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Story: Hydroelectricity

Page 1. Hydroelectricity development

Hydroelectricity has been central to meeting New Zealand's energy needs since the early 20th century. In 1924 hydro generation was less than one petajoule (a petajoule is equal to 277.7 gigawatt-hours of electricity). From the late 1920s hydro generation dominated electricity supply; in the mid-1990s it supplied three-quarters of all electricity. In 2007 hydro generated 83.8 petajoules – 54.9% of the total electricity generated in New Zealand.

From the late 20th century environmental factors were considered increasingly important. The generation of hydroelectricity produces no carbon dioxide (a greenhouse gas) and uses a renewable resource, water. Hydro contributes a very large proportion of New Zealand's renewable energy: in 2007 hydroelectricity supplied 82.5% of the 101.7 petajoules of energy generated from renewable sources.

Country for hydroelectricity

The generation of hydroelectricity requires a substantial and reliable water source, and a drop in altitude – water speeds down waterways and drives turbines that generate power.

Much of New Zealand's terrain is mountainous, particularly in the South Island. Close to three-quarters of the land is either mountainous or steep hill country, with another 15% hill or downland; only 11% is plains or plateaus.

The country has a temperate climate, and high rainfall. The long, narrow North and South islands lie roughly northeast–southwest across the path of westerly weather systems known as the roaring forties, which convey moist air across the ocean. Volcanic mountains in the central North Island, and the chain of the Southern Alps in the South Island are a barrier to moist airstreams, and cause high rainfall. These areas provide excellent catchments and run-off.

Hydroelectricity and the state

Hydro development in New Zealand involved public works, and the control and use of water rights by the state, because of the scale of developments, the high levels of financing, and the central role adopted by the state in development of infrastructure and natural resources.

Lighting up Rotorua

The state first entered the field of electricity generation in an unexpected way – lighting up the and booming tourist and spa of Rotorua in 1901. On 20

Early hydroelectricity

From the early 1880s to 1901 the state was not involved in hydro developments. In 1886 a gold-stamping battery at Bullendale in Central Otago had a small hydro plant.

Hydro plants were also used in the South Island for river gold-dredging in the 1890s, and at Thames in the North Island for gold mining. Freezing works and factories were powered by hydro.

May the railway station, baths and sanatorium were electrically lit for the first time, prompting one observer to say that the headlight of an incoming train 'pale[d] into insignificance when approaching the station'.¹

In 1888 Reefton was lit by the first public supply of electric lighting, provided by a small hydro station on the Inangahua River. In Wellington in 1889 some electric lighting was briefly provided by a hydro plant driven by the city's water supply, before a steam-driven plant was installed.

Small municipal hydro schemes were run by local authorities or private enterprise. In Taranaki, where there were many streams to be harnessed, such schemes proliferated. The first large-scale hydro plant was at Waipori, for the city of Dunedin, in 1907 – a gorge provided an ideal site for power generation.

Footnotes:

1. Neil Rennie, *Power to the people*. Wellington: Electricity Supply Association of New Zealand, 1989, p. 52.

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