

well as the first large steam plants in Ontario.

In the Prairie Provinces, a good deal of the twofold rise in generating capacity has consisted of thermal plants (now in part using the abundant resources of natural gas); however, sizeable additions to hydro-electric capacity have been made on the Winnipeg River to serve southern Manitoba and in the Alberta foothills to serve the Calgary area. The Atlantic region has also leaned heavily on expansion of thermal facilities, but a number of small hydro sites have been developed and the first stage of the Beechwood project on the St. John River has now been completed.

The capital investment expenditures involved in this vast programme, spanning the country and ranging all the way from the most ambitious hydro-electric undertakings to small diesel installations in the north, have of course been enormous. In the past eight years alone something like \$4 billions has been spent on additional generating capacity and transmission lines -- some 8 per cent of total capital expenditures in this period. Last year, the outlays reached a record \$778 millions, almost 9 per cent of the total, and roughly half as much as was spent by all the manufacturing industries together.

It is of some interest that the electric power industry has relied considerably less on foreign capital than some of the other resource industries. Apart from the power installations developed by such industries as pulp and paper and aluminum primarily for their own use (roughly one-fifth of total installed capacity), the major share of the capacity is publicly owned and the largest of the privately-owned utilities are owned and controlled in Canada. By and large the expansion of the utilities has been financed by plowing back earnings and through the sale of bonds, the major share on the domestic market, though there have been some large issues marketed in the United States.

In terms of demand for labour and materials, additions to power capacity have had a major impact on the economy. Construction of a big hydro project may take up to five years. If it is in a remote area, roads and other facilities must be built in addition to dams, reservoirs, penstocks and power houses. Some postwar undertakings have required the diversion of rivers and the construction of tunnels, and the potential of others has been increased by the provision of extensive storage basins. Thus large installations, which when completed require comparatively few workers to operate, may well require thousands of construction workers to build.

The massive requirements of power projects for cement and for sand and gravel are obvious. Indeed, rising demands from this quarter have been an important factor in the sharp growth of the cement industry since the war. Significant, too, have been the requirements

for steel of many kinds as well as for copper and aluminum. One has only to think of the thousands of miles of new transmission and distribution lines threading their way across the landscape to grasp the magnitude of this demand. Of the very large quantity of heavy electrical equipment required, some has been imported, notably certain types of custom-built steam generators, but a great deal of it has been made in Canada and has provided a major stimulus to the Canadian electrical manufacturing industry.

#### CHANGING CONSUMPTION

The large proportion of total electric power consumption accounted for by the resource industries has historically been one of the most striking features of the Canadian electric power picture. In the mid-thirties, the pulp and paper industry consumed over 40 per cent of all the electricity used in Canada. This industry is still the largest single consumer of power, but partly because it now uses less power in proportion to its output than it formerly did, and partly because other uses of power have increased so sharply, its consumption now represents only around 20 per cent of the total. Meanwhile, however, consumption of power for metal smelting and refining has forged ahead. And these two industries, together with mining, account for over 40 per cent of the total.

The aluminum industry stands out as a heavy user of power and its growth has been largely responsible for the sharp upward trend in power use by the metal-smelting group. The search by this industry for big power sites away from settled areas and near tidewater led to the great Kitimat project. In the east, a further major hydro development is under way on the Peribonca River to serve the longer-established plants in the Saguenay Valley. And the building of a new aluminum smelter at Baie Comeau, on the north shore of the St. Lawrence, has meant the expansion of facilities on the Manicouagan River.

Apart from the impressive localized growth associated with the aluminum industry, development of forest and mineral resources has been pushing up the demand for power all across the country. Hydro power has been developed to serve the new iron ore industry in Quebec-Labrador, is supplied to the titanium smelter at Sorel from the St. Maurice River and flows from the large Bersimis project by cable under the St. Lawrence to the Gaspé Peninsula and the copper smelter there. In the Lakehead area of Ontario requirements for power have increased by nearly 300 per cent since 1945, reflecting sharply rising production of iron ore, the opening of new base-metal mines and growth in the pulp and paper industry. To the east, expansion at Sudbury and the opening up of new uranium areas have added to the power load. In northern Manitoba, an essential part of the nickel development now