

Geothermal

– the renewable star

BRIAN WHITE



Geothermal energy development has progressed at great speed but changes are being brought about by flat electricity demand. By Brian White, executive officer NZ Geothermal Association.

THE GEOTHERMAL INDUSTRY has continued to progress at great speed and there is a lot of generation under construction at the moment. Quality training continues with additional funding, while Regional Policy Statements have been, or are being, reviewed setting a framework for future development.

But change is coming – brought about by the flat electricity demand over the past few years, and the New Zealand Geothermal Association (NZGA) has been working to reduce the impacts of this change.

Three significant power stations are currently under construction.

The Tasman Ormat Power Project is the sixth power station on the Kawerau geothermal field, all of which followed the initial supply of direct heat to the pulp and paper mill in 1957 – still the largest global user of geothermal steam for industrial purposes. The 24MW station is being built by Norske Skog Tasman (NST), with steam supplied by Ngati Tuwharetoa Geothermal Assets and will be commissioned early in 2013.

NST recently announced the closure of a paper machine because newsprint demand continues to fall internationally. Thus, the new power station is a diversification step for the company. The Kawerau geothermal resource and surrounding forests could eventually be part of a transformational activity in which the wood and geothermal resources could be used in a biorefinery for aviation fuels. Seeds of radical change can be seen at Kawerau.

The other long-standing geothermal development is on the Wairakei geothermal field. Most of the units at the Wairakei power station are now 50 years old. Contact Energy has just commissioned a unique innovative sulphur bioreactor (a substantial civil engineering project) to clean condensate discharged to the Waikato River.

Contact Energy is proceeding with partial replacement of the original station through construction of the 166MW Te Mihi power station, closer to the upflow region, using modern efficient low-impact technology. Commissioning is scheduled for mid-2013. This could be the largest geothermal station in the country, unless Tauhara is eventually built as a single stage. Meanwhile, Contact continues with its Taheke geothermal field exploration and is preparing for some trials at Tauhara in 2013.

Since 2006, Mighty River Power (MRP) has invested over \$1.3 billion in geothermal projects with its latest project, the 82MW Ngatamariki station, due for commissioning in mid-2013. MRP contracted Iceland Drilling to bring in two highly automated drilling rigs initially for the project. In turn, MB Century has purchased a larger DrillMec rig which should be available in New Zealand for the long term.

As I wrote this perspective, I noted that in a recent week of summer generation, thermal generation was down to 14 percent. Next year, with

the current geothermal construction projects on-line then we may touch the Government goal of 90 percent electricity from renewables, but only on a weekly basis – with favourable wind and rain.

Developers such as Top Energy and Eastland Group have been consolidating during this period. Each is looking to further stages of power projects when the time is right and contracts can be found for electricity sales. Ngati Tuwharetoa Geothermal Assets is in the process of securing further consents with a view to providing direct heat supplies at Kawerau, to add value to our forestry exports.

I want to draw attention to the establishment of the Geothermal Heat-pump Association of New Zealand (GHANZ), which receives considerable support from GNS Science as an outworking of their low enthalpy geothermal programme.

There is now a significant, energetic and growing core of designers and installers of geothermal heat pumps (GHPs) in New Zealand and they are increasingly busy. The NZGA has included GHANZ as an interest group and affiliated to the Climate Control Companies Association to bring some quality benefits to GHANZ.

While we have talked about heat pumps for years, we can now point to commercial buildings such as the Wharewaka building in Wellington and to domestic use in Queenstown to say the GHPs are “here and now”, and we expect exponential growth as the profile of this technology is raised.

During the 2012 year, Bay of Plenty Regional Council and, more recently, Northland Regional Council have been revising their Regional Policy Statements.

As mentioned earlier, these set the framework for further development. There has not been the opportunity for simple cloning of RPS’s, say from that of Waikato Regional Council, due to the historic development of geothermal systems in each region, and the different document design of each council, but there are many close parallels between the provisions and the councils collaborate on many geothermal matters.

Future prospects

New Zealand’s electricity demand has been flat since around 2007, as it has been in many other developed countries.

While many have views on the cause, New Zealand companies continued to build power stations, including baseload geothermal stations, through this period to the point where reserves are high.

A hiatus is coming for all forms of national electricity generation construction.

Offsetting this will be niche opportunities: a) seen by lines companies, b) prompted by land owners, or c) stemming from fuel substitution and a

changing role for gas, but there may be several years until demand growth restarts requiring large-scale power station construction programmes. When that happens, geothermal projects will again be front-runners because of their attractive economics with the bonus of renewable, low carbon attributes.

In the meantime, the critical skills collected in the New Zealand geothermal centre of excellence (because we are recognised as such internationally) need to be held together and developed, and this will be done through international activity.

Hints of this are already seen through Geothermal New Zealand Incorporated (GeoNZ), (a loose grouping of diverse companies), to open up the international markets for consultants, contractors, developers and manufacturers alike, with particularly close relationships being developed in Indonesia for which there are very ambitious geothermal development goals.

One stimulus for the establishment of GeoNZ was the success of recent New Zealand projects using Japanese technology coupled with Kiwi civil, engineering and project management skills to bring plants in on time and budget and ahead of performance targets.

GeoNZ is facilitating a useful marriage of skills and equipment.

The Government supported international efforts through closer ties with geothermal markets such as Indonesia, Chile, Papua New Guinea and Mexico. The Government also provided grants for capacity building in Indonesia and has provided fellowships to study in New Zealand. The Philippines, Kenya and other African nations are also looking to New Zealand to support their own geothermal growth goals.

NZGA lifted efforts to raise the international profile of our domestic geothermal expertise several years ago through successfully bidding to co-host the World Geothermal Congress in 2015 with Australia. There will be field trips in New Zealand where the recent and current construction projects (both heat and power) will be available for viewing. This will be a timely showcase.

“The Philippines, Kenya and other African nations are also looking to New Zealand to support their own geothermal growth goals.”

At home, the NZGA has concentrated on mobilising and diversifying our membership. This has been done through establishment of interest groups to meet specific industry needs. GHANZ has been mentioned already, but another group reflects diversification into geothermal tourism, which is both a significant income earner, but forms a means of raising public consciousness of the resources that we have beneath our feet.

The Heavy Engineering Research Association (HERA) is involved with another transformation through its Above Ground Geothermal and Allied Technologies (AGGAT) research programme. The end result of this could be local manufacture of binary cycle (or similar) power plant using already resident capability.

Concluding remarks

Change is coming, despite a buoyant domestic construction effort. But efforts are in place to hold the world-class resource of people that forms the New Zealand geothermal community.

Inevitably this will take many people overseas for periods, but still under a New Zealand umbrella.

We have a tremendous heritage in terms of our people, developments and quality educational resources which forms a solid foundation on which we will build.



THE DELOITTE
ENERGY
EXCELLENCE
AWARDS
FOUNDED BY ENERGY NEWS

WINNER
2011



- Geothermal Drilling
- Workover and Well Services
- Reservoir Logging

- Steamfield Design
- Steamfield Construction
- Power Station Maintenance

- Heavy Fabrication
- Precision Machining
- Industrial Painting

Tel: +64 7 376 0422

www.mbcentury.co.nz

info-nz@mbcentury.com