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Celebration of Geothermal Development

The year 2008 was always going to be a year of celebration for the geothermal interests in New Zealand.

The first unit at Wairakei Power Station was commissioned 50 years ago (15th November 1958). Contact Energy has been preparing for these Wairakei celebrations along with MB Century (who have carried on drilling operations since the earliest days under various names) and GNS Science (who have carried on as leading international scientists – some of the staff were in the old DSIR). The Wairakei geothermal project established a whole new community so the celebration brings in the Wairakei School and a wide range of people with long—standing links to this groundbreaking development.

Wairakei Power Station, with its steamfield separators to separate water from steam, opened the door to large scale commercial development of wet steamfields internationally. Previously development was focussed on the relatively rare dry steamfields. New Zealand consultants and trainers have gone around the world with many of these developments. They have a reputation for their broad understanding, practicality, ability to work with others and preparedness to work in remote and difficult places.

This expertise has been able to be used in the more recent burst of New Zealand geothermal development activity. Power stations have been developed on 6 geothermal fields (Wairakei, Kawerau, Ohaaki, Rotokawa, Ngawha and Mokai), with recent years seeing major extensions to some of these. Ngawha is on the point of supplying 70% of the Far North electricity demand. Mokai now hosts the largest independently-owned power station on the New Zealand grid, owned by Tuaropaki Power Company. Kawerau has just had the single largest geothermal capacity increase of between 90 – 100 MW since the commissioning of Ohaaki in 1989. This will soon be outstripped by the 132 MW Nga Awa Purua station at Rotokawa, then possibly by the 230 MW Te Mihi station that will replace the aging Wairakei plant.

Geothermal development is happening now for a variety of reasons, key among these being that the unit cost is attractive compared with all other options. Geothermal energy is a renewable sustainable energy form ideally suited to base load generation and largely independent of weather. It is associated with low emissions to air so is seen as part of the solution to climate change concerns. A number of developers have built up critical levels of skill and confidence to be able to make geothermal investments as part of a broad portfolio of energy projects.

The most recent capacity additions have already lifted the contribution of geothermal electricity from around 6% of generation (in terms of gigawatt-hours) in 2004 to current levels of around 10%. The steepness of the projected development curves based on announced projects (see figure 1) now suggests that geothermal energy could be generating 20% of New Zealand's electricity possibly as early as 2012¹. This compares with projections only last year that it would take until 2020 to achieve 20% generation.

¹ This is conditional on the successful development of Contact's Tauhara project for which consenting is due to begin next year, and on modest electricity demand growth (1.3% per annum as used in recent Government projections).

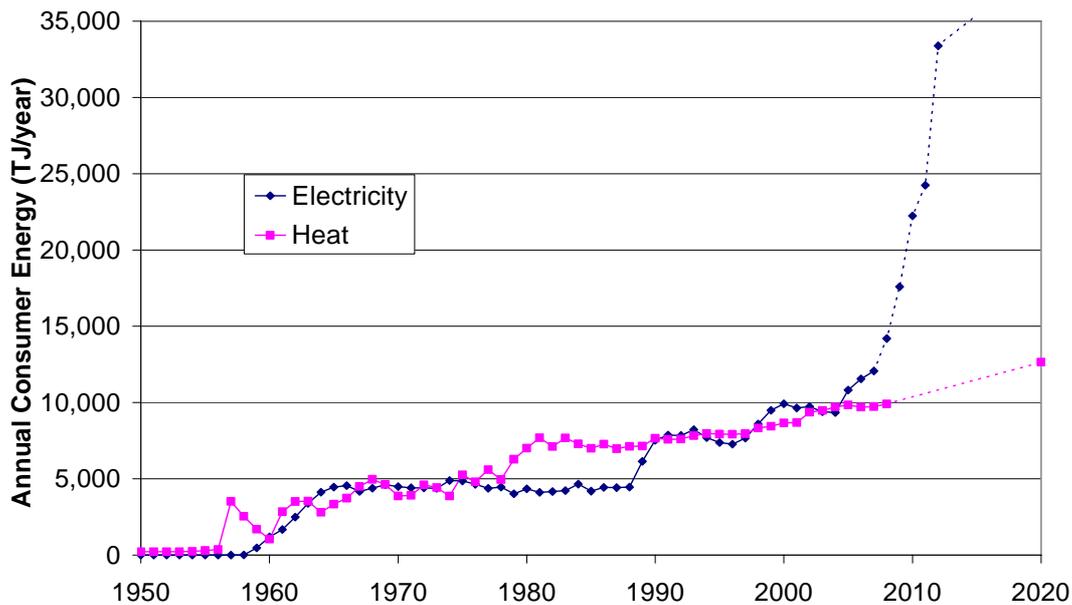


Figure 1: Projected growth in geothermal heat use and electricity generation (White, 2008)²

Recent years have seen renewed interest in direct heat applications, as developers recognise the strong value proposition available from geothermal direct heat use. Developments such as the Contact steam supply to Tenon in Taupo are likely to typify future industrial developments, especially as attempts are made to add value to New Zealand's exports. Over the last 50 years geothermal direct heat use has kept pace with, or outstripped electricity generation, though projections now are based on steady growth.

The other geothermal technology now entering the market is geothermal heat pumps. These are like the air-source heat pumps available from specialists and local hardware stores, but exchange heat with the ground or groundwater rather than air. A recent commercial example is for the redeveloped Dunedin airport space conditioning.

This week, some of the New Zealand geothermal community will meet in Taupo to celebrate these past and recent achievements, and to consider broader issues of sustainability. However, many of its members will continue in their offices or on scattered projects trying to achieve the many milestones along the way to implementing this boom of development.

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The **New Zealand Geothermal Association (NZGA)** is an independent, non-profit industry association with a wide membership covering developers, regulators, researchers, consultants, Maori interests, suppliers, etc. It provides information on geothermal phenomena and utilisation for industry, government and educational organisations. The NZGA supports appropriate sustainable development of geothermal resources, and works with industry and government to achieve this. Website www.nzgeothermal.org.nz

² B R White (October 2008) "Upcoming Geothermal Energy Development in New Zealand". Paper prepared for the 4th New Zealand Metals Industry Conference, 30th October 2008