Introducing Ohau B & Ohau C

Meridian Energy

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These 'twin' stations have the same generating capacity and similar equipment. Water from Lake Ruataniwha used by Ohau B goes into the Ohau C canal, which takes it to the Ohau C power station and out into Lake Benmore.

Excess water flow is controlled by gates in the Ruataniwha dam and a spillway ensures that excess water is diverted into the Ohau River and down into Lake Benmore. A labyrinth weir 1.6 kilometres downstream from Ohau B allows water to be discharged into the Ohau River, bypassing Ohau C. This provides an emergency overflow, and means Ohau B can operate if Ohau C is shut down.

Ohau B was commissioned in 1984 and Ohau C in 1985. This completed the Waitaki hydro scheme as we know it today. Each station can add around 958 GWh of energy a year to New Zealand's power generation capacity.

The canals – a major part of the Waitaki scheme

A major part of the Upper Waitaki development was the construction of a system of canals to link the power stations on Lakes Tekapo, Pukaki and Ohau. Entirely man-made from local materials and lined with waterproof compacted clay gravels, the canals are designed to take advantage of the natural layout of the land.

All the canals have measures to stop gravel passing into the powerhouse machinery. Some have a settling pond at the end, and all have an armour layer of gravel between the canal lining and the flowing water. Also, flow velocities are kept under one cumec (or one cubic metre of water per second) so material can't be carried along the canals.

Places of interest

There are many places of historical, scenic and recreational interest in the Waitaki Valley. Mount John, an astronomical observatory, is located on the shores of Lake Tekapo. Lake Pukaki is renowned for its scenic views of Aoraki, Mount Cook, and the mountain's visitor centre is located close to the Pukaki high dam. Lake Ruataniwha hosts national rowing competitions every year. The Ohau ski area, behind Lake Ohau, is one of the few New Zealand ski fields on the main divide of the Southern Alps. The surrounding Mackenzie basin was named after sheep rustler James Mackenzie in 1855. The area is sheep farming country, and in 1895 a third of a million sheep perished in a snowstorm. A statue of a sheep dog at the Church of the Good Shepherd by Lake Tekapo pays tribute to James Mackenzie's dog.

If you would like to find out more about things to do in the Waitaki Valley, please contact the following:

- Kurow Heritage Centre, 03 436 0950
  Email: kurowmuseum@xtra.co.nz
- Oamaru i-Site Information Centre,
  03 434 1656
  Email: info@tourismwaitaki.co.nz
- Twizel Information Centre, 03 435 3124
  Email: info@twizel.com

Did you know?

As part of the completed Upper Waitaki development, the Lower Ohau River is filled when water is discharged or spilled into it because of excess water levels, if one of the stations needs to be shut down, or when water is needed for recreational uses. The Upper Ohau River runs at 8-12 cumecs between Lake Ohau and Lake Ruataniwha.

Statistics for each station

Average annual energy output:	958 GWh
Station generation output:	212 MW
Number of generating units:	4 x 55.5 MW
Net head:	47.5 m
Turbine type:	4 Francis
Generator details:	4 x 11kV
Year commissioned:	1984–1985

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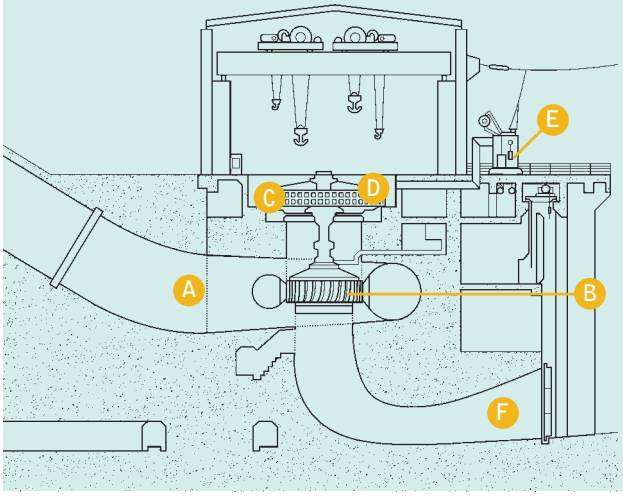
How does a hydro station produce electricity?

Hydro stations use the power of water to generate electricity. The Waitaki Valley hydro stations use water from the Waitaki River, which is fed by snow melting from the mountains and rain that falls within the Waitaki catchment area. Water is stored in six lakes contained by dams – Tekapo, Pukaki, Ohau, Benmore, Aviemore and Waitaki – to conserve water and ensure a constant supply to the power station in response to demand.

The water comes to the hydro stations either from the lakes or from man-made canals that join the lakes together. Once water passes through the station to make electricity, it is discharged back into the canals, which take it to the next station. This makes the most of the water as it runs to the sea.

The water coming into the station runs through penstocks (large pipes) down a slope to the powerhouse. The number of metres the water falls down to the station is called net head, and this determines the amount of potential energy that can be extracted from the water.

How a hydro power station works



A hydro power station generates electricity by using the force created by falling water as it travels down the penstocks (A) to the turbine (B). This turns the rotor (C) which spins a set of magnets within another stationary set of magnets called the stator (D) causing electricity to be generated. From the power station the electricity travels via transformers (E) to a switchyard from where it is sent to the national grid. After spinning the turbine the water discharges through the draught tube (F) back into the river, canal, lake, or sea.

In the powerhouse, the moving water drives turbines, which in turn drive the generators connected to them. Each generator spins a shaft. On that shaft sits a part that has magnets on it which also spins – called the rotor. The rotor spins inside a part that also has magnets on it but does not move – called the stator. Having one set of spinning magnets within another set that does not move creates a magnetic field. It's this magnetic field that produces electricity.

The stations generate electricity at 11,000 volts and it is then increased to 110,000 volts or 220,000 volts by the site transformers and transmitted to the national grid via transmission lines. Some of the electricity is converted into Direct Current (DC) and transmitted to the North Island via the Cook Strait cable.

The Waitaki hydro scheme

The Waitaki hydro scheme consists of eight power stations from Lake Tekapo to Lake Waitaki. All eight are operated from a control centre in Twizel, which ensures that as much electricity as possible is generated from the water as it flows to the sea.

The scheme began with the building of the Waitaki dam and power station in 1928. The station first operated commercially on 1 January 1935, and the last stations in the scheme, Ohau B and Ohau C, were completed in 1985.

Meridian Energy

Meridian Energy is 100% New Zealand owned, and we generate around 30% of the electricity used by New Zealanders.

We are the country's largest renewable electricity generator, and we own and operate nine South Island hydro stations, eight on the Waitaki scheme and the ninth at Manapouri.

We are committed to meeting the energy needs of New Zealanders by increasing the efficiency of our generation assets and investigating other economical methods of new generation – such as wind. Our 90 MW Te Āpiti wind farm in the North Island generates enough electricity to power up to 45,000 average homes.

We take our responsibilities to New Zealand and the environment very seriously. We generate all our electricity using renewable resources and work closely with local organisations and the Department of Conservation to preserve the natural environment and protect native plant and animal life.

We are proud of our involvement with local communities, through community and sporting activities, the arts, and with vital non-profit organisations. We work with organisations like the Energy Efficiency and Conservation Authority (EECA) to bring you ways to save energy at little or no extra effort or cost, and we are constantly on the lookout for new energy-efficient products and processes to help New Zealanders use electricity wisely. Using our resources wisely and efficiently helps protect our environment and helps ensure we have ongoing energy supplies for future generations.

Find out more about Meridian Energy.

Take a look at all the fact sheets in this series:

Waitaki Hydro Scheme	Tekapo A Power Station • Tekapo B Power Station • Ohau A Power Station • Ohau B and Ohau C Power Stations • Benmore Power Station Aviemore Power Station • Waitaki Power Station • Waitaki – Working with the Environment
Manapouri Hydro Scheme	Manapouri Power Station • Manapouri – The Second Tailrace Tunnel • Manapouri – Working with the Environment
Wind Energy	Te Āpiti Wind Farm • Wellington Wind Turbine
Meridian Energy	Introducing Meridian Energy • Energy efficiency brochures – residential and business

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