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The National Grid is the nationwide system of electric power transmission in New Zealand. The grid is owned, operated and maintained by Transpower New Zealand, a state-owned enterprise, although some lines are owned by local distribution companies and leased to Transpower. In total, the national grid contains 11,803 kilometres (7,334 mi) of high-voltage lines and 178 substations.

Much of New Zealand"s electricity generation is hydroelectric, the majority of which is from power stations on lakes and rivers in the lower half of the South Island, while most of the electricity demand is in the North Island, in particular, the Auckland region. Consequently, large amounts of electricity need to be transmitted long distances from power stations to electricity users, including transmission across Cook Strait through the HVDC Inter-Island link.[1]

Investments in new transmission are regulated by the Electricity Commission and the Commerce Commission. In a news release in January 2012, the Commerce Commission reported that Transpower was planning to invest $5 billion over the next 10 years in upgrades of critical infrastructure.[2]

Initial use of electricity in New Zealand was associated with mining. The first industrial hydro-electric power plant was established at Bullendale in Otago in 1885, to provide power for a 20 stamp battery at the Phoenix mine. The plant used water from the nearby Skippers Creek, a tributary of the Shotover River.[3][4] There was a two-mile-long (3.2 km) transmission line from the generating station to the stamping battery.[5]

The first transmission line constructed by the government was associated with the Okere Falls Power Station near Rotorua. Electricity was transmitted at 3.3 kV over a 13-mile (21 km) route to Rotorua, and was used to drive sewage pumps, and some public buildings including five thermal baths.[6]

The first major transmission line in the North Island was constructed in 1913-14, connecting the Horahora hydro station to Waikino to meet the power requirements of the stamp battery 5 miles (8.0 km) further on at the Waihi gold mine. The line length between Horahora and Waikino was 45 miles (72 km), and the transmission voltage was 50 kV, which was to set a precedent for North Island transmission voltage for many years.[7]

The first major transmission line in the South Island was constructed by the government as part of the Coleridge hydro station development and was commissioned in 1914. Two transmission lines operating at 66 kV carried the power from Coleridge over a distance of 65 miles (105 km) to Addington in Christchurch.[8]

The State Hydro-electric Department was established in 1946 to oversee the development of electricity

generation and transmission to meet rapidly growing demand. Nelson and Marlborough were the last regions to join the national grid system when a transmission line between Inangahua and Stoke was completed in 1956.

The construction of the 220 kV network began in the early 1950s, initially connecting Auckland and Wellington to the Waikato River dams, and Christchurch to Roxburgh Dam. The first North Island 220 kV line was commissioned between Maraetai and Whakamaru in October 1952, and the first South Island 220 kV line was commissioned between Roxburgh and Islington in July 1956.[9]

In 1958 the State Hydro-electric Department was changed into the NZ Electricity Department (NZED), reflecting the development of thermal generation to supplement the hydro-electric schemes.

The electricity systems of the two islands were joined together by the HVDC Inter-Island link in 1965, connecting Benmore in the South Island with Haywards in the North Island. The original link used mercury arc valve converters and was rated at 600 MW. It was the first HVDC link to be commissioned in the Southern Hemisphere.[10]

In 1978, the Electricity Division of the Ministry of Energy was established to integrate the state-owned electricity generation and transmission business with the oil, gas and coal businesses of the government owned energy sector.