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Siting and design

Manapouri, New Zealand

Overview

Lakes Te Anau and Manapouri are located within the Fiordland National Park. The Fiordland area of southwestern New Zealand has long been recognised as an area of great scenic beauty. Milford Sound became a primary tourist attraction for ship-board visitors to New Zealand in the early 1880s. In 1888 the development of the Milford Track began and people also began to visit Lakes Te Anau and Manapouri for recreation. Fiordland National Park was proclaimed a public reserve under 1928 legislation and it was designated under the National Parks Act in 1952. The area was accepted for World Heritage Area listing in 1986 by the International Union for the Conservation of Nature and Natural Resources (IUCN).

As Lakes Te Anau and Manapouri are located within the World Heritage listed Fiordland National Park, most of the facilities associated with actual power generation (power station, two tailraces) are located underground. The powerhouse is located 220 m below the surface and enables the 178 m height difference between Lake Manapouri and the sea at Deep Cove to be harnessed for generation.

The project now operates under strict environmental guidelines and is overseen by a community group ("the Guardians"). Major environmental campaigners now openly support the project.

Scheme Specifications

Dam name

Scheme operator
Meridian Energy

Country
New Zealand – South Island

Size of scheme (MW)
585 MW, upgraded to 700 MW in 2002

Catchment area
Lake Te Anau catchment – 3100 km^2Lake Manapouri catchment – 1390 km^2

River
Waiau and Mararoa Rivers, Lakes Manapouri and Te Anau

Effective reservoir capacity
Run of river

Construction years
1963 – 1971

Te Anau Lake Control structure completed late 1975.

Manapouri Lake Control structure completed late 1976.

Second tailrace tunnel completed 2002.

Reservoir size
Lake Te Anau– 352 km^2, 520 km of shorelineLake Manapouri

The SRO requires that a certain proportion of electricity provided by suppliers comes from renewable energy. This is achieved by compensating electricity suppliers for buying more expensive electricity from renewable generators. This funds for this are raised through a levy introduced on electricity bills to all consumers.

The Scottish Government awarded a contract for Cuileig under the Scottish Renewables Obligation. This scheme will make a contribution to the Government's target of 18% of Scotland's electricity from renewable sources by 2010.

Other Aspects

Erosion and sedimentation

Environmental impacts studies of Lakes Manapouri and Te Anau started in the late 1960's. They demonstrated a link between patterns of lakeshore vegetation and substrate, tolerance to flooding and tolerance to exposure, i.e. lake levels. Through implementing strict controls on lake levels, particularly rates of change, the vegetation and shoreline/beach remonitoring has revealed that the operating conditions are not detrimental, and there has been little change since hydro-electric development..

Longevity of benefits
A second underground tailrace was opened in 2002 to enable full use to be made of the energy available from the water harnessed from the lake. The station had been unable to generate more than 590 MW of power (despite a design capacity of 700 MW) due to insufficient capacity in the tailrace tunnel. In 2003, this project won a New Zealand award for engineering excellence for significantly increasing the energy output from the station without using any additional natural resources, and its design and construction was achieved with minimal environmental impact on a World Heritage Area.

Community consultation
Community concern regarding the Manapouri hydropower scheme began in 1959 when it became apparent that the New Zealand government was in negotiation with

an overseas consortium to utilise Lakes Te Anau and Manapouri for power generation. The Manapouri Commision of Inquiry found that the government was contractually bound to raise the level of Lake Manapouri, and that they had not ensured that the township of Te Anau would not be flooded.

A nation-wide "Save Manapouri" campaign began and continued for the next three years with many large meetings around the country. A petition, with 264 907 signatures (equivalent to almost 10% of the population), was organised by the Royal Forest and Bird Protection Society and was submitted to parliament in 1970. The controversy was a major issue in the 1972 general election with the opposition pledging not to raise Lake Manapouri levels. When they came to power they established the Guardians of Lakes Manapouri and Te Anau from those who had lead the conservation campaign.

As the decision to operate the lakes within their natural ranges had already been made, the main task of the Guardians was

"to develop guidelines for managing the lake levels to safeguard the natural environmental features and stability of the vulnerable shoreline while optimising the hydro-electric potential of the water resources."

Further Information

http://www.scotland.gov.uk/library5/environment/srfe.pdf

Cuileig – a benchmark for future hydropower schemes
Civil engineering 156, August 2003, pp 124-129

http://www.miller.co.uk/news_article.asp?ID=66&division=developments

http://www.highlandlightandpower.co.uk/energy_climate.html