other plants which operate under different load conditions or are located on rivers with different flow characteristics.

The extent to which the installed capacity exceeds the available continuous power at the various rates of flow is dependent upon the factors that govern the system of plant operation, and varies widely in different areas of the country.

The distribution of installed hydro-electric generating capacity given in Table 13.11 reveals that substantial amounts of water power have been developed in all provinces and territories except Prince Edward Island. As natural-resource development proceeds, the fortunate incidence of water power in proximity to mineral, forest and other resources becomes increasingly apparent. The existence of large amounts of potential hydro power on northern rivers may well prove to be a factor of prime importance in the eventual realization of the natural wealth of the Canadian North.

The water power resources of Nova Scotia and New Brunswick, although small in comparison with those of other provinces, are a valuable source of energy and make a substantial contribution to the economies of the two provinces. Numerous rivers in both provinces provide moderate-sized power sites either within economic transmission distance of the principal cities and towns or advantageously situated for use in development of the timber and mineral resources. These provinces have, however, turned to thermal generation initially coal fired but now increasingly utilizing oil; also, plans are well advanced for development of nuclear generation in New Brunswick.

13.7.3 Thermal power generation

The incidence of immense water power resources in Canada and the brisk pace of their development has tended to overshadow the very considerable contribution being made by thermal energy in the nation's power economy. The fact that energy produced in thermal plants during the year accounted for only 37% of the total may be attributed in part to the fact that a considerable amount of the capacity installed is operated for peak-load duty, with hydro-electric capacity providing base-load generation. This pattern will change with the introduction of additional nuclear-fuelled thermal generation plants which can be operated economically at high capacity for base-load purposes.

Conventional thermal power. Over 90% of all thermal power generating equipment in Canada is driven by steam turbines. The magnitude of loads carried by steam plants combined with the economies of scale has led to the installation of steam units with capacities as high as 540 MW, and units in the 800-MW size range have been committed for as early as 1975. Additions of these larger units are, however, only possible where systems are large enough to accommodate them. Additional types of thermal generation are provided by gas turbine and internal combustion equipment. The flexibility of internal combustion engines makes this type of equipment particularly suitable for meeting power loads in smaller centres, especially in the more isolated areas. Gas turbines are frequently used for peak loads where their rapid start-up ability is an advantage.

Table 13.11 shows that thermal generation is predominant in Prince Edward Island and Nova Scotia. By the end of 1971, the Yukon Territory had joined the Northwest Territories, Alberta, Saskatchewan, Ontario and New Brunswick in having greater than one half of their total capacity thermal-electric. It is expected that thermal generation will become increasingly predominant in Ontario. Although coal is still the most important fossil fuel for thermal plants in Nova Scotia, oil is rapidly becoming the preferred choice for thermal power generation in all of the Atlantic Provinces.

Nuclear thermal power. Commercial electric power generated from the heat of nuclear reaction became a reality in Canada in 1962 when the 20 MW Nuclear Power Demonstration (NPD) station at Rolphton, Ont., fed power for the first time into a distribution system in Ontario. The NPD station was a forerunner of a series of large nuclear stations that will shoulder more and more of Canada's rapidly growing power loads.

Atomic Energy of Canada Limited, a federal Crown company incorporated in 1952, has concentrated its efforts on the development of the CANDU reactor which uses natural uranium as a fuel and heavy water as the moderator. By using heavy water as the moderator, a high energy yield can be obtained from natural uranium and, since natural uranium is a low-cost nuclear fuel, the cost of fuel is a minor component in the cost of producing power. Natural