
Newsletter 15 September 2011

Welcome to the September 2011 issue of the newsletter. It's set out as follows:

- **President's Report**
- **Geothermal News / Articles**
 - NZ News
 - International News
- **Board and Executive Officer Update**
 - Board Matters
 - Elections to the Board
 - NZGA Special Interest Group – Geothermal Heat Pumps
 - Meetings – Recent and Planned
- **Submissions – Recent and Planned**
- **Industry Papers**
- **Training Update**
- **Media Releases**
- **Tenders and Funding Opportunities**
- **Forthcoming Events/Conferences**
- **NZGA Action Plan (last updated September 2011)**
- **Membership**
- **Keeping in Touch**
- **Use of and contributions to this Newsletter**

President's Report

Time has flown since our last Newsletter in April. Since then there has been a lot of NZGA activity and geothermal activity in general.

The NZGA Board and observers held a Board meeting and Strategy Day in Northland and visited Ngawha. A group of fifteen made the journey and were very well hosted by Les Parker and the Top Energy team. As well as visiting the power station, the group toured an old Mercury mine and got up close to lots of Geothermal features. Top Energy's Ngawha power plant is close to historic Geothermal hot pools and therefore has to run within strict rules in relation to pressure effects on the field. To minimise pressure effects water is collected on the site so effectively more fluid is injected than is extracted from the field!

The Strategy Day was a highlight with all participants actively shaping our future as an Association.

We settled on a purpose:

"To promote the reasonable and appropriate use of Geothermal with a focus on New Zealand and international linkages."

By "promote" we mean educate, debate, influence and provide connection between key stakeholders.

We defined "Geothermal" to mean heat from the earth and its benefits. This confirms that the Association is inclusive of interests in Geothermal heat pumps and tourism interests.

The Draft Five-Year Vision for NZGA that we came up with was:

To play a pivotal part in:

1. *New Zealand becoming a Geothermal Centre of Excellence, and*
2. *the increase of Geothermal output in New Zealand to 1300MW by 2016 through:*
 - *effective influence and promotion at a political and industry level*
 - *a large and mobilised Membership*
 - *superior communication to and education for our Members and the industry*
 - *strong links with the international Geothermal community*
 - *support for Geothermal research.*

There has been a lot of discussion in New Zealand Geothermal circles about how to advance a “NZ Inc” approach to Geothermal off-shore. A study jointly funded by NZTE and Hawkins concluded that there was a place for a collaborative New Zealand Geothermal effort and proposed a “NZ Inc Geothermal” export vision of “helping Geothermal-developing countries become global Geothermal leaders”. The NZGA is very supportive of this “NZ Geothermal Industry Group”. A “soft launch” for the Group was held at “The Cloud” as part of the Pacific showcase.

Given the NZGA’s focus on New Zealand, we see the offshore focus by New Zealand companies as an exciting prospect, but not a core focus for the Association itself. As the key window for Geothermal enquiry coming into New Zealand, the NZGA will keep close links with the Industry Group.

A good example of the NZGA delivering value to its members is the recent news that New Zealand will be accepted as a member of the International Partnership on Geothermal Technology (IPGT). The newsletter contains more detail on what this means but in short it will assist New Zealand obtain and provide information exchange on the latest geothermal research and technology. The NZGA advocated to the New Zealand government the importance of joining this partnership and also has prepared the draft application. Brian in particular deserves recognition for this outcome.

Looking ahead NZGA is hosting a workshop focussing on “direct use” using low temperature technologies on 12 October at the Clear Energy Centre, Taupo. Also, on 13 October there is the “Energising Geothermal Workshop”, also at the Clean Energy Centre.

The “New Zealand Geothermal Workshop 2011” on 21 to 23 November is being held at the Auckland University.

So enjoy all the rugby, and keep promoting our exciting industry.

Spence McClintock
September 2011

Diary Reminders

Geothermal Events and Training – Oct, Nov and Dec

(see this newsletter for booking details)

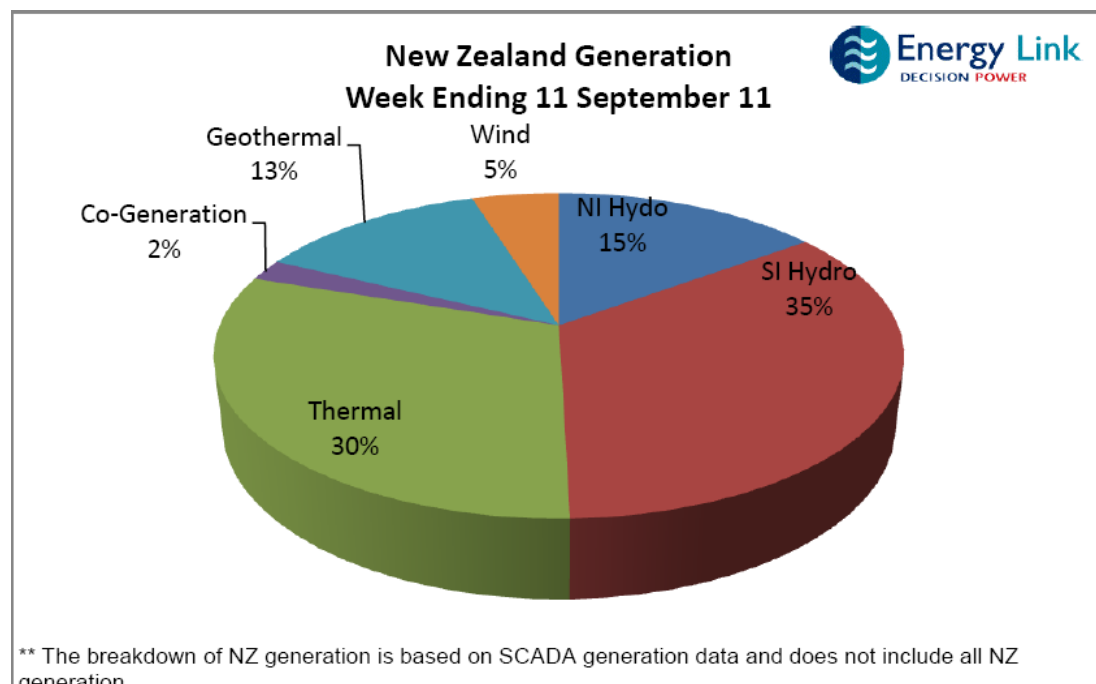
Geothermal News /Articles

NZ News

No News is Good News?? – The NZGA Executive Officer has had a few exchanges with Energy News reporters recently. They have been giving geothermal energy some good coverage, but geothermal energy does not rate a mention in the weekly summary of generation. As you can imagine, the weekly summary is about the swings in wind generation, rainfall and changing lake levels, changing demand and how the various thermal stations adjust generation to match total demand. All of this is exciting stuff for reporting, and interesting for the public who may be looking for the next impending power crisis.

Meanwhile, geothermal power stations just churn out the Megawatts – baseload, reliable generation – nothing to report. The untold story is the same week after week. Geothermal energy is generating 13% of our electricity requirements. This 750 MW is spread across six fields, so even a station trip would not significantly alter the national total. From the perspective of raising Geothermal's profile, no news is not always good news.

Having said that, you will find this newsletter filled with exciting news of the ongoing investment in Geothermal on a month-by-month and year-by-year basis.



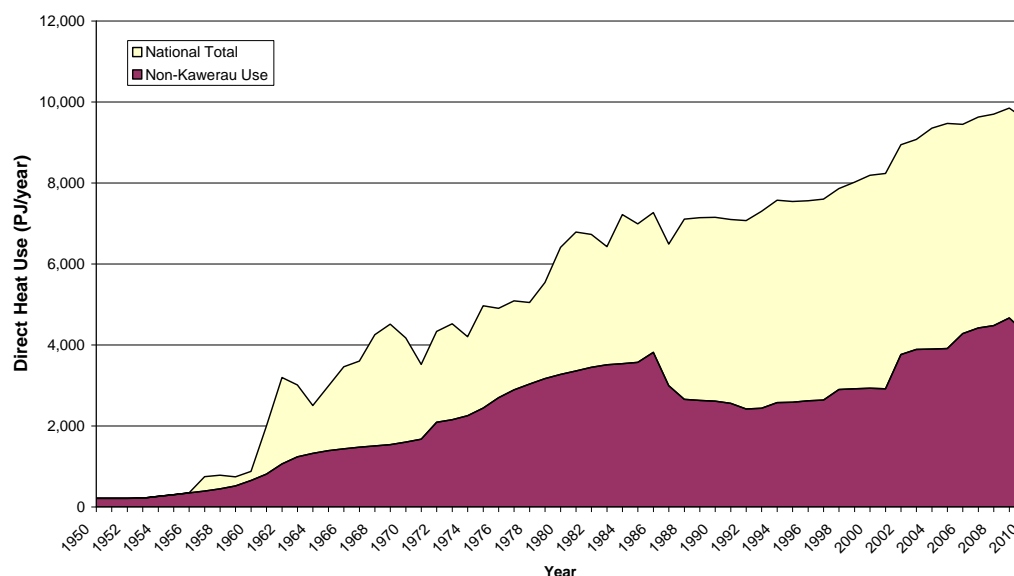
Ground Work Starts at Contact's Te Mihi – Having been granted approval in late 2008, Contact awarded the contract to develop its first stage 166 megawatt Te Mihi geothermal project to a consortium of partners including McConnell Dowell, SNC-Lavalin and Parsons Brinckerhoff. Te Mihi Power Station will use geothermal energy from the Wairakei geothermal field near Taupo. When Te Mihi is finished, output from the existing Wairakei Power Station will decrease by approximately 45 MW, resulting in a net increase of about 114 MW. The project is expected to cost \$623 million in total and while the ground work is just beginning, it's expected to be operational in 2013.

Geothermal gives NZ the Edge on Data Centre Location? - Centrally placed between the USA and Asia, and viewed as a "politically safe and neutral" location, New Zealand's geothermal resources might just prove attractive to several global companies like Google, Facebook and Amazon keen to use renewable energy as cooling is one of the largest cost items in operation costs. Geothermal power as a power source for data centers is being discussed in Iceland too. Over the last couple of years, Iceland has been working on attracting data centers to the country. Geothermal energy as a source of power for attracting energy intensive industries and companies, such as data centers clearly is interesting. Find out more [here](#) and [here](#).

Drilling at Contact's Te Huka Site – Contact has recently drilled makeup injection and production wells for the 23 MW Te Huka plant on the Tauhara geothermal field. Makeup drilling is part of the normal process of geothermal operations.

New Data on New Zealand Geothermal Direct Use – From time to time NZGA produces surveys of geothermal direct heat use in New Zealand. NZGA is the prime source of information on direct heat use for the Ministry of Economic Development's annual Energy Data File (EDF) report. This year a high level survey was undertaken in which major users provided data to the Executive Officer. The end result is shown in the graph below, and data is available through the EDF [more details [here](#).]

Annual Geothermal Direct Heat Use



Note that the graph shows a slight dip in use for the 2010 year. This was principally associated with pipe damage to the supply to NETCOR and, separately, to the pipework to

Tenon associated with a major storm in Taupo. All repairs have been made and supplies are back to usual levels.

The year 2011 should see further growth associated with the new supply to SCA at Kawerau, which commenced in 2010, and to the Miraka milk treatment plant, which is discussed below.

Miraka Plant Commissioned and Operational – Since the announcement this time last year GEA Process Engineering has been working hard to deliver the Miraka Milk Processing Plant – a facility with optimal sustainable and energy-efficient milk processing. The plant has been commissioned (the first bag of milk powder came off the conveyor belt on 1 August 2011) and is under the control of the team at Miraka now. Energy used in the milk-drying process is delivered from the nearby Mokai geothermal field by Tuaropaki Power Company. In addition, up to 60 GJ per day of waste heat from the process will be recycled to further improve the energy efficiency of the plant. The plant has the capacity to process in excess of 1 million litres of milk a day and has been engineered with state-of-the-art technology according to best practice benchmarks within the milk processing industry.

GEA Process Engineering is the market leader in its field of expertise. The plant is the fifth greenfield operation that GEA Process Engineering has installed in New Zealand over the past three years to meet the growing international demand for milk powder products. GEA Process Engineering has already delivered similar capacity milk processing lines for the dairy plants for Open Country Dairies in Waharoa and Wanganui in the North Island and Awarua in the South Island, as well as Synlait at Dunsandel in the South Island.

This link gives the background to the story - <http://thinkgeoenergy.com/archives/5472>



Photo: View from heat supply system through to the Miraka factory (from Andy Bloomer).

Miraka Dairy Company Geothermal Heat Supply – Tuaropaki Power Company (TPC) has recently commissioned a plant to supply up to 30-tonnes per hour of clean steam to the Miraka dairy processing factory at Mokai. The plant uses steam from one of two geothermal production wells at Mokai. The geothermal steam is processed in heat exchangers and has the geothermal gases stripped to generate "clean" feedwater. This is the first geothermal energy supply for dairy processing in the world.

The dairy plant is currently ramping up production, with steam being required up to 16 hours per day. At the peak of the season, steam will be required 24 hours per day, but demand will be low for an hour or so while the plant goes through a cleaning routine. The dairy factory is able to process 210 million litres of milk per season from 55,000 cows, turning out eight tonnes of whole milk powder per hour.

The heat plant was designed and built by MB Century, and managed by Andy Bloomer of Geothermal Engineering Ltd; in many respects it replicates a similar plant built for Ngati Tuwharetoa Geothermal Assets at Kawerau. A very high reliability is required, so as well as having two supply wells, there are duplicate trains of equipment in case of failure of any component. Geothermal fluid is taken from one of two wells at high pressure of about 26-bars. The production wells also supply the Mokai Power Station owned by TPC and operated under contract by Mighty River Power. The two-phase fluid is separated in one of two conventional cyclone separators, with the high pressure separated water being returned to the two-phase pipeline to go to the power station to be re-separated at slightly lower pressure. The geothermal steam then generates the clean steam by heating feedwater in one of a pair of heat exchangers with pre-heaters. The condensed geothermal steam is then stripped of virtually all its gases before being returned to the secondary side of the heat exchangers as very high quality feedwater. The plant is automated and runs itself, following the varying demand of the dairy process as required. The plant operation will be monitored by the power station operators.



Photo: View of Miraka heat supply system (from Andy Bloomer)

The heat plant adds another geothermal energy supply to the Tuaropaki Trust's portfolio at Mokai, which includes the geothermal power stations and the 12-hectare geothermally heated greenhouses. It is based on a recognition of the high value of large scale process heat, and definitely should not be thought of as a cascade operation from the power station.

There will be an opportunity to hear more about this plant at the upcoming “Energising Geothermal” Workshop at the New Zealand Clean Energy Centre, Taupo followed by a field trip to Mokai on 13 October.

Geothermal Power Struggle – A Taupo-Rotorua Mini Series - In the last newsletter we noted a couple of articles from Damian Stone on the geothermal resources in the Taupo-Rotorua region. Article 1 was - [Geothermal power struggle: What it means for us](#) and article 2 was [Geothermal power struggle - Risks and Rewards](#) - The next article in the series was entitled '[Geothermal power struggle: Owners get chance to harness their land](#)'. In this article Damian Stone explores some of the important considerations associated with geothermal energy development including steamfield access and ownership; expertise and capital and environmental issues.

Ngatamariki get's Green Light for MRP – In June this year Mighty River Power Ltd. announced commitment to the 82 MW plant costing \$466 million to be built at Ngatamariki, north of Taupo. Ormat Technologies was announced as the winner of the EPC contract. The completion of this power plant will bring the total installed capacity of Ormat's technology in New Zealand to approximately 350 MW in 14 plants. It will lift total geothermal generation under MRP's operation to 460 MW and mean that more than 40% of MRP's electricity generation output (by ownership interest) is from geothermal sources.

The new power plant will be comprised of four air-cooled Ormat Energy Converters and will allow 100 % geothermal fluid reinjection, which serves both to sustain the reservoir and to produce electrical power with virtually no environmental impact. The modular nature of the Ormat plant will allow further similar units to be installed later. The construction of the power plant is expected to be completed within 24 months from the contract date. Initial site works have already started. Further details [here](#).

Drilling is expected to commence shortly as a new rig arrives from Iceland, along with up to 40 staff members. MRP entered into a two-year US\$25 million contract with the Iceland Drilling Company (also known as Jarðboranir) for the provision of a drilling rig. The type of drilling rig that will be used is a significant step forward in drilling technology and is the first of its type to be used in New Zealand. It is the company's largest land rig and is a trailer-mounted highly automated [DrillMec HH300](#).

The drilling programme consists of four monitoring wells and four or five main wells. In addition to the Ngatamariki wells, the rig will be available for exploration drilling at new prospects and the drilling of replacement wells on existing fields.



The project is part of MRP's pipeline of geothermal projects, following the 100 MW Kawerau plant brought into production in 2008 and the 140 MW Nga Awa Purua station on-line last year, in a \$1 billion plan to build up to 400MW of new geothermal production. This investment is complemented by a further US\$250 million program of international investment through GeoGlobal LLC. Specific projects include the 50 MW Hudson Ranch project in California, a geothermal exploration project in Tolhuaca in Chile, and opportunities in Bavaria in Germany

Te Ahi O Maui - New Geothermal Development Option for Eastland Group - Eastland Group announced in June that it had signed an exclusive deal to be part of a three-way venture of a ground-breaking international indigenous people's project. The project name draws together Maori and Hawaiian concepts of the "fire of Maui" and source of geothermal heat.

It's part of the group's energy development plans, and involves the exclusive development right for 170 hectares in Kawerau on a Maori trust block belonging to the Kawerau A8D Ahuwhenua Trust.

There is an existing commercially viable geothermal well on the land known as KA22 well, and the initial 10 MW to 15 MW development costing up to \$60 million will be based around this. But Eastland Group chief executive Matt Todd says an assessment of the entire area has shown a significant additional resource underneath the A8D block (possibly up to 50 MW). The other company involved in the deal is the Hawaiian-owned Innovations Development Group (IDG), and this project has allowed them to successfully create the world's first Native to Native trade deal. Native to Native Trade has been established to help indigenous peoples who want to develop their lands and resources, but need assistance to see that realised. Such trade encourages ownership in projects, shared profits and socially, environmentally and culturally appropriate practices. Further details [here](#).

Eastland is developing the project as part of a strategy aimed at using its balance sheet and engineering expertise to develop a fleet of smaller-scale renewable generators. It already owns the 5 MW Waihi hydro project inland from Wairoa and last year bought the 9 MW Geothermal Developments Ltd (KA 24) plant at Kawerau.

Tikitere Geothermal Plant Announcement - A Rotorua Maori trust is set to become a major player in electricity supply with plans to build a \$140 million geothermal power station near Tikitere.

The initial 45 MW development could employ up to 20 local people in the first six months during the initial investigation and development phase, with more job opportunities in the future.

The Tiki Tere Trust (also known as the Whakapounakau 24 Trust) partnered with the neighbouring Paehinahina Mourea Trust and the Manupirua Ahu Whenua Baths Trust in 2008 to investigate the possibility of developing a geothermal power station on their lands. Jim Gray is a key figure in this development, and he will be known to many people in the geothermal community through his long term attendance at the Geothermal Workshops and the NZGA Annual General Meetings. The Trust has undertaken a six months long international process seeking expressions of interest. At the end of this process, Ormat Technologies was contracted to carry out the exploration, construction and development of the proposed geothermal development on a Build Operate Transfer (BOT) basis. The plant would be transferred to Tikitere Geothermal Power after 14 years of operation. This is the

first time that this sort of arrangement has been used for geothermal projects in New Zealand.

In terms of timing, Jim has said that exploration drilling is at least 6 months away, consents still need to be obtained, so that operation is unlikely before 2015.

The Tikitere field may have potential to generate up to 200 MW of electricity, but Jim has said the overall project would be developed in stages to avoid effects on surface geothermal features such as Hell's Gate (the prime asset of the Tiki Tere Trust) and Manupirua Springs. Further details [here](#).

NZ Energy Strategies – Released 30 August 2011 – The Government has released the New Zealand Energy Strategy and New Zealand Energy Efficiency and Conservation Strategy. We note a return to a balanced position on renewable energy within the wider energy context, and clear reference to roles for geothermal energy in this. It is also pleasing to see both reference to the prime resources we have and acknowledgement of the expertise within New Zealand. The Strategy says “We are a world leader in geothermal energy.” Supporting material on renewable energy says “Our hydro and geothermal developments are amongst the country’s greatest engineering achievements. We have well regarded expertise in geothermal. ...”

The major targets remain (90% of electricity from renewables by 2025 if all goes well, and 9.5PJ/year of additional biomass or direct use geothermal over 2005 levels by 2025) but overall, detail is still lacking. As such it can be seen as a high level, rather than prescriptive guide for government.

Given the ‘accidental release’ earlier this year, it’s of immediate interest to know whether this official release offers anything significantly different. The short answer appears to be that nothing significant has been changed. **The Minister’s media statement and the Strategies themselves can be found [here](#) on the MED web-site. Various reporting on the Strategies includes - Scoop - <http://www.scoop.co.nz/stories/PA1108/S00566/energy-strategy-sets-direction-for-nzs-energy-future.htm>**

Update on Central and Regional Government Planning Initiatives – The Government has a broad policy of encouraging renewables. One of the means that central government can do this is through National Policy Statements, which are planning instruments under the Resource Management Act. Recently the Government completed a consultation process on an NPS on Renewable Electricity Generation. This directs Regional Councils to take account of the benefits of renewable energy electricity projects when developing their policy and plans and when making decisions on consents for proposed developments. The [NPS REG](#) was gazetted on 14 April and is in effect from 13 May 2011.

In a separate exercise, Government has started consultation on an NPS on Indigenous Biodiversity, naturally wanting to maintain our rich biodiversity. While this is a good goal, the NZGA can see some fish hooks in the current proposal (see our submission later in the newsletter).

Most of our high temperature geothermal resources are located in the areas covered by the Waikato Regional Council and the Bay of Plenty Regional Council. Developments in their areas are covered by Regional Policy Statements and Regional Plans. Both Councils are now actively consulting on their new proposed Regional Policy Statements and hearings will be held shortly. NZGA has been active in the consultation process with respect to the

geothermal provisions of the two RPSs. Again, details of our submissions and further submissions can be seen later in the newsletter.

Some other Government Initiatives – There are some international energy arrangements which can benefit local industry that can only be made at a government-government level. One example is the [International Energy Agency – Geothermal Implementing Agreement](#) covering geothermal R&D to which we have been a party for some years. New Zealand is active in the IEA GIA and is represented by Chris Bromley and Mike Mongillo both of GNS Science.

On 1 May 2011 New Zealand signed up to the International Renewable Energy Agency (IRENA) which promotes the widespread and increased adoption and sustainable use of all forms of renewable energy.

For some time, NZGA has been advocating that New Zealand join the International Partnership for Geothermal Technology (IPGT), again with co-ordinated geothermal R&D in mind. A difficulty with the process was that Government was busy reorganising government-funded science and R&D initiatives. In recent months, the Ministry of Science and Innovation has been established and one of the first things they did (even before the official opening of their office) was to approach NZGA to assist with the application for IPGT membership. The draft application is referred to later in the newsletter. MSI has now completed and submitted the application, and we now wait to see the result. If there is a successful outcome, then a signing ceremony is likely to be held in Melbourne, Australia in November.

New Zealand Clean Energy Centre - Update – Acting Minister of Energy and Resources, Hekia Parata and Taupo MP Louise Upston joined other dignitaries at the Ministerial opening of the NZ Clean Energy Centre on June 29 in Taupō. The state of the art facility has been established to accelerate New Zealand's adoption of clean, renewable energy solutions by having innovative clean energy businesses working alongside each other developing and creating opportunities, by demonstrating a wide range of clean energy solutions, and by hosting clean energy events.



Hekia Parata said the opening of the centre demonstrates how clean energy solutions can work for industry, communities, businesses and households. "Clean energy sources have an increasingly important role to play as New Zealand responds to the global energy challenges of energy security and climate change and I welcome the development of innovative solutions to harness New Zealand's substantial renewable energy resources and help us meet our Government's target to generate 90% of New Zealand's electricity from renewables by 2025."

The NZGA regards the Clean Energy Centre as a useful focal point, especially for geothermal direct use. As such we are keen to support the Centre as it gets established. This year we will be holding a Board meeting at the site, and the NZGA Seminar will be held there linked to the NZCEC's own "*Energising Geothermal*" Workshop (see later notices for details and also www.cleanenergyexpo.co.nz)

NZCEC is inviting companies to take an Exhibit Stand for the two events – and the good news is you get two for the price of one – Just \$495 + GST for a 2 metre x 3 metre stand at both events.

The events are being promoted through the NZ Geothermal Association, through the networks of participating speakers, through Bay of Plenty Regional Council and Waikato Regional Council and through other advertising and PR channels. They are also being promoted to international visitors with energy interests through the NZ2011 Business Club.

If you're interested in exhibiting, please email rmcewen@nzcleanenergycentre.co.nz

Nga Awa Purua Geothermal Sells Carbon Credits, Boosts Company Earnings

- The Nga Awa Purua Joint Venture, owned by the Tauhara North No. 2 Trust and Mighty River Power, has recently concluded the sale of 410,000 Emissions Reduction Units (ERUs) to Deutsche Bank AG for NZ\$9.3m at NZ\$22.78 per unit.

The Joint Venture, which owns the Nga Awa Purua geothermal power station, secured rights to up to 791,000 Projects to Reduce Emission units (PREs) in 2004. In the first year after commissioning, the geothermal power station earned 410,000 ERUs from the PRE scheme, which were on-sold internationally.

The New Zealand Government PRE scheme operated in 2003/04 and allocated PREs to qualifying greenhouse gas emission reduction projects, in order to reduce the country's overall carbon emissions. The PRE allocation to the Nga Awa Purua geothermal power station reflects its displacement of high carbon intensity thermal electricity generation.

The 140MW Nga Awa Purua geothermal power station is located on the Rotokawa geothermal field North-East of Taupo, and was commissioned in early 2010.

Nga Awa Purua also assisted MRP increase underlying earnings 16% to \$162.2 million in the year to June 30, thanks primarily to a full year's operations from the Nga Awa Purua geothermal power station. Total electricity produced by MRP was up 17% to 6,833 Gigawatt hours, driven largely by the 140 Megawatt Nga Awa Purua station, but assisted also by higher than average hydro generation, which meant 96% of MRP's energy came from renewable sources in the last financial year. Further details [here](#).

MRP Investment Potential Limited until 2013 - MRP says its capacity to invest in new projects will be limited until the completion of its \$466 million Ngatamariki geothermal development in 2013. MRP says its commitment to that project, coupled with US \$250 million it has earmarked for investment overseas with GeoGlobal Energy LLC, will limit the pace of its international geothermal development short-term.

NZ Inc Geothermal makes Initial Steps – If you are involved in the New Zealand geothermal scene then you will know that there is interest in how the various companies can work together more effectively in the international geothermal market. The end goal is a greater share of the international work and the revenue associated with that. New Zealand Trade and Enterprise has worked with interested parties in developing initial think-

pieces. NZGA is active within this group as a catalyst and resource centre. Mike Allen (formerly of GENZL, director of MRP and long term geothermalist) is playing a greater coordinating role. The collective interests extend far beyond consulting and research through areas of manufacture (HERA is playing a role), construction and investment.

A number of background meetings have been held to rationalise the collaborative concept for “Geothermal New Zealand”, the form it could take and the near term focus. There is great interest at Ministerial level and a paper has been prepared by NZTE outlining the approach that is being considered and looking to address how government and industry interests can be most effectively brought together. There is still some way to go before any concrete structure emerges, but first steps have been made.

Among these first steps has been the preparation of collective marketing material including a brochure and a two minute video about New Zealand geothermal capability. This material has just had its first outing at the Pacific Showcase (linked to the Pacific Islands Forum) which ran from Monday 5 September to Thursday 8 September at “The Cloud” in Auckland. Thank you to all who helped to look after the Geothermal New Zealand stand.

One of the things that the brochure does is direct people to the [HERA website](#) to see the Geothermal Capability Register. If your company is not in this living register or needs to update material, contact Nick Inskip at HERA.

An Update on Christchurch Geothermal – Later in this newsletter we give notice of a tender for a district energy scheme for Christchurch. This may bring up the question of relevance in a geothermal newsletter. Firstly, almost all of the drilling done in New Zealand sedimentary basins has shown the typical temperature gradient of roughly 30°C temperature rise per kilometer of depth. Thus temperatures required for a district energy scheme (around 80°C) could be achieved by drilling to a depth just greater than 2 km – a typical geothermal well depth.

In addition to that, there are known warm springs, and Agnes Reyes (GNS Science) has provided a brief report on these and their response to the two major Christchurch earthquakes.

In 1992 Brown and Weeber reported seven historical and extant thermal springs in Christchurch located at Heathcote-Ferrymead area, Lyttelton (Cass Bay, Rapaki Bay, Lyttelton rail tunnel) and Motukarara with slightly warm waters discharging from a few wells in St Andrews Hill and Halswell. However, of the seven thermal springs, five were still active in 1992: Ferrymead, warm water discharging from a pipe in the Heathcote estuary, Motukarara, Cass Bay and Rapaki Bay. By 2003, when a South Island-wide geochemical survey of hot springs started, Ferrymead was dry and no warm waters were found discharging from the Halswell and St Andrews Hill wells. Thus most of the monitoring of the Christchurch warm springs since 2003 has been focussed on Cass Bay (discharge temperature of 30°C), Rapaki Bay (33°C) and Motukarara (26°C). A thermal spring is defined as having discharge temperatures at least 4°C above the mean annual ambient air temperature.

After the September 2010 and February 2011 earthquakes, the volume of water discharged in Cass Bay, Rapaki Bay and Motukarara increased by a factor of 10, although discharge temperatures remained the same. While that was expected there were some surprises in terms of gas discharges. Gas (~ 82% nitrogen and 13% methane) was being discharged copiously in Rapaki Bay where normally there was none. Some gas was also released in Cass Bay after the February 2011 earthquake albeit much less than in Rapaki Bay.

In Cass Bay thermal waters discharged mainly from two concrete pipes and seeped along a canal adjacent to the boat shed. However, after the February 2011 earthquake a landslide in Cass Bay, more extensive than the aftermath of the September 2010 earthquake, exposed several points of warm water upflow along a 50m stretch of land from the playground to the boatshed. At Ferrymead warm waters, about 5°C above the ambient 17°C air temperature, were flowing in the spring after the February 2011 earthquake, although seasonal variations in flow cannot be discounted.

Thermal waters in Christchurch are mainly groundwaters that had circulated and been heated deep in the crust and then discharged to the surface at 20-33°C, often mixing with cooler groundwaters, and/or seawater, near the surface.

The thermal waters in Christchurch can provide sensitive records of the effects of large earthquakes to a large volume of crust. Variations in the physical and geochemical characteristics of thermal springs after the earthquakes may provide insight on changes in permeability and compaction of the crust and how these changes affect fluid pathways at depth.



Photo: Rapaki Bay- Dark patches on beach are heated groundwaters mixed with seawater. Thermal waters are discharging on the on the left and middle of the beach. Further northeast, the waters are near ambient in temperature. (Photo taken by Agnes Reyes after 22 February earthquake).

International News

An Update on the Australian Geothermal Industry – The Australian geothermal industry is evolving along a different path to New Zealand. The New Zealand Geothermal Association is now working closely with the Australian Geothermal Energy Association and the Australian Geothermal Energy Group especially around matters concerning the World Geothermal Congress. The two Australian associations effectively

serve the same purpose for Australia as the NZGA does for New Zealand and there is talk about a possible integration of the Australian associations at some stage.

Australia has interests in developing the full spectrum of geothermal applications. However the prime sources of energy in Australia, rather than being volcanic in origin (as in TVZ and Northland, New Zealand), tend to be:

- hot sedimentary aquifers (HSAs) which may take advantage of normal thermal gradients or sit about radiogenic granites, or
- potential enhanced (or engineered) geothermal systems (EGS) based in hot fractured granites. Australia is seen as having an optimum resource with hot granites close to the surface and geology which facilitates horizontal fracturing regimes.

The Australians look to the massive reserves on the continent with their low emissions and low environmental footprint, and see opportunities for R&D leadership in both EGS and electricity generation technology with a view to international applications. Clearly geothermal energy is baseload. They have an expectation of low cost which, when this is compared with the cost of a wide range of other alternatives, seems to be the most cost competitive on a levelised cost basis. However, as some people have said – it is all about the flow, and it now appears that the expectation of flow from wells may have been high, implying cost estimate increases as the number of wells go up.

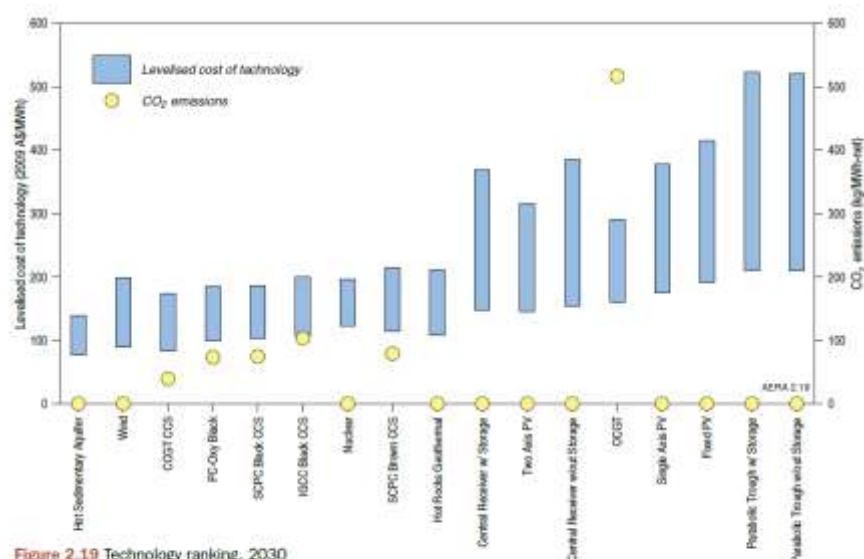


Figure 2.19 Technology ranking, 2030

Source: EPRI technology status data, 2010

Note for 2.18 and 2.19: EPRI levelised cost of technology estimates based on simplified pro-forma costs, individual projects may lie outside this. Levelised cost of technologies: includes weighted cost of capital (8.4% real before tax); excludes financial support mechanisms; excludes grid connection, transmission, and firming (standing reserve requirements); and includes a notional allowance of 7.5% for site-specific costs.

It might surprise people to know that there are 54 Australian companies in the geothermal sector and 51 holders of geothermal exploration licences. Ten of the companies are listed on the Australian Stock Exchange, suggesting an investor appetite for risk in the recent past. In this context, these companies had AU\$2.9b committed to work plans to 2014. This was supported by \$262m from governments including \$153m from the Renewable Energy Demonstration Program (REDP) for the Innamincka and Paralana geothermal projects (REDP requires a 2 for 1 investment by the developers) and \$21m from the Geothermal Drilling Program (GDP) for 3 projects (the additional project being Penola).

The \$50 m GDP existed to offset resource risk associated with the recent high cost of drilling and was allocated on a dollar for dollar basis, but despite being fully allocated, only a small

fraction was spent by the companies. Four companies (Hot Rock Ltd, Green Rock Energy, Greenerth Energy and Torrens Energy) have each recently returned their \$7m allocation because of unfavourable market conditions and the requirements on companies around the matching funding within certain deadlines. In practice, many geothermal companies have struggled through the financial crisis, there have been no recent listings, and share prices have steadily declined over the last 4 years.



There has been some notable progress:

- Geodynamics achieved proof of concept in 2009 on their Innamincka project despite their well blowout,
- A Weatherford deep drilling rig was brought in to assist Petratherm and Panax in mid-2009, leaving in 2010,
- Petratherm completed its first Paralana well in 2010 and has had a successful fracture stimulation programme. It has an offtake agreement with a nearby mining operation,
- Panax completed its Penola deep well in 2010, but its current focus is on investment in Indonesia and India,
- CSIRO has allocated \$19m for drilling in Perth, and
- 180 geothermal heat pumps have been installed in Australia.

The work by the various companies has drawn the interest and investment of a number of utilities:

- [Tata Power](#) is a cornerstone investor in Geodynamics
- [Origin](#) is a JV partner with Geodynamics and has just completed their '[shallows' program in the Cooper Basin](#). Origin owns 51.4% of [Contact Energy](#) which has its own major investment in geothermal energy in New Zealand. Origin has drawn on the expertise available through Contact. Origin has also taken geothermal licences in [Chile](#)
- [TRUenergy](#) is a JV partner in the Petratherm Paralana project (with Beach Energy). TRUenergy is a subsidiary of [China Light & Power](#)
- [AGL](#) owns Geogen which has geothermal projects in Victoria, New South Wales and Queensland

Against initial promises, Prime Minister Julia Gillard has introduced a carbon pricing mechanism to level the playing field in which the 500 largest emitters of CO₂ will pay A\$23 per tonne of CO₂ equivalent from mid-2012 with a transition to a "cap and trade" ETS in mid-

2015. There are now talks about alignment with the New Zealand Emissions Trading Scheme.

The government has continued a 20% Renewable Energy Target (RET) by 2020. A new Australian Renewable Energy Agency is to be established to administer existing grants of \$3 billion allocated to renewable R&D, along with a \$126m Emerging Renewables Fund and a \$100m Venture Capital Fund. Note that the returned GDP funds have been added to the Emerging Renewables Fund, with the intention that up to one third of this fund be for geothermal use on a more flexible basis than past schemes. A Clean Energy Finance Corporation will be set up with \$10 billion for investment in renewable energy projects.

Susan Jeanes of AGEA notes that investors want certainty. This includes a clear and stable policy landscape impacting on funding and market frameworks, a managed resource risk to get the required flow for developments, ongoing cost reductions coming from scale and technology breakthroughs, and workable business models for direct heat projects and geothermal heat pumps.

Because geothermal is a relatively new industry, AGEA is working on a number of compliance issues. This includes:

- Code for reporting geothermal reserves and resources working through a joint code committee (AGEA and AGEG) and a Compliance Committee
- Code of Ethics,
- Best practice notes for community consultation, and
- Guidelines for reporting LCoE

Susan Jeanes is upbeat about the industry. Some of the recent policy initiatives are likely to give the Australian geothermal industry another boost.

Australian Geothermal Grants returned Unused - A lack of interest from private investors in the geothermal sector has seen four geothermal operators return \$7 million each in grants to the Federal Government.

Green Rock Energy, Greenerth Energy, Hot Rock Ltd, and Torrens Energy told the ASX in an announcement in early August that tough market conditions and the design of the grant structure had combined to discourage investors.

The grants were to be used for drilling on projects in Victoria and South Australia under development by the four companies. Only Geodynamics was successful in accessing the drilling fund for a project in the Hunter Valley.

The \$28 million will now be absorbed into a new \$126 million emerging renewable technology program launched in early August by Energy Minister Martin Ferguson. The Minister said up to a third of that fund would be committed to geothermal project development.

Australia Reserves US\$45 million for Geothermal in Emerging Renewables Fund - Australia launches Emerging Renewables Fund, reallocating geothermal drilling grants not taken up and providing up to US\$45 million under a more flexible funding mechanism to the industry.

Sources in Australia reported in early August, "The country's federal government has finally launched its Emerging Renewables program to help support geothermal, ocean and solar technologies, and has expanded the funds by \$26 million after effectively cancelling an

equivalent amount of geothermal drilling grants. Resources and Energy Minister Martin Ferguson said the Emerging Renewables fund would now stand at \$126 million, with up to one third of these funds reserved for the geothermal industry following the repatriation of funds. Further details [here](#).

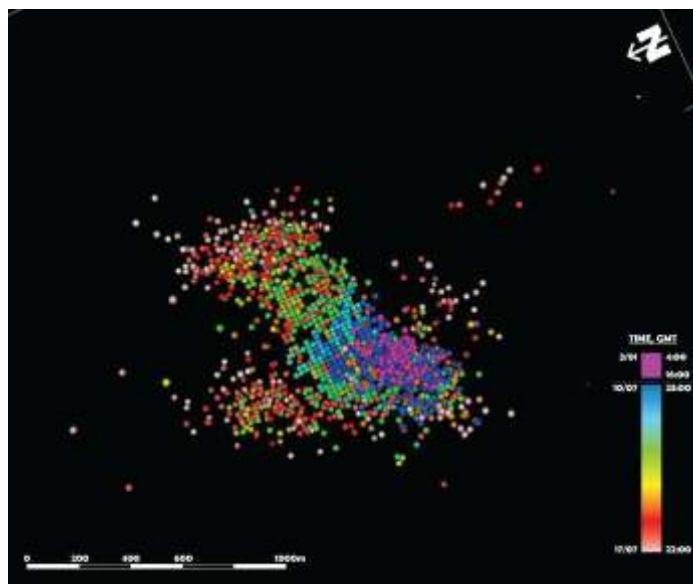
A Paralana Project Update -Petratherm is a specialist EGS explorer and developer with projects in Australia, Spain and China. The Company's flagship project, the Paralana Engineered Geothermal Project is located 600km north of the city of Adelaide in South Australia. Petratherm Limited in joint venture with a major oil and gas (Beach Energy) and power industry energy (TRUenergy) utilities are initially seeking to build a 7.5 MWe commercial power development to supply a local off-grid mine, with the long term objective of providing large scale (260 MWe) power through the national grid.

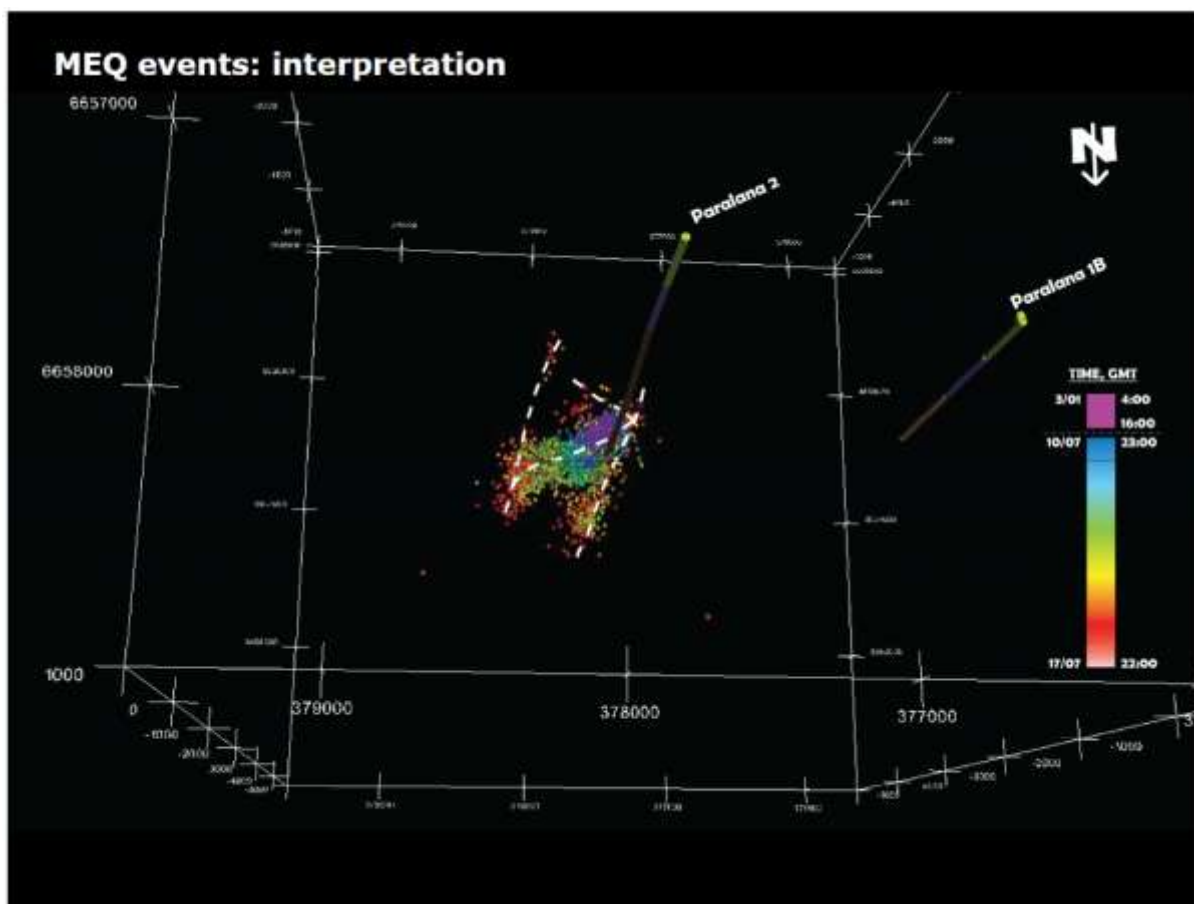
In the second half of 2009 a deep geothermal well, Paralana 2, primarily designed to be an injector well, was drilled to 4003 metres (G.L) AHD. During drilling of the well, several zones of over-pressured fluid between 3670 - 3864 metres were encountered. The Paralana 2 well recorded a temperature of 176°C at approximately 3,670 metres with modelled temperatures of 190°C at 4,000 metres.

In July 2011 the large scale fracture stimulation works were successfully completed. Over a five day period, a total of 3.1 million litres of water were pumped into the Paralana 2 well at pressures up to 9,000 psi (620 bar) and with sustained pump rates of up to 27 litres per second. The extensive micro-earthquake monitoring array detected over 7,000 micro-seismic events.

The stimulated zone extends approximately 900 metres to the north east of the Paralana 2 well at a depth from 3,500 to 4,000 metres. On completion of the stimulation, the calculated stable wellhead pressure was 3940 psi (272 bar).

The encountered over-pressured fluids should assist in the recovery of hot fluids from the reservoir.





IEA Geothermal Roadmap - IEA Executive Director, Nobuo Tanaka, launched the *Technology Roadmap: Geothermal Heat and Power* at the Eurelectric Annual Conference in Stockholm, Sweden, on 13 June 2011. The Geothermal Roadmap reviews the current global state of geothermal energy, its potential for deployment and CO₂ abatement to 2050, and highlights key policy actions required to achieve significant growth of this renewable energy resource. Several GIA participants contributed to the development of this document. Further details as follows - [Press Release](#) and to download the IEA Geothermal Roadmap, click: [Geo Roadmap](#)

As mentioned earlier New Zealand is a party to the IEA Geothermal Implementing Agreement.

Indonesian Government Guarantees will affect about 40 Projects – 40 projects are affected by the recently announced government guarantees for IPPs [Independent Power Producers' projects], with geothermal blocks at Rajabasa (Lampung), Muara Laboh (Aceh), Seulawah (Aceh), Dieng (Central Java) and Flores (East Nusa Tenggara) of particular investor interest.

In mid August this year, the Indonesian government has revised a guarantee that answered investor concerns about the feasibility of independent power producers' projects in the country. Finance Minister Agus Martowardojo signed a revised decree as a way to lure investors into establishing power purchasing agreements with state utility company Perusahaan Listrik Negara (PLN).

It is hoped that the amendment will alleviate investors' concerns about PLN's financial ability to meet the power purchase agreements between PLN and private power plant companies.

In the previous ministerial decree, the guarantee was given by the government through the Energy Ministry to PLN. In the revised decree, the guarantee was issued by the finance minister and given directly to private power plant producers.

PLN president director Dahlan Iskan said re the move that in the past many geothermal projects could not be developed because investors asked for a government guarantee. Geothermal production will contribute 4,000 MW, or about 40 percent of the government's total estimated power production.

There are 40 projects that will be affected by the revised decree. Geothermal blocks likely to be of interest to investors were Rajabasa (Lampung), Muara Laboh (Aceh), Seulawah (Aceh), Dieng (Central Java) and Flores (East Nusa Tenggara).

Note that Indonesia has been a traditional geothermal market for New Zealand consulting skills and direct investment. Many Indonesian geothermal professionals have trained in New Zealand. Indonesia has major goals in terms of new investment in geothermal electricity generation. Greater involvement by New Zealand geothermal companies working in Indonesia can be expected in future.

Further details [here](#).

Japanese Parliament passes Feed-in Tariff Bill for Solar Photovoltaic, Wind, Biomass, Geothermal and Small Hydroelectric Generation

- Japan is positioning itself as the next large growth market for renewable energy as in late August the upper chamber of the Japanese parliament approved legislation that will create a national feed-in tariff.

The new law is expected to bolster solar, wind and geothermal projects by mandating that utilities buy power from renewable sources at above-market rates. The law will go into effect next year, but details about the pricing structure have yet to be determined. In the wake of the recent earthquake and nuclear disaster, there is a growing call for the country's leaders to move away from nuclear power and replace it with renewable energy. According to a recent poll 74 % were in favor of a gradual phase out of nuclear power plants, 11 % called for an immediate end and 13 % thought there was no need to alter policy. Further details [here](#).

Note that the IGA News No 84 has a brief article by Kasumi Yasukawa on the good response of the Japanese geothermal power stations to the magnitude 9.0 earthquake. Nine of the 16 Japanese geothermal plants which have a total installed capacity of 535 MW are located in the northeastern-to-eastern Japan area affected by the earthquake and aftershocks. Some plants were automatically shut down immediately after the quake, but they were quickly restarted (within a few days) and have been generating at original levels since.

Although Japanese high-tech companies are leaders in geothermal technology and export it, its use nationally is relatively small. For decades the Japanese have relied heavily on imported fossil fuels and nuclear power. For now, geothermal makes up less than 1 % of the energy mix in Japan, a resource-poor economic powerhouse that imports its oil, coal and gas and has invested heavily in nuclear energy since the 1970s oil crisis.

The biggest hurdle to geothermal, most experts agree, is the high initial cost of the exploration and drilling of deep earth layers that contain hot water, and of then constructing the plants. Another problem is that Japan's potentially best sites are already being tapped for tourism with popular "onsen" hot spring resorts or are located within national parks

where construction is prohibited. Environmental protection laws too will need to be addressed if the full potential of the resource in Japan is to be realized. Further details [here](#).

Note that the Japanese Government is interested in how it can manage the potential effects of geothermal development in its sensitive areas. Consequently, a small team has just commenced (13 September) a visit to New Zealand to draw lessons from central and local Government, various developers and consultants and from the NZGA. New Zealand has some strong parallels with Japan, so NZGA has been working with tour organisers to ensure key lessons are learnt.

Board and Executive Officer Update

Most updates have been inserted into the body of the newsletter.

Board Matters

There have been no recent Board changes.

The last NZGA Board Meeting was held in Kerikeri, Northland at the offices of Top Energy, the owners of the Ngawha Geothermal Power Station on 23 June. The location enabled a site visit that afternoon, and was a reminder that geothermal development for electricity generation occurs outside the Taupo Volcanic Zone.

The following day the NZGA Board engaged in a Strategy day which Spence McClintock has reported on in his opening note. Tricia Scott did an outstanding job in organising the combined event.

Elections to the NZGA Board

Voting closed for the next Board rotation on 12 September. All current Board members offered themselves for re-election and there were 5 additional nominations for 5 vacancies. Short profiles of those standing have been distributed to all NZGA members along with voting instructions. Announcement of results will be made to members in early October.

NZGA Special Interest Group – Geothermal Heat Pumps

NZGA has a broad base of membership. Within this there are topics of particular interest to some members, and particular issues around those topics. The NZGA is in the process of establishing what should be a semi-autonomous interest group within the Association to focus on heat pumps.

This is an infant industry in New Zealand, though the technology is well-established internationally. With any new industry there is a need to ensure quality information to the public and quality installation by developers. There is likely to be strong representation from manufacturer/retailers, system designers, drilling companies and other interested parties in ensuring that this industry is properly established.

The topic of heat pumps (and other topics) will be covered at the NZGA Seminar in Taupo on 12 October. On that date we will also seek to pull together the first meeting of this interest group. With the help of EECA and GNS Science, representatives from a Canadian Heat Pump association will be brought to New Zealand the following week to discuss the operation of such a group.

Similar Approaches in other Associations - It is noted that the Bioenergy Association of New Zealand (BANZ) has set a precedent for strong interest group representation. That Association has four interest groups, each with its own Committee and Convener, though BANZ members (depending on their level of membership) can choose to be part of any group/s they choose). See more [here](#) and [here](#).

Likewise, the Energy Management Association of New Zealand (EMANZ) also uses Focus Groups as a means to focus member's interests. EMANZ has 5 Focus Groups. Further details are available [here](#).

Once we have established the principle of operation of interest groups there are a number of other obvious interest groups to establish, including an NZ Geothermal Inc international Group and a Maori Issues Group.

Meetings – Recent and Planned

Spence McClintock and Brian White had a very positive meeting with Hon Hekia Parata, Acting Minister for Energy and Resources on 24 May. For the Minister, this was part of a series of meetings with renewable energy associations, to better understand renewable energy opportunities and issues, and to let the renewable industries know the Government saw them as an important part of the future energy mix.

A series of meetings have been held recently in Auckland with a view to progressing a more joined up approach to international geothermal opportunities. See the earlier article about NZ Inc Geothermal.

Related to that, one of the major markets is in Indonesia. The Executive Officer has attended some meetings hosted by the Indonesian Embassy with a view to making connections and understanding the opportunity.

NZGA Annual General Meeting (AGM) November 2011

The **NZGA Annual General Meeting** will be held on **22nd November 2011** and will coincide with the Geothermal Workshop – *“Geothermal - Energy for the Future”*, University of Auckland, **21-23 Nov**. See ‘Events’ for more information and registration details.

Submissions – Recent and Planned:

Recent Submissions

Since the last NZGA Newsletter the following submissions have been made:

- [US Blue Ribbon Panel Geothermal Report](#) - This was an invited submission on a [report](#) on recommended US direction in geothermal research and funding. This drew from New Zealand experience. It was recommended that attention be given to policy aspects around permitting, and market failure aspects around direct use, possibly including a low temperature programme. It supported some funding of drilling and exploration programmes while recognising that it was developers responsibility to bring projects to a decision point. The international workload was pointed out as a means of sustaining any geothermal company. Alignment with IPGT research on EGS was encouraged. We encouraged the expansion of the pool of competent personnel to achieve growth. **August 2011.**

- [Proposed Waikato RPS](#) - A structured further submission reinforcing earlier points. Waikato Regional Council's area that will be covered by the operative policy statement includes most of New Zealand's known high temperature geothermal fields. **July 2011**
- [IPGT Exploration Paper](#) - This was an invited submission on an IPGT white paper on exploration. This submission was supportive of efforts to develop robust exploration models. Encouragement was given for a common code for geothermal reserves and resources estimation. **July 2011.**
- [Proposed Bay of Plenty RPS](#) - This was a structured further submission on the proposed RPS, expressing support or opposition to various other submissions in the areas we have already submitted on. This covers the permitting environment for the balance of New Zealand's known high temperature fields (with the exception of Ngawha). **May 2011.**
- [Proposed NPS on Indigenous Biodiversity](#) - This submission noted that geothermal systems are associated with rare habitats and species, and that protection efforts are underway through complete field protection (in some cases) or targeted reinjection (in some cases). It supported an ongoing flexible approach to 'like-for-like' mitigation. It was noted that some wording was particularly restrictive, and if mishandled could have major unintended consequences for geothermal development in general, for the economy, and for Maori developers who are active parties in most geothermal developments. **May 2011.**

Planned Submissions

Northland Regional Council is in the early stages of undertaking a review of their RPS. A draft for consultation may be available in October, with a view to a proposed draft RPS being notified mid-2012. See more details [here](#)

No other submission requirements known.

Industry Papers

The New Zealand Government is seeking to join the International Partnership for Geothermal Technology (IPGT) and has publicly announced this intention. Target date for joining is at a meeting in November 2011, with a signing ceremony to be held in conjunction with another meeting in Australia at that time.

The following paper was prepared to assist with making the case for New Zealand to be part of the IPGT. It was effectively draft input into the final submission put together by Ministry for Science and Innovation. It includes a lot of useful background into the various New Zealand developments and of the history of some of New Zealand's active participants in the geothermal industry, and gives a summary of the main research and development areas in the public domain.

- **Case for New Zealand Membership of the International Partnership for Geothermal Technology, Brian White, Executive Officer, New Zealand Geothermal Association, August 2011** - The paper can be downloaded from the NZGA web-site [here](#).

Training Update

Geothermal Reservoir Modelling Course - IESE



Registrations are now open! - This 5-day course combines lectures and hands-on experience with modelling software. It's one of the suite of courses on offer by IESE (details available [here](#) and full details of all courses on offer are [here](#)). The syllabus of the modelling course is designed to give a quick overview of geothermal reservoir engineering and modelling theory and practice and then most of the course is devoted to demonstrations and hands-on experience with several simple geothermal models.

The next course date - Monday 14th - Friday 18th November 2011

For enquiries and assistance, please contact Rachel Fenton, Training and Marketing Manager, IESE on email: r.fenton@auckland.ac.nz

[Editors note – why not match this course up with attendance at the New Zealand Geothermal Workshop – see **'Events'** in this newsletter].

Media Releases

New Zealand set to join the International Partnership for Geothermal Technology – The IPGT provides a forum for government and industry leaders to coordinate their efforts and collaborate on projects. Partners share information on research results and best practices to avoid blind alleys, limit unnecessary duplication, and efficiently accelerate the development of geothermal technologies. The relationship is formed at the government to government level and in May this year, the NZ government indicated its intention to join. The NZ Geothermal Association Press Statement is available [here](#).

Tenders and Funding Opportunities

Tenders

GETS Ref 33901 - District Energy System for Christchurch

The Christchurch Agency for Energy (CAfE) invites Expressions of Interest (EOI) from suitably qualified consultants to undertake feasibility studies for a District Energy System (DES) for Christchurch, New Zealand.

[Editor's note - Resources in the area are of course of a lower temperature. That aside, if people drilled deep then there may be resources of interest bearing in mind that temperatures could increase by about 30°C/km].

Christchurch has recently been subject to three major earthquakes (and approximately 8,000 aftershocks) which has largely destroyed the central city business district (CBD).

The implementation of a district heating and/or cooling scheme (commonly referred to as a District Energy System (DES) is one of the opportunities available for the Central City rebuild following the Christchurch earthquakes. CAfE seeks to determine the feasibility of a DES from the following perspectives:

1. Technical feasibility
2. Social, Environmental, Economic and Political feasibility
3. Investment and Ownership feasibility

It is proposed that the selection and appointment of companies to carry out the feasibility studies be on a two stage basis as follows:

- Stage 1: Expressions of Interest (EOI) (this stage) – to identify suitably qualified consultants and potential shortlisting if necessary.
- Stage 2: Request for Proposals (RFP) – seeking proposals for each study.

It is anticipated that contracts for the three feasibility studies will be awarded 30 September 2011.

Enquiries to Lauren Christie EOI submissions should be emailed to: lauren.christie@ch.octa.co.nz

The new Christchurch Agency for Energy (CAfE) – launched in August 2001 - commissioned a report on District Energy Systems (for heating and cooling) from BECA – more details [here](#) and the BECA report [here](#).

[Editors notes - Space heating of individual buildings and of entire districts, is - besides hot spring bathing - the most common and the oldest direct use of geothermal water. Geothermal district heating systems pump geothermal water through a heat exchanger, where it transfers its heat to clean city water that is piped to buildings in the district. There, a second heat exchanger transfers the heat to the building's heating system. The geothermal water is injected down a well back into the reservoir to be heated and used again. The first modern district heating system was developed in Boise, Idaho. (In the western U.S. there are 271 communities with geothermal resources available for this use.) Modern district heating systems also serve homes in Russia, China, France, Sweden, Hungary, Romania, and Japan. The world's largest district heating system is in Reykjavik, Iceland. Since it started using geothermal energy as its main source of heat Reykjavik, once very polluted, has become one of the cleanest cities in the world.

Geothermal heat is being used in some creative ways; its use is limited only by our ingenuity. For example, in Klamath Falls, Oregon, which has one of the largest district heating systems in the U.S., geothermal water is also piped under roads and sidewalks to keep them from icing over in freezing weather. The cost of using any other method to keep hot water running continuously through cold pipes would be prohibitive. And in New Mexico and other places rows of pipes carrying geothermal water have been installed under soil, where flowers or vegetables are growing. This ensures that the ground does not freeze, providing a longer growing season and overall faster growth of agricultural products that are not protected by the shelter and warmth of a greenhouse.

From such a catastrophic event, this is a great opportunity for Christchurch and potentially for low temperature geothermal energy in New Zealand].

Funding Opportunities

Renewable Energy Feasibility Study Grants

EECA aims to help increase the use and understanding of renewable energy in large-scale industrial and commercial applications.

To support this, EECA is now offering grants for feasibility studies into the direct use of either bioenergy or geothermal energy.

More information is available on the EECA website [here](http://www.eecabusiness.govt.nz/node/19231)

Forthcoming Events/Conferences

October

NZGA and NZCEC Seminars and Field Trip – 12-13 Oct

- **NZGA Seminar** – “Geothermal heat: it's amazing what you can do directly, NZ Clean Energy Centre, Taupo, **12 Oct 2011**. Click [here](#) for seminar flyer and programme.
- **Energising Geothermal** - NZ Clean Energy Centre, Taupo, **13 Oct**. Click [here](#) for information and registration

November

Australian Geothermal Energy Conference – “Energy at our feet”, **16-18 Nov**, Sebel Albert Park, Melbourne, Click [here](#) for information and registration.

New Zealand Geothermal Workshop, “Geothermal - Energy for the Future”, University of Auckland, **21-23 Nov**, Click [here](#) for more information and registration and [here](#) for the dedicated event web-site. *[Editors note – why not match this Workshop up with attendance at the 5 day **Geothermal Reservoir Modelling Course** from IESE the preceding week? See **Training** in this newsletter].*

Other Events

World Geothermal Congress 2015 Melbourne - UPDATE

As reported previously New Zealand and Australia geothermal associations have jointly won a bid to host the next World Geothermal Congress in 2015, with the venue being in Melbourne but with field trips in New Zealand and Australia.

Brian White, Jim Lawless and Susan Jeanes (Australian Geothermal Energy Association) have been working hard to ensure the effective operation of the Organising Committee (OC) and various sub-committees beneath that. It is noted that the Australian geothermal industry is

in a dynamic state such that several of the people that were involved in the OC initially have since left the industry, but others have stepped in as replacements.

The major task currently being undertaken is the development of the Master Plan and Budget. Drafts were prepared by Arinex and have been subject to review. Efforts have been made to ensure a match between the current offering and the original bid, and a distinctive New Zealand presence.

Details of the Master Plan and Budget have yet to be presented to the IGA Steering Committee. However, while the cost of registrations is little changed in Australian dollars terms, the major shift in the value of the US dollar will give the appearance of an almost doubling of registration fees. The Organising Committee is endeavouring to maintain flexibility in the structuring of registrations, and will be reviewing the costs as we progress closer to the time.

Arrangements have been made for the next IGA Steering Committee to be held in Melbourne in conjunction with the Australian Geothermal Energy Conference in November, at which time the Steering Committee and Organising Committee members will be able to see the Melbourne Convention and Exhibition Centre facilities. The Master Plan and Budget will also be a topic for discussion.

NZGA Action Plan: (last updated September 2011)

The New Zealand Geothermal Association seeks to assist and promote geothermal interests through a range of means that are put forward by its members and agreed by the Board. These actions are set out in an Action Plan developed on an annual basis. Current status of this Action Plan is shown in the table following.

Action	Comments	Status
HIGH PRIORITY		
Government Lobbying and Raised Public Awareness	NZGA should meet with interested Government ministers and officials, highlighting growth opportunities across Cabinet. NZGA should continue to lobby for NZ membership in the International Partnership for Geothermal Technology to ensure NZ remains a force in geothermal science and technology	Minister Wayne Mapp announced the Government's intention to sign up to the IPGT and has commenced the process. NZGA assisted with the preparation of a draft application on behalf of Ministry of Science and Innovation, and NZ Government has now sent the application to IPGT for consideration and possible agreement in November. Meeting with Minister McCully held 29 March and Acting Minister Parata held 24 May.
Submissions on Policy	NZGA will make relevant submissions in response to government consultation documents e.g. climate change regulations, etc	Submissions were made on geothermal aspects of RPS's for EW and BOPRC. Submission made on NPS for Indigenous Biodiversity 2 May A further submission on BOP RPS was made 19 May and referenced parties have been copied. Submission made on IPGT High Temperature Downhole Tools paper 8 July A further submission on Waikato RS was made 15 July and referenced parties have been copied

		Submission on US Blue Ribbon Panel geothermal report 1 August
Review of Training Requirements	Information and Education Subcommittee should meet to set its own terms with a view to high level direction for NZGA, and to develop broad industry training strategies. Training and currency of information is critical in an expanding industry with ongoing development. This applies to electricity generation, heat supply and heat pump applications. It covers tertiary and trades development.	Juliet developing a paper
'Policy on a Page'	NZGA should review its high level messages	
Geothermal Marketing Plan	NZGA needs to present geothermal energy in a positive manner to attract investment and personnel.	
New Zealand Inc Initiatives	There are great opportunities for international growth and NZGA can facilitate some of the efforts aimed at a more integrated approach and assist with provision of useful information.	Board and EO offered to provide technical review for papers. EO has been working with interested parties now under leadership of Mike Allen. Soft launch of New Zealand Geothermal at the Pacific Forum Showcase in September including collective marketing brochure. Further prompts given to members to update details in the HERA Geothermal Capability Register.
INTERMEDIATE PRIORITY		
Website Update	The website will be continually updated to include latest studies and information. Some of the tasks below reflect current weaknesses in the website and NZGA's knowledge base. This is one of the principal means by which we educate the public and inform our own members.	The site is continuously updated. Information on alternative resources added. Job vacancy section added. Information on developments has been prepared. Draft company profile section has been prepared.
Annual NZGA Seminar and the New Zealand Geothermal Workshop	These will be the premier national industry events for information dissemination and networking. NZGA should lobby for the production of proceedings or for the publishing of papers on the Stanford website	Proceedings and papers will be produced. Dates and details for these upcoming events have been finalised and advertised
World Geothermal Congress 2015	NZGA should provide necessary support for the joint NZ/Aus World Geothermal Congress 2015	ANGEA/IGA agreement was signed at WGC2010, initial deposit has been made, ANGEA internal agreement has been signed, Arinex management and underwriting agreement has been signed, Organising Committee has commenced work, draft master plan and draft budget have been developed for IGA Steering Committee review, arrangements have been made for IGA Board and Steering Committee to visit venue.
Geothermal Short Courses	Short courses (normally crammed into a day), can give a broad overview of geothermal energy for consenting agencies, developers and other interested parties. This assists development directly. Policy and industry overview meetings are still required	Short courses have been arranged through the University of Auckland and advertised on the NZGA website.
Broadening Geothermal Base to Tourism	Our members include landowners and varied businesses including tourism. This aspect should be more prominent	Have prepared brief notes for public presentations, Independently, Whakarewarewa has joined NZGA as a Corporate member and their manager has

		offered herself as a Board candidate.
Awards	A function of NZGA is to recognise significant achievement by members. One aspect of this is awarding of Life Memberships	Board has followed a process that has seen Colin Harvey and Richard Glover elected to Life Membership.
Geothermal Drilling Report	Continuing a suite of geothermal reports, a report will be prepared on geothermal drilling and well design outlining current practice, costs, differences between conventional fields and EGS developments, new areas of development and issues to be addressed by industry	MB Century will be using an engineer working with Tom King to undertake this work.
Development Guideline Report	While large generators can handle their issues, there may be a large number of issues faced by small generators. This will provide a beginners guideline to geothermal development.	Have had initial discussion in East Harbour
Description of Major Geothermal Developments	This information, aimed at the public and those with a general geothermal interest, is of general interest	Complete. Information was collected for input into the IPGT application and has subsequently been added to the NZGA website.
Geothermal Heat Pump Studies	Heat pumps are now entering the New Zealand market. Initial indications are that, for large domestic loads (including water heating) and above, this option is competitive with other common heating options so could be a significant contributor to our national energy future. There is still a need for resource information in the top 100m around NZ. Efforts should also be directed at raising the profile to help with uptake.	GNS Science is reporting on Heat Pumps as part of their Low Enthalpy research program. Heat pumps will be covered in the NZGA Seminar. An attempt is being made to establish a geothermal heat pump interest group within NZGA
Memorabilia and Industry Archive Facilitation	It is recognised that key information and equipment could be lost if an industry archive is not established. The NZGA should facilitate discussions to collect and preserve this pioneering material.	Initial discussions were held with Contact Energy on a temporary storage location.
Emissions Trading Scheme Information	Major geothermal industries will be subject to emissions trading scheme regulation and potential trading. This is a major change in the industry for which there may be little understanding. Some paragraphs are required on the NZGA website.	Brian Carey and Tricia Scott will progress this.
Review of the Australian Geothermal Industry	The Australian geothermal market is a home market for many NZGA members. Opportunities and progress need to be understood. This can be in a framework of government policy, permitting regimes, access to data, and factors leading to success.	A short article was written in the September newsletter based on presentations by Susan Jeanes AGEA and recent news releases.
Science and Innovation Fair	This is a 2012 event directed at schools in the Taupo region that could help direct young people into engineering/science, for which alignment with industry is wanted	Not relevant in 2011, but retained as a prompt for 2012

Membership

NZGA individual membership currently stands at 300. NZGA is grateful for the support of its Corporate and Institutional members in helping the Association's work on behalf of the wider geothermal industry. For a list of these industry supporters see <http://www.nzgeothermal.org.nz/about.html>.

Further details on Membership can be found [here](#) on the NZGA web-site.

Individual membership

The NZGA currently has 300 individual members with varying degrees of involvement in the geothermal sector in New Zealand. We have actively been following up members for subs payments and deleting people who no longer wished to remain members.

Western Pacific Regional Branch membership

The Board encourages members to consider the voluntary membership of the WPRB of the International Geothermal Association. This can be done by contacting Jim Lawless (JLawless@clear.net.nz). Currently there is a one-off joining fee of only NZ\$7.

Life Membership - NEWS

Colin Harvey and Richard Glover have been accepted as Life Members of the NZGA. We congratulate them both and thank them for their contributions over the years (and ongoing) to the geothermal industry and to the Association.

Because of by-law restrictions, Colin Harvey will be made a Life Member in the 2010/11 financial year and Richard Glover will be made a Life Member in the 2011/12 financial year.

We hope to make a formal presentation of a certificate at the AGM or Workshop dinner in November. A further election of Life Members may be made next year.

Corporate and Institutional Membership

Memberships at this level are tiered – Platinum, Gold, Silver and Bronze - and members logo's are shown on the web-site against their membership level (see <http://www.nzgeothermal.org.nz/about.html>). Links to member's respective websites are shown and we are developing short member profiles on each of these companies. They will be available on the web-site soon. If your company is involved in the geothermal industry, and so benefits from the long term advocacy and coordination of the NZGA, then we would encourage you to contact the Executive Officer or other Board Members about your support role.

The NZGA would like to thank all of its members for their ongoing support of this industry.

Keeping in touch

A note to all members – if your contact details change for any reason, please advise us of your new contact details as soon as possible. Email the [Executive Officer](#).

Use of and contributions to this Newsletter

NZGA produces this Newsletter primarily for the benefit of its members and also for the wider public. We are happy for the material in the newsletter to be used but ask that the NZGA Newsletter be acknowledged as the source.

We are always keen to promote our members and their project activities – please contact us with your news, vacancies or useful materials.

Thank you.

Brian White
Executive Officer

Spence McClintock
President

Colin Harvey
Past President