

B. GAS TURBINES

Gas turbines must also be assigned our highest priority because of their diversity of applications, their near-term application and hence payoff, their great reduction in environmental impact, their reduction in energy demand through increased efficiency, and their reduction in cost of the power system.

Gas Turbines for HTGR. This is the only nuclear power system we support over the 5-year period 1975-1979. For this reason alone, great emphasis should be placed on bringing this system into full commercial service in the early 1980's. The ability to reject heat economically and efficiently to air will eliminate the thermal pollution of our waters, give freedom of site selection, and thereby permit nuclear powerplants to be installed at an accelerated rate.

Although LMFBR will be a very important heat source post-1985, no substantial R&D on power conversion systems for this reactor need be performed during the 1970's.

Gas-and-Steam-Turbine Combined Cycle. This system is entering commercial service in 1973 and will dominate the fossil-power field for at least 15 or 20 years. The R&D program should emphasize increasing efficiency above 50 percent and the use of low-B.t.u. gas from coal.

Decentralized Power. Small (about 1 MW), closed gas turbines should be rapidly developed for efficient use in total-energy systems. Decentralization of power production will permit use of the heat now wasted in power production. Overall energy efficiency might rise from present values of 30-40 percent to perhaps 75 percent, a goal unachievable in any alternate approach to power generation. Use of gas turbines for this service is discussed under the sub-program Use of Waste Heat and Fuel; fuel cells are also potentially suitable for decentralized power (See Fuel Cells sub-program).