

## Energy perspective for 2015

A tremendous rush of activity has come to a temporary rest. In reality, development at the recent pace could not continue forever. Over the last 10 years the industry has grown to 1,000 MW installed electricity generation capacity, now regularly supplying 16% of our generation, and is now sufficiently diversified (including a variety of heat projects) to support ongoing work and careers for a wide range of specialists and service providers.

Construction of geothermal power stations continued to this year, with the 166MW Te Mihi station at Wairakei now operational. Wairakei steamfield now has new wells and piping interconnecting Wairakei, Poihipi and Te Mihi geothermal stations. When one station is undergoing servicing another can take up the slack. Most remaining units of the now-56 year old Wairakei station may continue operating at least until consents expire in 2026. Contact also invested in a range of environmental measures including its bioreactor to help strip out sulphur from condensate entering the Waikato River, and further reinjection. The turbines are still turning a half century after commissioning. Modelling indicates that the expanded operations of this world-pioneering development of a wet geothermal system should be sustainable at similar levels for another 50 years.

However, not all new or recent plant will have the operating life that the old Wairakei plant had. At Kawerau, a 38-year old back pressure turbine was replaced in 2004, and this year saw the retirement of the first binary cycle plant in New Zealand (the 2.4MW TG-1 plant owned by Nova Energy) after 25 years. Our engineering assets have a limited life, though the combination of resource, wells, steamfield assets and power plant should continue for generations with replacements here and there – as long as that careful field management continues.

Since competitive market aspects were introduced with Rogernomics in 1984 there has been investment by power companies including New Zealand Electricity then ECNZ and then its descendants Contact Energy and Mighty River Power, the old supply authorities and more recently their descendants Top Energy and Eastland Group, broader energy companies like Nova, and the pulp and paper industry (now through Norske Skog Tasman). Maori Trusts have been active investors, with Tuaropaki Trust being the primary shareholder of New Zealand's largest merchant power station, located at Mokai, and major developments involving Tauhara North No 2 Trust and Ngati Tuwharetoa Geothermal Assets. In the past, other land owners like Alistair McLachlan have developed resources. We see equipment suppliers like Ormat ready to lead new developments.

However, while an electricity market (supported by such initiatives as the Resource Management Act with its resulting policy statements and plans) opened the door for this diverse range of investors, that same market says "wait a moment" now. The recent steady investment in geothermal (about NZ\$2.4 billion over the last 10 years) and other renewables was triggered by upward revision of gas prices after Maui redetermination in 2003. It has been in the face of flat electricity demand since 2006, so has built up reserves, allowed retirement of two coal-fired units at Huntly and is now changing the role of our gas-fired stations. Currently, no projects are being constructed.

The geothermal scene remains active, though. The new expanded portfolio of geothermal assets must be maintained. Several of our fields are capable of further expansion, so efforts can be directed at more careful assessment of field response to current development. And there are quiet

plans for new development for which developers are testing out markets for electricity or heat contracts, arguing in court, preparing for consent applications or preparing plans and contracts.

There is a growing international pool of work for contractors and consultants. The Geothermal New Zealand network continues to look for work in places like Indonesia, the African Rift Valley countries (especially Kenya) and the Caribbean, and it courts partners in a range of places including Japan. Mighty River Power has directly invested in the USA and Chile and uses its staff to good effect there. Contact Energy staff are supporting the geothermal interests of dominant shareholder Origin Energy as Origin looks to invest internationally. Some of the MFAT geothermal initiatives in places like the Caribbean and on Vanuatu were linked to the New Zealand Government's successful bid for a place on the United Nations Security Council. We understand that Government support for these initiatives is likely to continue or accelerate over the next few years. We will have a prime opportunity to advertise the work of the global centre of excellence here, through the World Geothermal Congress (a five yearly international meeting) in 2015 jointly hosted by New Zealand and Australia with conference venue in Melbourne, but field trips (and more) in New Zealand.

Another solution during a hiatus is diversification. Our drillers and rigs are working on oil and gas wells. Construction companies are following up other opportunities. HERA is leading an initiative to stimulate our manufacturing industry to new offerings around 'above ground geothermal and allied technologies' with a focus on home-grown binary cycle plant. At Kawerau, where there has been a strong emphasis on direct use of geothermal heat, consents have been obtained and new direct use and electricity generation opportunities are being sounded out. Will the combination of geothermal energy and available forestry biomass eventually lead to a biorefinery?

Change is stressful. Although we have had geothermal hiatuses in the past, this hiatus is so far progressing smoothly. Staff numbers have reduced a little, but there is still much to do. When the markets are ready here then geothermal projects will be at or near the front of the queue in terms of low unit cost. Similarly, we are a globally-recognised centre of geothermal excellence and will pick up geothermal work on the international market, where bidding is a percentage game.

Developers can concentrate work within their own staff, reducing dependence on consultants. Consultants can refocus on building international work. Contractors and construction companies focussed on New Zealand face the brunt of change.

I want to reserve a few words in praise of our Resource Management system. While every system has flaws and can be improved, the fact is that projects are/were happening in New Zealand. There have been some costly disappointments in the past for developers, with some consenting processes taking a long time, but ultimately, developers have seen a path through to responsible development. This is not always the case in other countries.

Our health and safety systems will receive a shake-up in coming months and years. MBIE and WorkSafe New Zealand are now progressing initiatives that will make our work places safer and healthier, or at least give new structure and help to formalise systems. There will be several key documents related to geothermal development that will need editing or a complete rewrite. With other Government consultation, there will be debates over whether the geothermal industry should be classed as 'high hazard', 'major hazard' or something lesser, and there will be discussion around detail, but there is a collective will and current practice to ensure that the geothermal industry

continues to provide a safe and healthy work environment. One of the relevant documents for revision is NZS2403 Code of Practice for Deep Geothermal Wells. It is encouraging to see the high degree of industry mobilisation to revise this key document, ahead of any Government-initiated calls to do so.

The New Zealand Geothermal Association is aware that there are both large and very small players in the geothermal market place, and we want to ensure that 'red tape' does not unduly exclude the domestic developers interested in heating of homes and pools.

The next few years are likely to be a mix of highs and individual lows as we negotiate the immediate changes.