POWER, POLITICS AND PEOPLE PROBLEMS AND SOLUTIONS LONG TERM USE OF GEOTHERMAL RESOURCES

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INTRODUCTION

Distinguished guests, International and New Zealand workshop delegates. I've been asked to *speak* at this 15th New Zealand Geothermal Workshop because the Wairakei Geothermal Power Station with which I am involved has used geothermal energy over a long period of time. Wairakei is a natural candidate for inclusion at this workshop with a theme of the long term use of Geothermal Resources. The 35th anniversary of power generation from the Wairakei Station occurs in just a few days. The first high pressure turbine generator at Wairakei was synchronised to the North Island grid on the 15th November 1958.

In this address I want to focus on both the past and the future. The long term use of geothermal energy requires that the future be kept in mind and that the past be used to assist with our future view and direction.

It was stated by Allsop "if men could learn from history, what lessons it might teach us!" I *trust* we will learn from history over the course of *this* workshop.

This paper will not look at technical issues because it is my view that there are generally solutions for technical issues, and we are working on these in our day to day work. I wish to extend our horizons today because the issue of the long term use of geothermal energy relates now, more than ever before to the environment with in which geothermal energy functions and the values placed on geothermal energy.

To that end I wish to discuss

POWER, POLITICS AND PEOPLE

Power, politics and people are usually three areas in which it is more difficult to find solutions than it is to technical issues. Satisfactory solutions in these three *areas* requires persistence, effort and time.

The central government's referenda on the 6 November on the way the government is made up indicates that the solutions to hard issues are usually left for people to decide. Maybe there is a message here for the geothermal community. The decisions relating to the long tenn use of geothermal resources rest with the people of New Zealand. Referenda on geothermal matters are not held but people do vote by their attitudes, behaviours and submissions.

The Peoples Choice

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POWER ?

What of power?

Power crises in the 1940's and 1950's birthed the geothermal development at Wairakei , but the natural, raw power of the resources we harness is much older.

THE POWER OF NATURAL PROCESSES.

It is easy to forget the time taken and the power of the processes that have been responsible for forming the geothermal systems with which we are involved. When eruptions on the scale of Pinotubo or even small events the size of Mount St Helens occur we are reminded of the immense natural forces and energy that are responsible for the formation of volcanic areas. The processes at work are immensely powerful and have occurred over vast time scales.

The forces involved in the Taupo Volcanic Zone are evidenced in the recent eruption of Taupo about AD 186. This was probably the largest eruption on earth for the last 5000 years and yet provides only the surface formations to parts of the Taupo Volcanic Zone.

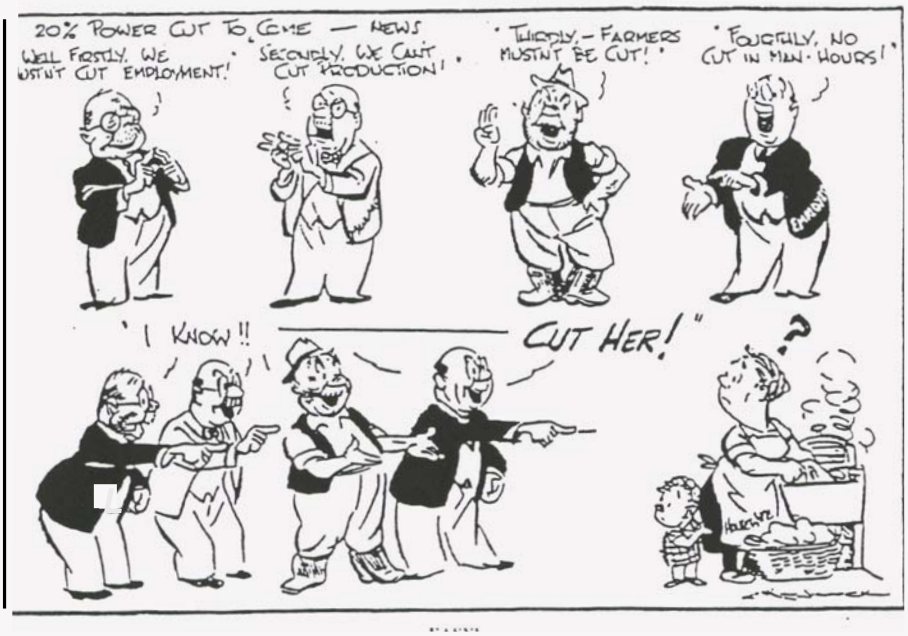
Wairakei the place of adorning, sparkling water where the pools were used as mirrors is a modest understated name for a location where the raw power of nature from deep underground penetrates the surface. The Wairakei system is a complex creation of volcanic eruptions, flows and sediments spanning over half to one million years in time. We look back over 35 to 40 years and talk of harnessing the energy and raw power from this amazing complex. We need to look back beyond the last 40 years . and to develop a deeper respect for the length of time taken to form these natural resources.

We must also continue to cultivate and foster respect for the raw power of the geothermal resources that we harness.

POWER DEMAND

The use of geothermal energy in New Zealand emerged on a large scale as a result of the post world war II demand for energy and in particular electrical energy.

During the war brown outs and supply disconnection occurred as the demand out stripped the available supply. New plant was unprocurable and could not be installed because industry was focussed on the war effort. The situation continued to deteriorate in the post war period. 1945 saw coal in short supply and the level of lake Taupo reduced to low levels. Power cuts were the only alternative to a breakdown of the North island generating system. 1946 and 1947 experienced periods of drought, with low inflows to the hydro catchments. Power cuts of up to 20% were imposed over the winters of 1946 and 1947. Demand was increasing rapidly. Electricity had arrived and people wanted it.



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The development of Wairakei occurred out of the necessity to meet this growing demand for electrical energy in the North Island. Significant hydro power development was being undertaken on the Waikato but the droughts and water crises in the late 1940's focussed the minds of the politicians and government agencies on the need to consider other indigenous sources of energy. Power development at Wairakei was one result.

In the period 1948 to 1961 demand surged forward at an average rate of 8.1% per annum.

Later, in the 1960's and 1970's power station size became an important consideration for the New Zealand Electricity department. Big was beautiful and anything that was going to produce less than 2000 GWH per annum was not seriously considered. Ohaaki was almost a causality of the big is beautiful syndrome. For the long term use of geothermal resources medium to small size is an appropriate strategy.

POWER PLANNING

Centralised planning has come and gone. Maximum benefit to the owner, competition and the market place is the mechanism the government is wishing to employ in the current era of energy planning. What conflicts does this raise that may rebound on wise use of geothermal resources? What does wise geothermal energy planning look like in the current era - is there such a notion?
If the geothermal community doesn't have a coherent plan how can we expect other people to organise a plan for us? Maybe we don't want a plan but lets at least discuss it.

POWER STRUGGLE

Natural gas came to challenge geothermal in the late 1960's and early 1970's when the power planners relegated geothermal behind natural gas for electricity generation. In 1971 the Ministry of Works wound down the Geothermal project based at Wairakei because geothermal was out of vogue. Kapuni and Maui gas were first and forever.

The drought years of 1973 and 1974, and an oil crisis soon focussed the power planners attention again to indigenous sources of energy. Geothermal remerged as a strong contender. A power station at Ohaaki started to be considered seriously.

Why ever was gas played off against geothermal. There was a need for both, then, now and in the future.

And so, there is a need in the future to ensure that different energy forms are not played off against each other. Different energy forms have their place in the energy market.' If geothermal plays one up to another energy form then it won't be long before the game is reversed. A complementary approach to different forms of energy will allow each to develop long-term.

The struggles of competing energy forms of the 1970's has been replaced with the struggle of the 1990's between conservation and energy use. Having conditioned ourselves and the nation over the last 40 years to the fact that energy is available, we want it, we say we "need" it and we certainly use it. What will our approach be in the 1990's? Did you live through the 40's? Did you bath once a week to save energy and what about the restrictions on using electricity, what alternatives did you use. I understand that in the 40's there were restrictions on the purchase and manufacture of radiant heaters and almost all other domestic electrical appliances. If you lived through this era then I *suspect* you will have learnt a conservation mentality and have strategies that you have already used. You will be better placed than those of us who haven't lived through that period.

Conservation seems a little like self imposed blackouts? Can you live without your appliances, your TV, your video, your geothermal heating, your computer and your energy intensive lifestyle? On the other hand - Why should you? How will this conflict be resolved? Where does the middle ground lie and what balance will you achieve? What weighting do you give to your energy use and to conservation values?

POWER OF PROMOTION

The geothermal industry needs to promote itself. If geothermal is not going to become embroiled in conflict the indusw needs to continue to mature, to exhibit a balance between conservation and wise use of the energy resources. Additional uses of the geothermal resources that are currently being extracted need to expand further. Heat and mineral use opportunities are areas that can be pursued still fiuther.

Within the industry we need to work through the conservation and energy use conflict If it is argued vigorously in the public arena it is likely to expose the **industry** to additional uncertainty and result in resistance from the nation to further wise use of geothermal resources.

ECNZ has been promoting geothermal use through its visitor centre at Wairakei over many years. The centre is visited **by** over 100,000 visitors per year. IGNS have an excellent centre at Wairakei which has just recently opened. What involvement have you in promoting Geothermal? Is the promotion from self interest or geared towards the wise use of the geothermal resources of New Zealand?.

Have **you** joined the New Zealand Geothermal Association (NZGA)? It is a **forum** for open debate on issues. The possibilities for public promotion need to be further explored by the NZGA.

Geothermal educational material needs to be prepared and available for New Zealand schools. Education of the younger generations is one way that a balanced perspective of geothermal energy can be presented and maintained for the future.

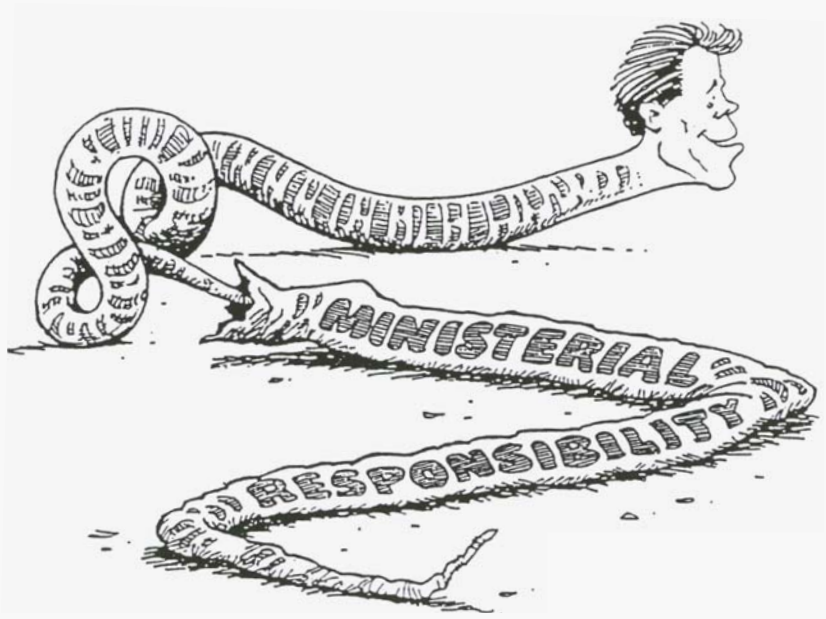
And what of the Auckland Geothermal Workshop **is** it possible to put on Geothermal seminars and information sessions for the people of Auckland and of New Zealand. Would industry consider hosting perhaps one night of the workshop for public information. It is an ideal opportunity. We need to, not only be meeting colleagues from the past but also focusing on and fostering colleagues for the future.

The World Solar Summit convened in July 1993 under the auspice of UNESCO is looking to have a World Solar Decade from 1995 to 2005. The definition of Solar energy includes geothermal energy. What possibilities exist for raising the profile of geothermal energy in New Zealand **as** a part of the Solar Decade.

POLITICS

GOVERNMENT POLITICS

The New Zealand government has in the past assumed a pivotal role in the use of geothermal resources in New Zealand but the government is no longer taking that role. The government has shed its skin!



Development at Wairakei was born out of central government power planning and legislation promulgated to facilitate geothermal development.

1952 saw the enacting of the Geothermal Steam Act, followed by the Geothermal Energy Act in 1953. These acts were specifically passed to enable the Wairakei development to proceed, for electricity generation to be undertaken using geothermal energy and to facilitate other uses of geothermal energy. In reading the Geothermal Energy bill for the second time on 25 November 1953 the Hon W Gooseman stated that "The bill is a very important one. We have arrived at the stage in the development of our geothermal resources when we are able to say that there is not any doubt about the future use of geothermal steam for the generation of electricity."

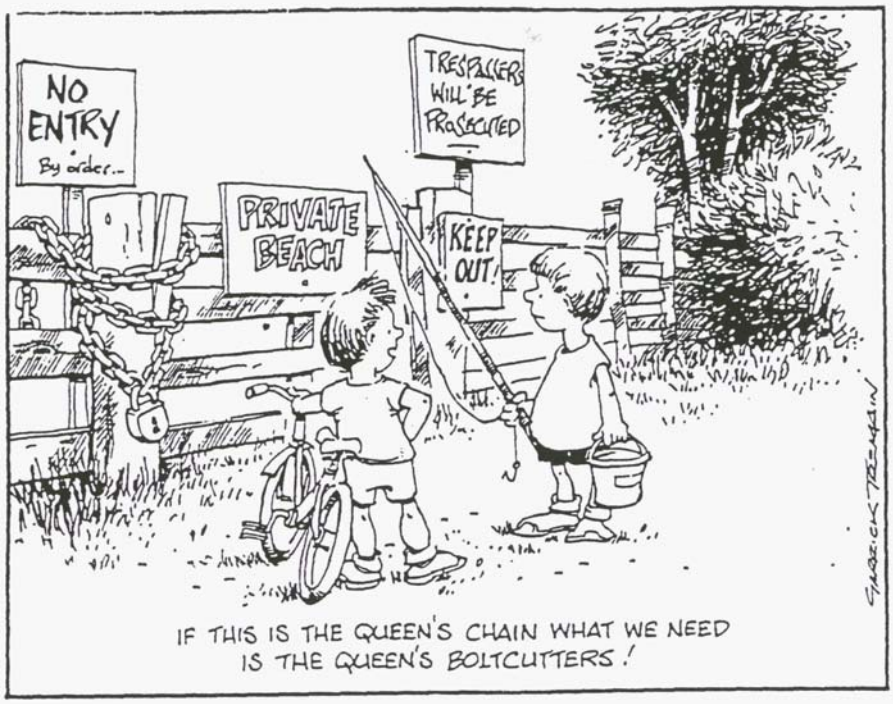
The Geothermal legislation vested the energy management with the Crown. The process was an internal process by the Minister and the department responsible for the legislation. The minister took advice and he decided, - issuing the licenses or authorities as appropriate.

Some 14 years later the use of water, including geothermal water and steam came under the jurisdiction of the Water and Soil Conservation Act 1967. The Regional Water Boards were involved with water. The process was a public process through the Regional Water Boards with hearings able to be held. People could object to applications but objectors had to have an interest to an extent that they were affected by the applications being considered.

The geothermal legislation evolved to be a mixture of a public process (WSCA) and an internal process (GEA) to the Minister responsible for the Geothermal Energy Act. For a development to occur both approvals had to be obtained and they had to coincide to enable the extraction of fluid and energy to occur.

The legislation took a significant change in 1991 with the passing of the Resource Management Act 1991. The resource management act process is a public process. The days of the internal government process and the Minister deciding have gone. The Government has put the decision making out to the regional Councils and to individuals, including you and me.

Any party or individual can make a submission on a consent application and can be heard at a hearing, whether or not they are directly affected by the application. The regional councils are in the process of preparing regional policy statements and regional plans right now. You can have input into these. The geothermal community through the regional planning processes needs to get the correct perspective on geothermal into the regional policies and plans that are presently being developed.



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The resource management legislation which covers geothermal resource use requires a values base to be effective. This values base is open to interpretation. The values are not yet well understood by the professionals or the public. What is the concept of sustainable management for geothermal?

The geothermal community needs to be aware that lack of information and misinformation will shape values if real information is not available. It is important that balanced information be put forward for the future management of geothennal resources.

REGIONAL AND TERRITORIAL POLITICS

In the past and still today there is interaction between the various territorial and regional governments. The issues relate to where the boundaries lie under the legislation and physically on the land? Are neighbouring regional councils going to have quite different geothermal polices and what about the territorial authorities some of them are involved with multiple regional councils. Will geothermal get cdught up in any conflict or cross fire?.

PEOPLE

The New Zealand geothermal sector is built with character and built by Characters. You don't have to think too hard to identify Characters who are or have been involved in geothermal work in New Zealand.

Let me introduce to you some people who may be new to you. They are from the political arena and from the electricity industry. They have been responsible for giving momentum to development of geothermal resources in NZ.

HON R SEMPLE (LABOUR MP) 1935 TO *1949*

The minister of the Public Works Department and also the Minister of the State Hydro-electric Department when it was formed in 1946.

Semple was a hydro man at heart. "Other countries without water power resources look with envy upon the immense water-power potential of New Zealand which only awaits development in order to place this country beyond the possibility of power-shortages for a considerable time to come."

In 1948 he understood that other energy sources had to be developed to meet the demand for electricity and geothermal energy started to emerge. He stated "At the same time that this investigation of hydro-electric sites is being prosecuted, the Department of Scientific and Industrial Research has undertaken the investigation of the possibility of making use of geothermal steam." (1948 D-4 p2).

Semple was the man who was responsible for the intensive investigations that were commenced at Wairakei and likely was responsible to a greater or lesser degree for the careers of many of you people attending this workshop.

KILOWATTS AND KILOWHYS

HON W GOOSEMAN (NATIONAL MP) *1949* TO *1957*

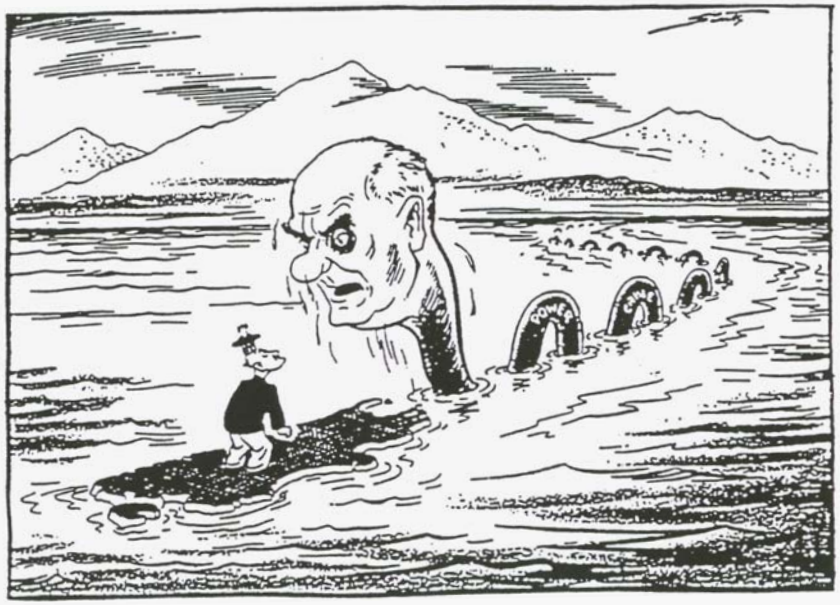
The minister of the Public Works Department and the State Hydro Electric Department fiom 1949 to 1957. He pledged that he would work towards eliminating power shortages.

Under questioning in the house on 12 July 1949 he stated "Immediately this government took office the subject of power supply was investigated. The completion of the hydro-electric generating plants under construction is being expedited and all possible methods of overcoming the present power shortage and thereafter of maintaining generating capacity above demand are being examined. ....Investigations into the possibility of generating power from geothermal steam are in hand also and are being pushed ahead so that the Government may know as early as possible whether, and if so, how much, power might accrue from this source." (Question and replies July 12 1950)

In the next year he stated *An* investigation into the possibility of harnessing geothermal steam is proceeding very actively. If this source of power proves to be available, then it will have a profound effect upon the future of this country. (1950 D-4 p1)

1952.."Personally I have the utmost confidence that geothermal steam will take its place as one of the power resources of the North Island." (1952 D-4 p2)

Subsequently he committed the government to completing major Hydro developments in the Waikato and in our context was responsible for the commitment to Wairakei in 1953.



THE COOK STRAIT MONSTER

HON H WATT (LABOUR MP) 1357 TO 1960

Minister of the Public Works Department and State Hydro Department. He was responsible for pushing for increased generation from Wairakei. Watt produced a White Paper on power development and favoured the plans of the Ministry of Works somewhat more than those of SHED.

He stated in 1958 " Alongside the expansion of generating facilities on the Waikato River there is to be development to the fullest extent of the geothermal resources at Wairakei and other areas of the North Island." "It is the governments intention to proceed at an increased pace with the drilling and investigating for geothermal steam. The power station at Wairakei is almost completed to the stage where stage I will be producing power. Stage II has been approved and shortly the engineers will be in a position to determine stage III.

Very encouraging progress is being made with the investigations at Waiotapu, while it is also confidently anticipated that a station of 40,000 to 50,000kW could be established at Kawerau."

FREDRERICK KISSEL 1905 TO 1948

Kissel was a pioneer of the electrical system in New Zealand. He joined the Public Works department in 1905 and through the period up to 1924 was involved in the Electricity system in an investigations capacity and then as Assistant Chief Electrical Engineer. In 1924 he was appointed Chief Electrical Engineer a position he held up until 1946 when he was appointed the First General Manager of the State Hydro-electric Department from which he retired in 1948.

Kissels contribution was as the overseer of New Zealands emerging electrical system and the formation of the government department responsible for electricity generation. Kissel was dedicated to hydro generation and the Waikato was his preferred source for generation. He had some interest in steam plant but had doubts about the reliability of coal supplies. Kissel retired at the time that the investigations into geothermal steam generation were emerging.

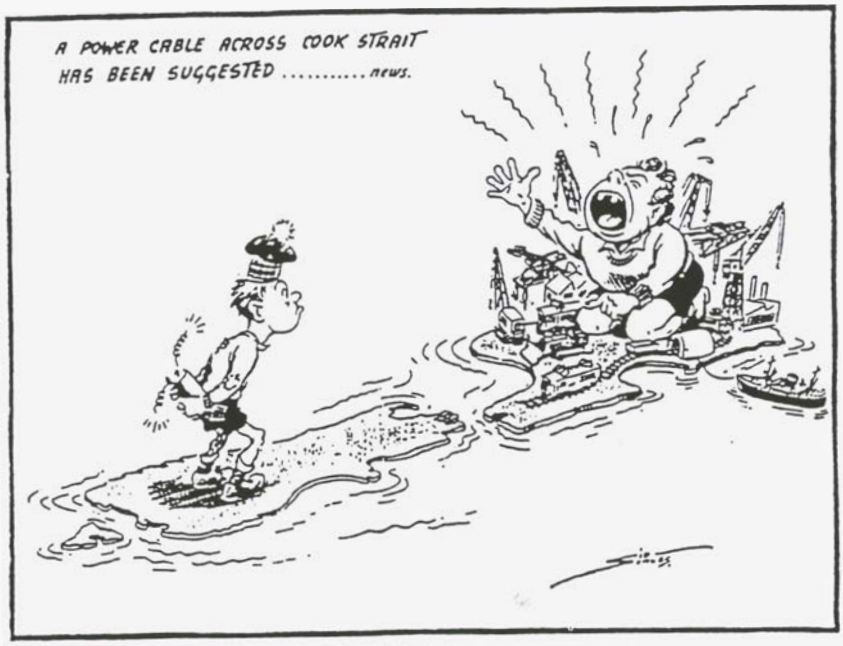
***ARTHUR* DAVENPORT 1948 TO 1963**

Davenport followed Kissel as the General Manager of the SHED from 1948 to 1963. Davenport oversaw the transition from SHED to the New Zealand Electricity Department. He also saw the development of the electricity system under both labour and national governments of the 1950's.

Davenport was responsible for broadening the electricity generating base to include thermal power generation from Meremere and geothermal generation from Wairakei. He was responsible for dealing with a period in which the demand for electricity was rapidly rising. Davenport was less convinced about geothermal use than some of his colleagues in the Ministry of Works but never the less saw Wairakei through to the completion of stage II in 1963.

MATTHEW LATTA 1948 TO 1963

Latta was appointed Chief Electrical engineer of the SHED in 1948 a position he retained until 1963 when he retired. He was a key proponent and the brains behind the link between the South island and the North Island. He was a strong proponent of this link and the strength of his view was born out in an open dismissal of alternatives. New Zealands coal supply was too small and expensive, oil-fired stations were expensive and relied on imported fuel; the potential for nuclear stations had been exaggerated; gas-turbine stations were not suitable for base load; geothermal energy was a very much unknown quantity. If Latta had his way geothermal development would not have featured until the Cook Straight Cable was in place. Balancing up the strength of Latta's view was the strength of the views of the Commissioner of Works. F M Hanson publicly stated in 1956 that the need for the inter island link was not urgent because of the prospect of geothermal steam becoming available. The Cook Straight Cable was commissioned in 1965 and the stage II development at Wairakei completed some two years early in 1963. In hindsight was there any need for the battles between the personalities?



"MUM — HE'S GOT THE BATTERY!"

ECNZ

WHAT ABOUT ME AND YOU ?

The problem is that we always want to be right. Why is our desire to be right so strong? What does that limit and what does that stop from being undertaken or developed ? Are you a lava flow thinker?

When you entered the geothermal world you developed patterns of thinking based on the people around you. You went with the flow. Your thinking processes developed, flowed, bubbled, spurted and ran hot. In time a bit like the lava flow the edges cool, crusts develop and then the lava solidifies. May be you and I need a fresh eruption in order that we will be open to new ideas and new possibilities enabling the commitment of the forceful characters of the past to be carried into the future..

THE FUTURE

The key to the future of geothermal in New Zealand lies with the people. If the people want geothermal energy then further use will occur.

In the past the Government has played a pivotal role in the geothermal industry, establishing the legislative framework and through its departments taking the lead in developing the technical expertise of the industry and in providing the developments it thought the people of New Zealand needed. This role is no longer being played. For the future the government has set a basic open legal frame work inside of which values of the people of New Zealand will determine the opportunities for further geothermal energy development.

The Tangata Whenua have had strong associations with the geothermal resources over the period that they have occupied New Zealand. Their cultural values and views are becoming an integral part of geothermal resource management.

Opportunities need to be made to present the wise use of geothermal energy as a responsible coherent option for the supply of some of New Zealand's energy demand for the long term so that the public and government are at least neutral if not supportive of the use of geothermal energy.

Do we like the Hon Gooseman have the utmost confidence that geothermal steam will take its place as one of the power resources of New Zealand for the future

Geothermal energy will be there. Its profile will depend on the characters involved. No one is as well equipped to promote geothermal energy for the long term as we are.

THE FUTURE ?

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