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Energy Alternatives for Brazil

In 1973 the developing countries had built or begun to build economies in which cheap oil was a crucial energy source. Suddenly the price of oil jumped and they were without means to pay for it. Their three general choices now are to decrease consumption of energy, to harvest the sun, and to go nuclear.

Nowhere is there enthusiasm for curtailing use of energy, because this would be synonymous with curtailing development. Harvesting the sun is the desirable solution. However, little thought has been given to converting solar energy to versatile forms. Thus, an important and disturbing consequence of the oil crisis has been to push the world toward going nuclear.

Among the "developing countries" Brazil is one to be watched, for it is emerging as a leader in adopting nuclear energy and in harvesting the sun.

When many people think of Brazil, they have visions of a lanquid, exotic country. The Brazil that matters is tough-minded, energetic, imbued with a sense of its own "manifest destiny." In many ways, Brazil today is reminiscent of the United States of generations ago. Vast areas of the country are unoccupied. Were the potentials of the country realized, it could probably sustain more people at a higher standard of living than could the United States. Brazil is only at the early stages of using its intellectual resources. The first university at São Paulo was founded in 1932. The first sizable group of bachelors in geology were graduated in 1962. There is now a growing research and development establishment. More than 4000 scientists attended the recent meeting of the Brazilian Society for Progress of Science. In the higher echelons of government are experts knowledgeable in technology, some of whom were trained in the United States.

Brazil has enjoyed a rapidly expanding economy and earlier was hailed as a new Japan, but the sharp rise in cost of oil was a blow. The country is heavily dependent on the use of oil in transportation, but it produces only about a fourth of its needs. It was faced with the prospect of a long-term slowdown of its drive toward an expanded economy. The government responded by maintaining imports of oil sufficient to permit continued growth of the economy even though a trade deficit was incurred. However, the government also entered into negotiations with West Germany aimed at achieving nuclear self-sufficiency. As a result, in about a decade Brazil will have eight additional large power reactors, uranium isotope enrichment facilities, a fuel element fabricating plant, and a processing plant for spent fuel capable of producing plutonium. Brazil plans to pay for much of the new installations by exporting uranium.

While it is possible today to buy and transfer large-scale nuclear technology, there is no comparable possibility in the use of solar energy. If a worldwide stampede toward nuclear proliferation is to be slowed, development of this alternative energy source must be speeded.

In the parts of the tropics where rainfall is adequate, utilization of plant materials has great potential. The combination of maximum solar radiation and a long growing season leads to huge annual yields. Brazil is already using plant energy and exploring means of greater exploitation. Thus, some of the country's gasoline currently contains 15 percent ethyl alcohol and charcoal and is employed in smelting much of the country's steel.

Brazilian scientists are impressed with the potential of cassava (manioc). This plant grows well on poor soils such as the laterites. In some soils, yields of more than 50 metric tons per hectare have been obtained. The principal component, starch, can easily be fermented to ethyl alcohol. At today's oil prices, costs for such alcohol would be very favorable. An automobile engine designed expressly for alcohol is being developed. Brazilians point out that because of the absence of sulfur and the low combustion temperature, exhaust gases would be virtually pollution free. Brazil's current energy needs could be largely met by devoting about 1 percent of its total area to cassava.

It is to be hoped that in solving its own energy problems Brazil will come to choose to exert world leadership not in facilitating nuclear proliferation but in providing the tropical countries with examples of how best to harvest and utilize solar energy.—PHILIP H. ABELSON