

Nuclear Energy Prospects and Uranium Resources in Latin America

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In 1970, the 250 million inhabitants of Latin America consumed about 150×10^6 MWh of electrical energy, but although the average consumption appeared to be around 600 kWh, it is worth noting there was a very large discrepancy between the maximum (1200 kWh) and the minimum (100 kWh) consumption per capita in the different countries of the region.

It is estimated that Latin America may require 350×10^6 MWh by 1980, 800×10^6 MWh by 1990 and 1500×10^6 MWh by the end of this century. This would require around 200 000 to 250 000 MW of installed capacity by the year 2000 and would represent around 10 percent of the world's electrical production at that time.

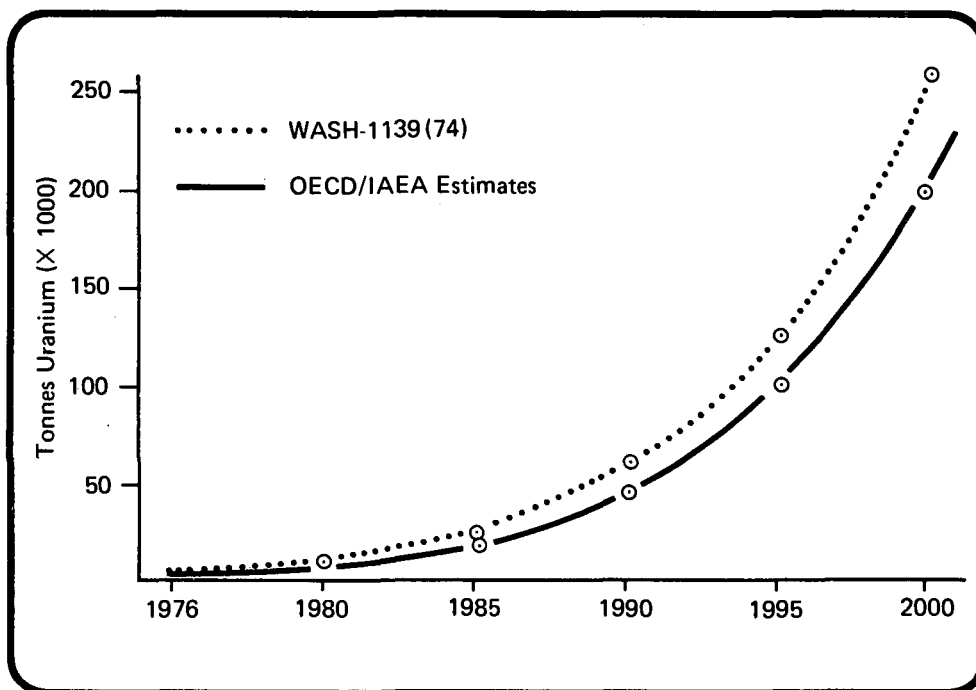
Although Latin America has assured resources of conventional fuels and enormous unexploited hydro resources, nuclear energy has been introduced (a 319 MW(e) nuclear power plant in Argentina began operation in 1974). Three Latin American countries have initiated large nuclear power programmes that could result in a nuclear power generating capacity of 25 000 MW(e) by 1990. Many other Latin American countries are contemplating smaller nuclear programmes in the coming years.

Because of the wide disparities among the Latin American countries with respect to their size and national economies, it is not an easy task to define what the short term role of nuclear power will be in satisfying the electrical needs of this region. Studies carried out by the IAEA in 1974 indicated the potential nuclear market in Latin America, in terms of installed capacity, would be about 50 000 MW(e) by the beginning of the 1990's. This figure has since been revised to about 35 000 MW(e).

About one-fifth of the potential nuclear market in Latin America is for smaller nuclear power plants, in the range of 150 to 500 MW(e). At the present time, such plants are not readily available commercially, and it may be the end of the 1970's before they are made available to utilities at competitive prices.

In addition, like other developing countries, those in Latin America are faced with the problem of the high capital cost of nuclear power plants. The required financing for the installation of 35 000 MW(e) nuclear power capacity is in the order of \$20 to \$30 billion just for the power plants themselves. Because of the difficult positions of the national economies and the inflationary trend in the region, obtaining such large funds may prove to be difficult.

Another problem is the lack of skilled manpower, particularly engineers and technicians, which may limit the development of national power programmes. With the assistance of the IAEA, several Latin American countries have begun large training programmes.



Forecasts of uranium demand for Latin America (Argentina, Brazil, Chile, Columbia, Cuba, Mexico, Jamaica, Peru, Uruguay and Venezuela).

The projected nuclear power capacity of 35 000 MW(e) raises the question of fuel supply and reprocessing. It appears that a large regional nuclear fuel cycle centre of near optimal size could be established in Latin America and that it would offer both economic and technological benefits.

Uranium Resources

Geologically, the potential for finding uranium in Latin America is good, as approximately two thirds of its 23.4 million km² is considered to be favourable for uranium exploration. However, prospecting such an immense area, much of which is virtually inaccessible, presents difficult and, sometimes, special problems. Therefore, in order to obtain quick information on the geology and the mineral potential of their inaccessible territories, some countries are utilizing remote sensing techniques such as side-scan radar and satellite images. For example, more than 4.5 million km² of the Amazon Basin have been covered by high resolution radar surveys in recent years.

With the exception of a few countries, the uranium exploration effort was at a moderate to low level until 1970. Since then it has increased rapidly and, during the last two years, exploration expenditures in Latin America were greater than the total of the preceding decade.

According to the nuclear power installed capacity planned, the cumulative uranium requirement from 1976 to 2000 is estimated at between 200 000 and 250 000 tonnes. The

present known reserves are located in only three countries (Table 1) and the reasonably assured resources are enough to satisfy the forecasted demand until the year 1990, exactly when the demand should increase sharply.

Thus, it is clear that a large effort in exploration and production of uranium is required in Latin America beginning now and continuing into the mid-1980's. Evidence that this effort has already started is found in the larger investment in exploration, which in certain countries was as much as 10 times that of 1973. Exploratory and development drilling for uranium in Latin America reached a record of 292 000 metres in 1975.

Reasonably Assured Uranium Resources (Tonnes X 1000)			Estimated Additional Uranium Resources (Tonnes X 1000)	
	\$15/lbU ₃ O ₈	\$15-30/lbU ₃ O ₈	\$15/lbU ₃ O ₈	\$15-30/lbU ₃ O ₈
Argentina	9.3	11.3	15.0	24
Brazil	9.7	0.7	8.8	—
Mexico	5.0	1.0	—	—

Table 1: Uranium resources in Latin America

Also, during the last two years several countries in Latin America initiated long term exploration programmes of varied sizes. In some cases, in addition to the national programmes, participation of foreign companies through associations or joint ventures are being implemented.

Production capacity of uranium concentrate is expected to reach 110 tonnes/year during the current year, 320 tonnes/year by 1978 and 950 tonnes/year by 1980. Production of uranium as by-product of other elements is also being considered.

The IAEA is participating in the increased uranium exploration effort in Latin America by providing expert assistance and donations of equipment both under its regular programme and, for large-scale exploration projects, in co-operation with the United Nations Development Programme. In the past four years, 10 Latin American countries have received IAEA assistance in uranium exploration, mining and production of U₃O₈ concentrates. Many fellowships and scientific visits have been granted, and requests in these areas are expected to increase. Training courses in the exploration and evaluation of uranium resources as well as a symposium on the uranium geology of Latin America, are being considered for 1978-79.