

(c) Transmission-lines.

Work under this section was mainly associated with 110 k.v. line Timaru—Oamaru—Dunedin, and duplication of 110 kv. line Hororata to Ashburton.

(d) General.

The plotting of operating data for the various systems including lake-level and river-flow data, maximum loads and weekly outputs for generating-stations, maximum demands and consumption of energy for the local-supply authorities and other major consumers, was continued throughout the year.

B. Hydraulic Section.*(a) New Work.*

Proposals were developed to secure control of the flow from Lake Waikaremoana by piercing a tunnel 65 ft. below the surface of the lake. This will not only allow the full capacity of the existing plant to be utilized but will provide water for the third unit for which specifications are being prepared.

Extensive boring and grouting operations have been carried out to render the country impervious through which the tunnel will be driven.

(b) Maintenance.

New surge-chamber gates at Mangahao have been fitted with remote-control equipment and with an automatic closing-device which will function with excessive flow in the penstocks. This should prevent a major disaster in the event of a pipe-burst or earthquake.

The pipe-distribution system at the bottom of the penstock at Mangahao has been remodelled and tests show a substantial gain in head as a result of these operations.

(c) Tests.

Satisfactory turbine and governor tests to specification were carried out on one of the Waitaki units in March, 1935.

(d) Statistics of River Flow.

Statistics have been kept of developed and undeveloped streams, and these have been charted up ready for use. Duration curves on "probability" graph paper have also been prepared for twenty-two rivers.

(e) Investigation of Power Resources.

Preparation of drawings embracing the Waikato power-survey has proceeded steadily, but definite recommendations for future development have not yet been made.

ELECTRIC-POWER BOARDS.

There are now forty-five districts constituted, and forty-one (including Westland Power, Ltd., operating under delegated license) actually carrying out the distribution and sale of electrical energy (August, 1935). The total area covered is 78,968 square miles, or 76 per cent. of the total area of the Dominion (103,415 square miles); (the total population concerned is 1,076,051 or 69·5 per cent. of the total population (1,553,005) of the Dominion) and the unimproved value of the land included in the electric-power districts and outer areas is £249,357,348, or 80·5 per cent. of the total unimproved value of the Dominion (£309,770,390).

So far only one of the four main cities—viz., Auckland—has been included in the inner area of a power district, but of the secondary centres the cities of Wanganui, Palmerston North, and Invercargill, and the Boroughs of Timaru, Napier, Hastings, Blenheim, Greymouth, Gisborne, and Oamaru, are included. The advantage of Power Board organization is more obvious to rural than to urban rate-payers, and yet the above position indicates that some of the more important centres have realized that it is to their advantage generally to be associated with the country in undertaking the work of reticulation of electric power on a comprehensive scale.

Table VIII gives details of the gazetted date of constitution, the area, population, and rateable value of each of forty-five power districts already formed, also the amounts of the loans already authorized, and the voting on each poll taken. The total amount of the loans authorized by the forty districts which have taken their polls is £13,766,625. The population of the districts concerned is 943,964, so that the loans authorized amount to £14·58 per head of population, as compared with £14·5 last year. The unimproved valuation of the districts is £219,322,780, the loans authorized amounting to 6·28 per cent. of the unimproved rateable value of the lands pledged as security for the loans. The voting at the polls totalled 69,720 for and 12,409 against the loan proposals.

Table X shows the capital outlay incurred by each Board up to the end of the financial year 1934–35, together with the revenue and annual expenditure.

The total capital outlay by the forty Boards which are in operation is £14,120,490, practically all of which is on works in service. The gross revenue from the sale of electricity by these Boards was £2,252,109. The general result is a profit over the whole business of the Power Boards of £129,799 for appropriation to reserve funds, &c., after paying working-expenses and capital charges for interest, sinking fund, and depreciation.

During the last year five of the Boards struck a general rate, which was collected in all cases, and one of the Boards struck special rates for the security for loans, which were collected in this case.