

The "system total" of units generated and purchased increased from 100,075,668 to 104,992,762. The diversity factor, exclusive of power supplied to Auckland and of connected load in Auckland, is 4.85, as compared with 4.1 last year.

Horahora.

There were no extensions at Horahora during the year.

Additional Transmission-lines.

Ngongotaha—Edgcumbe—Waiotahi 50 kv. Line.—This line was completed and placed in service in June, 1928.

Hamilton—Huntly 50 kv. Line.—Except for short gaps at the two ends, this line was completed during the year. Special narrow-base towers have been ordered for the Hamilton end, provision being made for these to carry more than one circuit, so as to minimize interference with property.

Arrangements are being made to build a new 50 kv. line from Half-way, on the Horahora—Waikino line, to Waihou and thence to Paeroa (total length about twenty-four miles), to improve supply to Waihou, Waikino, and Kerepehi Substations.

Arapuni—Penrose 110 kv. Steel-tower Line.—This line was completed last year, but examination of the foundations this year showed that a number of them in the heavy clay country had water or wet clay in the bottoms of the holes. In a number of cases the holes were dug out and refilled, and in others holes were bored down to the bottom and broken rock rammed around the grillage.

Substations.

Penrose (110/22 and 22/50 kv.).—General construction work which had been almost at a standstill during the erection of the Diesel plant was resumed. Outside, the 110 kv. steel structure was extended, and was nearing completion at the end of the year. The runways were extended and pads installed for the new 30,000 kv.a. bank of transformers. Cable-ducts were constructed for control cables and all rockwork and concreting completed. All 22 kv. cables were laid and connected up and a start made on running the control cables to the various O.C.B.s. The main 110/22 kv. and 22/50 kv. transformers were completed and tested out under voltage. The synchronous condenser-transformers were completed and connected up, but have not yet been used. The 110 kv. O.C.B.s were completed, and the erection of the remaining O.C.B.s nearly completed. A protective fence was erected round the whole of the outdoor apparatus, with a special fence round the lightning-arresters. Inside the building the switch-gear was completed, and was livened up on the 21st February, the Power Board making use of the gear subsequently. The synchronous condenser (10,000 kv.a.) was erected, but has not yet been dried out. A control board was erected for the control of the 110 kv. outdoor equipment. Practically the whole of the equipment has since been tested out and put into service.

Bombay (110/50 kv. and 50/11 kv.).—Work on the permanent equipment was continued throughout the year. The outdoor steelwork was completed in April, and all apparatus, insulators, and bus-bars erected and connected up. Four 1667 kv.a. 110/50 kv. transformers were transported by road from Auckland, dried out, and assembled in position. Four 500 kv.a. 50/11 kv. transformers were also installed, and have been carrying the Franklin Power Board load since the 16th December. Five 110 kv. and two 50 kv. O.C.B.s were erected, lined up, dried out, and filled with oil ready for service. The whole of the permanent 50 kv. gear, including the oxide-film arresters on the Waikino line, has been in service since the 16th December. Inside the building five 11 kv. cubicles have been erected complete with isolators and metering for the supply of the Franklin Power Board. A control board with mimic bus diagram for the control of all the outdoor gear is complete, and batteries for operating trip circuits and the motor-operated O.C.B.s are installed. A 10-ton electric crane was erected in the workshop. The old temporary substation has been partly dismantled, but the 50 kv. air-break switches are being retained until the 110 kv. wood-pole line is required for use at 110 kv. The three 250 kv.a. transformers from the temporary substation are being moved to Te Awamutu.

Hamilton No. 2 (110 kv.).—The extra steelwork for the incoming O.C.B.s arrived in May and was erected. The four 110 kv. O.C.B.s arrived in July, and have been erected and dried out. A thorough overhaul of all the apparatus was made, and the substation left ready for service. A protective fence round the structure has still to be completed.

Hamilton No. 1 (50/11 kv.).—The new workshop was completed, and has been of great use. It consists of a covered gantry portion extending over the railway-siding, with a pit for handling transformers. The old crane from Horahora was shortened and erected in the gantry. The building was further extended by a wing similar in size to the original workshop, and has provided much-needed room for storing heavy cases and transformers, and also provides accommodation for the transmission-line repair equipment. A new concrete test-room building has been completed, taken over from the contractors, and equipped.

Waikino (50/11 kv.).—Construction work at Waikino continued with the arrival of the seven new 1,000 kv.a. 50/11 kv. transformers. These were dried out and installed, the first bank being put into service on the 24th June, and the second on the 5th August. The old arresters on the Bombay line were dismantled and a new oxide-film arrester erected in their place. Improvements were made in the control-room lighting and in keeping dust out of the condenser-room. The old transformers were railed to Hamilton No. 1 to be overhauled and one bank converted for outdoor use at Gisborne.

Waihou (50/11 kv.).—Four new 750 kv.a. transformers were installed in place of seven 250 kv.a. transformers. The work was commenced at the end of May, and completed on the 12th June. The new bank is connected delta-star and on the 11 kv. side will parallel with Waikino and Kerepehi over the Thames Valley 11 kv. lines. The old transformers which were connected delta-delta were