

markets of the world. An increasing amount of power will be required however by the need to increase productivity to meet the demands of Canada's increasing population. Consequently, though the annual rate of growth of consumption may decline from its present level of 6 p.c. to about 4-5 p.c. in the 1970's, annual installations varying between 1,000,000 kw. and 2,000,000 kw. will still be required throughout the 1960's and 1970's. If this prospective revolution in the generation of thermal power from nuclear energy takes place it will have important effects on many sectors of Canada's economy, notably on the chemical industry and capital investment and construction requirements. Though the supply of uranium for nuclear fuel can be met from existing sources of supply the need for heavy water for Canada's nuclear plants, according to the forecast developments, would need to be several times present production capacity.

If by 1981 there is an installed nuclear power station capacity of from 4,000,000 kw. to 7,000,000 kw. then the material needs might be: an inventory of 2,600 to 4,600 tons of natural uranium, an annual make-up of 180 to 200 tons of natural uranium (to replace the uranium burned), and an inventory of from 4,000 to 7,000 tons of heavy water. Cost of producing this natural uranium for domestic consumption apparently would run into tens of millions of dollars a year. Even if new methods are discovered for the manufacture of heavy water at appreciably lower costs, expenditures on this might reach an annual level 25 years hence of from \$40,000,000 to \$50,000,000. Outstripping these expenditures would be the outlays on generating plant, machinery and equipment—capital investments that might reach into the \$100,000,000 a year category by 1980.

These are large figures but they are not far out of line with the performance of Canada's electric power industry in recent years. The annual outlay by utilities for generating plant and equipment is at present about \$250,000,000. Twenty years from now their annual capital investments on facilities of all types may be closer to the \$500,000,000 mark. Construction, equipment and supply of a number of base-load-type nuclear power plants, costing around \$150,000,000 annually is therefore unlikely to be impeded by a lack of financial resources, according to the Geneva report.

**Advisory Committee on Atomic Power Development.**—To ensure that the various publicly and privately owned utilities are kept fully informed of the progress being made, the Government set up in 1954 an Advisory Committee on Atomic Power Development on which the various power producers throughout the country are represented. The committee, which meets periodically at Chalk River, studies the research results obtained at that centre, receives complete information on the NPD station, and assists in evaluating the economic importance of atomic power in various regions of the country.

In 1955 an "industrial assistance office" was set up at Chalk River to create as wide as possible an interest on the part of private companies in the possible applications of atomic energy in general and of atomic power in particular.

**Development of Canada's Atomic Energy Program.**—As at Mar. 31, 1956 the approximate total expenditure on the Canadian atomic energy program was \$160,000,000. An estimated further expenditure of about \$100,000,000 will be required to carry out the program planned for the next four years.

The program had its beginning in 1942 when it was decided to set up a Canadian-United Kingdom project in Canada, under the administrative control of the National Research Council of Canada. British, French and other European scientists doing nuclear research moved to North America (mainly to the United States and Canada) early in World War II to work on an atomic weapon—the possibility of which became evident when O. Hahn and S. Strassman in Berlin, Germany, announced the first recognition of nuclear fission in 1939.

The United States project used the more readily available graphite to moderate its reactors and the project in Canada was assigned the task of trying heavy water as a moderator so that all possible routes to the production of plutonium for bombs would be tried.