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A Global Rush Toward Nuclear Energy

Perhaps the most important sequel to the Arab oil embargo has been movement toward widespread adoption of nuclear energy. Some 38 countries outside the United States have a total of 260 power reactors either operating, under construction, or on order. Although the United States still has a major role in nuclear matters, it is rapidly losing its technological and political supremacy.

The situation is complex; one approach toward insight is to concentrate on a single country—France. This nation has little indigenous coal and oil. In 1950 its energy consumption was the equivalent of 87.5 million metric tons of coal (MTec), 65.3 million coming from coal and 15.5 million from oil. By 1973 energy use had tripled, but consumption of coal had fallen by a third while use of petroleum had increased more than 11-fold to 175.6 MTec. Thus, France had become dependent on oil imports for about two-thirds of its energy. In contrast, the United States obtains about 14 percent of its energy from foreign sources. If there is need for the United States to attain energy independence, there is desperate need for France to do so.

The French, who have abundant domestic reserves of uranium, have chosen to place emphasis on nuclear energy, in which they have developed considerable expertise. Their first research reactor went critical in 1948 and the first power reactor in 1958. (Later they obtained extensive know-how from Westinghouse and General Electric.) They have in operation a small gaseous diffusion plant for separation of uranium isotopes and nuclear fuel processing plants to produce plutonium, and they are well along with techniques for handling radioactive waste. They have now had nearly two years' successful experience with a 250 Mwe breeder reactor and in this respect are far ahead of their U.S. counterparts.

Before the embargo, France was obtaining 8.5 percent of its electricity from nuclear reactors. The plan for 1985 calls for 72 percent nuclear, 14 percent hydroelectric, and 14 percent thermal power, with almost all of the latter coming from domestic coal. France is likely to reach these goals. The time required for planning and constructing a power reactor there is about half that in the United States.

France is also a major participant in an international consortium which is building a very large isotope separation plant to produce enriched uranium for power reactors. The partners include groups from Belgium, Italy, Spain, and Iran. The plant is scheduled to begin operation in 1979 and reach full production in 1981. It will have an annual production capacity of 10.8 million separative work units (SWU), or 2670 metric tons of enriched uranium having an assay of 3.15 percent ^{235}U. A second large plant is in the planning stages with construction dependent on obtaining orders for nuclear fuel. Present U.S. capacity, which is being upgraded, is 16.6 million SWU.

In addition to the consortium, others, including an English-Dutch-German combine and the Russians, are producing and selling enriched uranium for reactors. The virtual monopoly of the United States is about to end. There has been talk on Capitol Hill of shutting off exports of enriched uranium, but this would merely lead to expediting the construction of separation plants elsewhere and to a further loss of U.S. influence.

The oil embargo forcefully reminded many nations that oil reserves are limited and oil supplies are vulnerable to other interruptions. The quadrupling of the price of oil made nuclear energy look very attractive from the viewpoints of cost and balance of payments. The embargo also came at a time when a number of industrialized countries had accumulated some experience in the design, construction, and operation of nuclear power reactors.

A country possessing power reactors is a step along the way toward nuclear weapons. However, irradiated fuel that contains plutonium also contains tremendous quantities of fission-product radioactivity. To obtain weapons-grade plutonium requires a complex processing plant. The best hope for holding down weapons proliferation is to bring spent-fuel processing plants under international control. Attaining such an objective should be a major and urgent goal of U.S. foreign policy.—PHILIP H. ABELSON