SESSION II.
1918.
NEW ZEALAND.

HYDRO-ELECTRIC DEVELOPMENT.

NORTH ISLAND SCHEME.

Laid on the Table of the House of Representatives by Leave.

REPORT BY THE CHIEF ELECTRICAL ENGINEER TO THE HON. SIR W. FRASER, MINISTER OF PUBLIC WORKS.

OUTLINE OF THE SCHEME OF DEVELOPMENT.

THE scheme of development herein advocated as regards the sources of power is practically identical with the scheme advanced in my interim report* on this subject. Briefly, it comprises the development of three principal power sources—viz., Mangahao, Waikaremoana, and Arapuni—with the reservation that the construction of the dam required for the latter may be found impracticable, or at least inadvisable, when the character of the foundations has been more definitely determined by tests, in which event Arapuni would be replaced by Aratiatia, which is the next in order of merit as regards size and location.

Of the three sources, Mangahao is the best situated in respect to the load, and it is to be regretted that this source is not capable of yielding a larger amount of power. The general scheme falls short of the ideal in two other respects—viz., the lack of a moderately large source of power in the Taranaki district, and a similar lack in the Whangarei district. If it were possible to obtain 50,000 horse-power or more from Mangahao, and if a source of about 20,000 h.p. in the Taranaki district and one of about 10,000 h.p. in the Whangarei district were available, the scheme herein outlined would be materially improved; but the ideal is never attained, and the scheme here advocated is the best under the circumstances, and, while being adequate, economical, and eminently practicable at the stage described, can be still further developed and enlarged as required.

It is recommended that in the interest of national economy and production the scheme should be planned in such a manner and on such a scale that a supply of power shall be available, with the co-operation of the local authorities, for every householder in the North Island, and for any industry requiring the supply of power, temporarily or otherwise; for main-line electrification, light railways, coal and other mines, for winding, pumping, ventilating, and smelting, and for any other purpose.

In order to provide for the requirements outlined above a total substation load of 130,000 h.p. is necessary, requiring a plant capacity in the main power-stations of 160,000 h.p., allocated as follows—viz.: 96,000 h.p. at Arapuni, 40,000 h.p. at Waikaremoana, and 24,000 h.p. at Mangahao. The power to be provided is equivalent to one-fifth of a horse-power per head of the present population of the North Island, which provision is ample for ordinary requirements, but not sufficient for such extraordinary developments as have taken place in Tasmania. The sources mentioned have, however, greater potentialities than it is proposed to develop under the present scheme, which can be developed later to satisfy extraordinary demands for power over and above those now provided for. The route length of transmission-lines is 1,421 miles, and the number of primary substations is twenty-nine. The location of the power-stations and the primary main-line substations, together with the routes of the primary transmission-lines, is shown on a map attached to the report. The system of transmission as designed, together with a system of distribution radiating from the main substations, is sufficient to ensure a supply of power to the whole of the Island. The distribution system allowed for cannot be shown on the present map.

* "Hydro-electric Development: North Island Scheme." Public Works Statement, 1917, Appendix E, p. 49.