

At Douglas Point on the shore of Lake Huron, the country's first full-scale nuclear power station went into operation in 1966. The station, built with the co-operation of Ontario Hydro, houses a 220-MW CANDU reactor. Experience gained in the design and operation of the NPD and Douglas Point reactors encouraged and contributed to the development of larger units. Construction of the 2,160-MW Pickering nuclear station near Toronto is now complete; two of the station's four units came on line in 1971 and units 3 and 4 produced their first electricity, ahead of schedule, in 1972 and 1973. All four units have performed exceptionally well with capacity factors in 1973 ranging from 70% to 93%, for an average of 83.4%. Work on the Bruce nuclear station for Ontario Hydro is proceeding on schedule with four 800-MW units planned for installation from 1975 to 1978. In addition, a duplicate of the Pickering station, at the same site, has been committed and Hydro-Québec and New Brunswick Electric Power Commission have started construction of 600-MW CANDU stations at Gentilly and at Point LePreau.

A further step in the development of the CANDU reactor is the use of boiling light water instead of pressurized heavy water as the coolant. The initial Gentilly nuclear power station (Gentilly I) utilizes boiling light water in its CANDU reactor; this station came into service in 1971 with 266 MW of nuclear-electric capacity.

### 13.5.5 Load demand and electric energy use

Firm power peak load is the measure of the maximum average net kilowatt demand of one-hour duration from all loads, including commercial, residential, farm and industrial consumers as well as the line losses. Such load demand increased at the rate of 7.5% a year from 1963 to 1973 and 7.4% a year from 1969 to 1973; peak load demand is forecast to increase at the average rate of 7.3% a year in the period 1974-78. As a result of the rapid increase in generating capability and the somewhat slower but steady increase in the peak loads, together with the slight reduction in deliveries of firm power to the United States, the indicated reserve on net capability in the 1961-73 period increased each year except 1961, 1963, 1964, 1966 and 1972. The reserve ratio as a percentage of firm power peak load reached a high of 28.2% in 1960 and fell to 13.7% in 1968 but is expected to increase to 18.7% in 1978. Absolute figures are given in Table 13.11.

As indicated in Table 13.12, total electric energy consumed in Canada during 1973, after losses of 9%, showed industrial loads at 54% down sharply from 67% in 1950; farm consumption at 21%, up from 13% in 1950; and commercial consumption had climbed to 16% in 1973, the latest year for which statistics were available, up from 11% from 1950.

While availability of electric energy at reasonable cost is an important element in Canada's industrial growth, in only a few industries is the cost of electric power a key element in economic competitiveness. Energy distribution for industry can be subdivided approximately as follows: one third to the mineral industry (including smelting and refining), one quarter to the pulp and paper industry, one tenth to chemical manufacturing and the remaining portion to all other industrial categories.

The growth among non-industrial customers results from a greater reliance by Canada's population on facilities powered by electricity. Tremendous quantities of electric energy are required, for example, to meet rapidly escalating demands for heating, cooling, lighting, transportation, elevators, electrical appliances and farm machinery. The shift of population from rural areas to cities and towns, where electrical demand is greatest, has also contributed to this growth.

Details of the provincial pattern of electric energy use can be seen in Table 13.13. Of total energy made available in Canada during 1973 more than two thirds was consumed in Ontario and Quebec with all other regions accounting for the remaining one third. The share of total consumption by these other regions has, however, been rising (combined total of 26% in 1960 as against 33% in 1973) and has remained constant in Ontario at 34%. The actual portion of total energy consumed by industry in 1973 ranged from a high of 60% in British Columbia, to a low of 47% in the Prairie region. Domestic and farm consumption remains greatest in the Prairie provinces and Ontario but for different reasons. In Ontario, where the majority of people are urban dwellers, high demand from the large cities accounts for the higher level, while in the Prairies it results from a substantial farming load combined with a normal level of domestic usage.