S. economic health.