

SESSION II.
1906.
NEW ZEALAND.

UTILISATION OF WATER-POWER

(REPORT ON).

Laid on the Table of both Houses by leave.

Public Works Department, Wellington, N.Z., 22nd October, 1906.

I HAVE the honour to report on the several proposed water-power schemes for which surveys have either been completed or are now practically so.

I have dealt in each case with the scheme as it would be if fully developed for full-time and for half-time working when storage is available. Each scheme can be partially developed at first where this course seems justifiable, but the works executed in each case should be parts of the completed scheme, as decided on. It is, however, an uncertain matter to determine years in advance how many hours per day any scheme will be worked in the future, and to proportion the size of the necessary conduit. It is improbable that any scheme designed to supply the general demands of a city or district for power will work either wholly full time, or a great part—say, eight hours per day. I have taken twelve hours per day, or 4,380 hours per year, as the average part-time working. This is, I think, as good an approximation as can be arrived at for the present.

ROTOITI, KAITUNA, ETC.

The schemes possible at Rotoiti appear to be more promising than the Huka or other Waikato schemes. Much higher falls are obtainable, and a much less quantity of water has to be handled. Their adverse feature is the longer length of conduit required, and the consequent increased cost of partial development. When fully developed any of the larger schemes on the Kaituna should be able to supply power to the Thames and Auckland districts at considerably less cost than at Huka.

There are quite a number of possible ways of taking a conduit from Rotoiti; these are given in the list below. It does not, however, appear possible, by taking a conduit along the Kaituna or Pokopoko, to get all the 914 ft. of fall available between the lake-level and the sea. Whether better results could be got by diversion to the Pongokawa has not been tried, but the conduit would be very much longer and more costly; and as nearly 800 ft. fall can be got on the Kaituna, it is not likely much better results could be got on the Pongokawa.

The country immediately to the east of Lake Rotoiti is very broken; this and wet weather has delayed the completion of the survey, which must necessarily be exhaustive in view of the magnitude of the issues involved.

It is not permissible to build a dam at Okere to store all the flood-water by raising the lake-levels. The intake can be put at about 20 ft. below the low-water level of Rotoiti; this will give a large storage-volume, and a further large quantity can be stored in Rotorua Lake between the ordinary fluctuations of the levels of that lake—about 3½ ft. Possibly the storage so got may generally be sufficient.

The best place found for the construction of an intake is in the bay opposite the head of the Pokopoko. The water in the bay leading to Okere is too shallow, though an intake at a suitable depth can be made. It would be more costly work than at the other point where the necessary depth is got in a very short distance.

The routes for conduits examined are as follows:—

Starting-point.	Distance Intake to Power- station.	Total Fall.	Power, Twenty-four Hours per Day.	Designation of Power-station.	Probable Cost.
	Miles.	Ft.	H.p.		£
Okere	2½	325	18,000	...	570,000
"	4	484	28,000	...	650,000
"	5½ (?)	530	30,500	Hururu ...	690,000
Pokopoko	6½	595	36,000	Te Akau ...	750,000
"	8	784	45,000	Kohangakairea	1,250,000
"	3	250	13,000	Pokopoko ...	400,000