other end uses. From a modest 133 MW (megawatt = one thousand kilowatts) of generating capacity installed at the end of 1900, Canada's installed hydro capacity rose to 34,266 MW by the end of 1973 and thermal capacity to 20,005 MW (Table 13.11).

Thermal-electric power development in Canada was slow and of relatively minor importance until the late 1940s. The rate of development of hydro facilities, on the other hand, accelerated after the turn of the century when improvements in electric power transmission techniques were introduced and increasing emphasis was placed on the construction of large hydro-electric stations.

During the prosperous 1920s demand for electricity became heavier and the rate of installation increased appreciably. Then, in the depressed conditions of the early 1930s, power demand dropped off but this did not show up immediately as a drop in the installation rate because of the time lag inherent in hydro-electric power development. The completion of hydro projects initiated prior to the depression period accounted for the continuation of the high rate of capacity installations until 1935; thereafter, poor economic conditions in the 1935-39 period resulted in a reduced rate.

The tremendous demand for power for Canada's war industries accounted for the sharp rise in installation of new generating facilities between 1940 and 1943 but construction dropped off from 1944 to 1947. After the war, industrial expansion and rapidly growing residential and agricultural development placed extremely heavy demands on power generating facilities. Since hydro sources alone could not possibly satisfy this demand an extensive program of thermal plant construction began in the early 1950s until, by 1956, thermal generation represented 15% of installed capacity. Since then, the annual installed capacity has averaged 56% hydro-electric with the remainder in thermal generation. At the end of 1973 thermal generation accounted for 37% of Canada's installed capacity.

Thermal power generation may use fossil fuels or nuclear fuels as the source of energy. The fossil fuels — coal, gas or oil — can be obtained from domestic sources in some parts of Canada but nuclear fuel is becoming an increasingly important source of energy for thermal power generation. Nuclear power will be especially attractive for regions where fossil fuel costs are relatively high and where the power system permits the use of very large generating units which show the best economic advantage for nuclear plants. The CANDU reactor system, which provides the heat source for Canadian nuclear plants, allows the use of natural uranium mined and processed in Canada.

13.7.2 Hydro-electric power generation

Hydro-electric generation forms a significant though decreasing part in Canada's electrical development. By the end of 1973, the hydro portion of the country's total generating capacity had fallen to 63% from over 90%, 20 years earlier.

In view of the vast water resources existing throughout Canada, there would appear to be many undeveloped sites that could be potential sources of hydro-electric power. It is not sufficient, however, to assume that all of these possibilities represent economically viable sources of electric power. In fact, only a very minor portion of the sites with a theoretical power potential can actually be developed competitively. Before a site can be termed a source of potential power, a detailed analysis of such factors as cost, geography, geology and ecology must be performed. Until such a study is completed on a national scale, estimates of Canada's undeveloped water power resources (recently estimated to be in excess of 60,000 MW), may be misleading.

Figures of water power resources already developed are given in Table 13.11 and are based on the manufacturer's rating in kilowatts as shown on the generator name-plate, or derived from the electrical rating. The maximum economic installation at a power site can be determined only by careful consideration of all the conditions and circumstances pertinent to its individual development. It is normal practice to install units having a combined capacity in excess of the available continuous power at Q50 (flow available 50% of the time), and frequently in excess of the power available at Qm (arithmetical mean flow). There are a number of reasons for this. The excess capacity may be installed for use at peak-load periods, to take advantage of periods of high flow, or to facilitate plant or system maintenance. In some instances, storage dams have been built subsequent to initial development to smooth out fluctuations in river flows. In other cases, deficiencies in power output during periods of low flow have been offset by auxiliary power supplied from thermal plants, or by interconnection with