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, contributed to this growth.

Details of the regional pattern of electric energy use can be seen in Table 13.13. Of total energy made available in Canada during 1974 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 1974) and dropped from 34% in Ontario to 33%. The actual portion of total energy consumed by industry in 1974 ranged from a high of 51% in British Columbia and Quebec, to a low of 28% 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.

Part of Canada's growing need for electric power reflects a growth in population but per capita consumption increased 5.3% to 11 900 kWh in 1974, up more than 95% since 1960. The Atlantic provinces experienced the largest increase, 242% to 8 900 kWh per capita, followed closely by the Prairie provinces with 197% to 9 200 kWh. The lowest over the period was in BC with only a 70% increase to 14 100 kWh per capita. Quebec recorded the highest per capita consumption in 1974, 14 900 kWh. Table 13.14 sets out details of this per capita consumption by region.

Electric power transmission 13.6.6

Loads handled by small, widely scattered generating systems in the early days of the electric power industry did not warrant the expense of interconnecting power systems. However, as demand for dependable electric power increased and as improved techniques reduced power transmission costs, the benefits of integrating power systems to achieve reliability of service and flexibility of operation were reappraised. Today, most of Canada's generating stations are components of large, integrated, and often interconnected, power systems operated by power utilities.

Research in power transmission has developed techniques enabling power producers to utilize hydro-electric sites previously considered beyond economic transmission distances. Most noticeable, perhaps, is the progressive stepping-up of transmission-line voltages. A number of transmission lines are designed for operation at 500 kilovolts (kV) and 735 kV. A 574-mile (924 km), 500-kV line is in service to carry power from the Peace River to the lower mainland of British Columbia. In Ontario, a 435-mile (700 km), 500-kV line carries power from hydro-electric plants in the James Bay watershed to Toronto. In 1965 Hydro-Québec achieved world leadership when power was carried for the first time at 735 kV over the 375-mile (604 km) transmission line linking Quebec's Manicouagan–Outardes hydro complex with the urban demand centres of Quebec and Montreal. By the end of 1971, the initial program for 1,228 miles (1 976 km) of the 735-kV line had been completed, and three 735-kV circuits connecting the Churchill Falls generation station to the Hydro-Québec grid are now in service.

Most power is transmitted as alternating current but there are three applications of high-voltage direct-current (HVDC). In service in British Columbia