to dispose of this output the transmission and distribution system would have to be extended at a cost of probably another £600,000. The total cost of the whole system for 120,000 kw. at Arapuni and 10,300 kw. at Horahora would then be £5,170,000, including £410,000 for interest during construction. The annual cost would then be—

	£
Working-expenses	50,000
Interest on £5,170,000 at 5·2 per cent.	269,000
Renewals and depreciation on £4,760,000 at 2 per cent. ..	95,000
Sinking fund on £5,170,000 at 1 per cent.	52,000
	£466,000

All this, of course, relates to the position prior to the discovery of the crack that caused the plant to be closed down.

It was anticipated that without making any concessions to consumers, the whole of the 130,000 kw. would have been taken up by 1940 and sold at an average cost of £6 10s. per kilowatt year, giving a total annual income of £845,000, as against £166,000 actually required to cover all costs at that time, leaving a margin of £379,000 per annum to pay for contingencies and to make good any losses or sinking-fund arrears that might possibly have accrued in the earlier years of operation, or, alternatively, to enable reductions in charges to consumers.

Taking the whole system for the purposes of the present discussion as being confined to 70,000 kw. at a cost of £3,970,000, including £360,000 for interest during construction, the annual charges for interest at 5·2 per cent. and depreciation at 2 per cent. would be £279,000, and working-expenses £45,000—a total of £324,000 per annum. There is very little doubt that within a very short time after resumption of operation, without any great increase in the transmission capital costs, the whole output of 70,000 kw. could be sold at an average rate of £6 10s. per kilowatt a year, which would give an income of £455,000. This, after paying a sinking fund of 1 per cent., equal to £40,000, and the £324,000 above referred to, would leave £91,000 per annum, or sufficient to meet any small losses during the period the station would be gathering full load, and the interest and other charges on a further capital expenditure of £1,100,000 without increasing the plant capacity. On the assumption that repairs could be completed at Arapuni by 1st April, 1932, and allowing £210,000 for interest on Arapuni headworks during the intervening period to be capitalized, and other capital charges deferred until operating is resumed, it appears that the Government could spend up to £890,000 on repair work and still look for financial success, even with only four units installed instead of eight. Even if the full £890,000 had to be spent, which is unlikely, the position about 1936 would be—

Total capacity of Horahora and Arapuni, 70,000 kw.

Capital cost—

		£
Ordinary expenditure to 4-unit stage at Arapuni	.. ..	3,970,000
Deferred interest charges during repair period ..	.. ..	210,000
Loss between 1932 and 1936 until full load is reached	.. ..	100,000
Cost of extraordinary repairs	.. ..	890,000
		£5,170,000

Capital charges on above—

		£
Interest at 5·2 per cent. on whole amount	.. .. ..	268,600
Sinking fund at 1 per cent. on whole amount	.. .. ..	51,700
Renewal provision on £4,500,000 at 2 per cent. ..	.. ..	90,000
		410,300
Working-expenses	.. ..	45,000
Total annual costs	.. ..	£455,300

Annual income (70,000 kw. at £6 10s.), £455,000.

As any further machines could safely be installed at a capital cost for power-station and distribution of about £20 a kilowatt, the annual return from their operation would be something like 25 per cent. per annum on cost when fully loaded, and there is no need to further pursue that aspect of the case.

These conclusions have taken no account of the cost of installing or operating steam or other similar plants to carry the load in the meantime, as whatever is done at Arapuni will not affect the necessity for their erection.

Should the whole of the Arapuni headworks, costing to date, as set out above, the sum of £2,280,000, be abandoned, the annual interest charges at 5·2 per cent. and sinking fund 1 per cent. would amount to £141,000 per annum for thirty-seven years, which annual amount would require to be found either from the general Consolidated Fund or an extra charge to the users of electricity from other works. In addition, there would, of course, be the unassessable loss to the country, and to the Auckland Province in particular, through the impossibility of supplying cheaper electricity for the several years that must elapse before some other water-power scheme could be completed to replace Arapuni.

F. W. FURKERT,
Engineer-in-Chief and Under-Secretary.

22nd August, 1930.