

MEMORANDUM FOR: Mr. John Despres

Attached is the information on costs of the Brazilian nuclear program that you requested for Ambassador Smith and Under Secretary Nye.

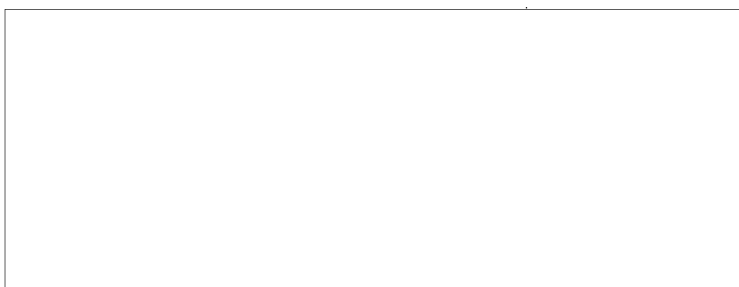


Latin America Branch
Developing Nations Division
Office of Economic Research

Date 16 Nov 77

FORM 101 USE PREVIOUS EDITIONS

(b)(3)
(b)(6)



(b)(3)
(b)(6)

ERM 77-10742

Brazil: Costs of the Nuclear Program

Latest estimates are that Brazil's nuclear program will cost \$15 billion for the nine power reactors slated through 1990 and another \$5 billion for the full fuel cycle. These estimates are more than three times those made just two years ago. Estimates of costs for power reactors under the agreement with Germany have jumped the most, from \$600 million each to nearly \$2 billion apiece. As a result, the estimated cost per kilowatt capacity for the three reactor Angra complex has grown from less than \$500/kw to \$1400/kw. Costs of alternative energy sources have also risen, although far less. Estimates for Itaipu hydroelectric capacity have only increase from \$400/kw to \$550/kw. Nuclear power from Angra dos Reis will thus be 2.5-3.0 times as expensive as hydroelectric power from Itaipu.

Another alternative with far lower capital costs and improved cost/benefit ratios would be the installation of thermal plants on the coast which would burn either US or South African coal.

The high cost of going nuclear has already put the Brazilian program under financial stress. NUCLEBRAS is suffering from chronic cash flow problems; the enrichment facility is being delayed due to a need to recapitalize the

~~SECRET~~

(b)(3)

financing; and serious manpower shortages are being aggravated by the government's failure to pay competitive wages for skilled personnel. The financial burden caused by the nuclear program will also aggravate Brazil's balance of payments. Direct imports of components and external financing needs will require that over 80% of the total program cost be paid for by foreign exchange. Almost all of the foreign exchange costs will occur during the initial stages of the program.

The costs of the enrichment and reprocessing facilities are relatively minor compared to the needed investment for power plants. As a result, the reduced economic justification for the power program is expected to have little impact on Brazilian enrichment or reprocessing plans in the near future.

Estimated Cost Escalation in Brazil's Nuclear Program

<u>Facility</u>	<u>Cost Estimate - 1975</u>	<u>Estimate - 1978</u>
Angra I (626 MW)	\$ 400 million	\$550 million
Angra II (1245 MW)	\$ 600 million	\$2,000 million
Angra III "	\$ 600 million	\$2,000 million
Enrichment Plant	\$ 255 million	\$700 million

~~SECRET~~

(b)(3)