

# Hydro dams



## Top of the class

The Roxburgh dam was by far the largest hydroelectric scheme in New Zealand when building started in 1949. At its peak 1,400 men worked on the construction, which used half a million cubic metres of concrete. It took seven years to build and a further six before it was fully commissioned.



## Jargon hunter

**Watt:** A watt is a measure of power (energy use). One watt is equivalent to one joule of energy per second.

**Megawatt:** One million watts.

**Kilowatt:** One thousand watts.

**Kilowatt hour:** The number of joules of energy equivalent to the power of one kilowatt running for one hour. Your electricity usage on your power bill is generally quoted in kilowatt hours.



## Digging deeper...

### Dealing with floods

The Roxburgh dam has three spillways (overflows for excess water) with a maximum capacity of 4,248 cumecs (cubic metres of water per second). The Clyde dam has four spillways with a maximum capacity of 5,240 cumecs. The highest flow rate recorded to date is about 3,300 cumecs at Roxburgh.



## Stat attack

**Roxburgh dam:** height 76m, annual power generation 1650 gigawatt hours, area of hydro-lake 6km<sup>2</sup>

**Clyde dam:** height 100m, annual power generation 2100 gigawatt hours, area of hydro-lake 26.4km<sup>2</sup>

Hydroelectricity was first produced on the Clutha River through small local plants, associated with goldmining in the late 19th and early 20th century. New Zealand's largest river now produces about 10% of New Zealand's electricity through the Roxburgh and Clyde dams.

In 1947, Roxburgh was selected as the site for the first major hydroelectric power scheme on the Clutha. The dam was finished in 1956, is 358m long and 61m wide at its base and has eight turbine-generators with a generating capacity of 320 megawatts. It produces enough electricity to power about 200,000 homes.

The brainchild of Robert Muldoon's 'Think Big' strategy, the Clyde dam was a highly controversial project. At the time, many questioned whether it was even needed, and the flooding of the valley upstream of the dam meant many orchards and houses were to be lost, including in the town of Cromwell. The project also ran considerably over budget and over time because of the rock around and upstream of the dam containing microfractures, which needed to be filled with cement. Construction began in 1977, with the dam finally commissioned in 1992.

Today the dam provides the backdrop to the township of Clyde while the lake behind the dam is a major recreational asset for boating, rowing, fishing and watersports. The dam measures 490m across, and has a width of 10m at its crest and 70m at its base. It produces enough electricity to power about 270,000 homes.

An important part of the Clutha power scheme project included an earth dam on the southern edge of Lake Hawea, the main storage lake for the Roxburgh and Clyde dams. The level of Lake Hawea was raised about 20m through the construction of this dam.



Aerial view of the Roxburgh dam and Lake Roxburgh



Aerial view of the Clyde dam with the township of Clyde to the right

