GOVERNMENTAL IMPACT IN THE U.S.A. ON GEOTHERMAL MARKET DEVELOPMENT.

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Abstract

Geothermal resources initially were developed in the United States in the conventional way with an entrepreneur independently exploring for and doing the preliminary development work necessary to demonstrate reserves.

Having independently established a reserve contract was entered into with a utility to build a generating plant and purchase the geothermal "fuel" from the steam developer.

With the oil crisis in the early 70s came the desire for rapid development of renewable resources and government became involved to facilitate the expansion of the use of renewable resources such as geothermal.

As the oil crisis has become more of a crisis for the suppliers rather than the users, government activity in renewable has waned and "lowest price" options are being promoted in the electric utility industry.

The paper will cover the history of government activity and emphasize the benefit of a healthy long term governmental involvement in the development of the market for the geothermal industry.

Key words: Legislation, government, history, market.

The Federal and State governments in the USA played a key role in establishing a system under which the development and marketing of geothermal power has flourished. The cooperation of governmental legislatures and regulatory agencies is a key element in the success of development and can be a detriment as well, if regulatory uncertainty and legislative hostility to the industry occur.

Certain key pieces of legislation that has occurred over the years in the USA and I hope to highlight them and give insight into the needs which brought them about and the success (or failure) of the implementation at both the Federal and State levels. My desire is that countries which are formulating governmental policy in geothermal development in their own jurisdictions learn from the experiences of the USA.

Geothermal resource development began in the U.S. at "The Geysers" in Sonoma County in California and was the basis for the formation of the Magma Power Company in **1954.** The exploration and development was carried out in a way similar to that of oil & gas, with the field operator looking to the electric utility as the purchaser of the resource or the "refiner". In **1958** PG&E entered into a contract with The Geysers field operator to purchase geothermal steam and build the generating facilities to convert it into electricity.

The initial development was on privately owned land with the surface owner having the ownership of the minerals. It was fortunate that this initial development did occur on private land since it allowed leasing and development to occur without a need for significant governmental involvement. Development began with a 12 megawatt contract.

After success of geothermal development became obvious at The Geysers on private holdings, serious interest began in exploring on the State and Federal lands, where surface manifestations indicated high potential for exploitable geothermal resources.

The federal government deemed that geothermal resources were minerals under leasing laws, in existence at the time, when developers sought exploration opportunities on federal lands. It became clear that due to the unique characteristics of geothermal that it did not fit under the regulations associated with mineral law. Lobbying for a special handling of geothermal resources brought about the Geothermal Leasing Act of **1970** and this was signed on December 31, **1970** by President Richard Nixon.

HIGHLIGHTS OF THE GEOTHERMAL STEAM ACT OF 1970.

This legislation was a comprehensive act "To authorize the Secretary of Interior to make disposition of geothermal steam and associated geothermal resources and for other purposes."

Systems were established for competitive bidding on lands known to have geothermal resources and direct leasing on other lands. The United States Geological Survey was given the responsibility to determine the boundaries of Known Geothermal Resource Areas (KGRA's) where competitive bidding was required.

It gave grandfather rights to those who had spent money on the exploration of geothermal resources in a KGRA under previous government systems, where they could match the highest bid in a competitive auction and obtain the lease.

The act laid out the specifics of the leases and also called for the Secretary to have rules and regulations developed that he felt needed to cany out the provisions of the act.

Environmental impact reports on the leasing were developed and regulations finalized in early **1974** and the initial leasing took place in **1975.**

The leasing act created a good vehicle for the exploration for geothermal resources on Federal lands and States implemented similar laws to allow State lands to be explored. As resources were discovered, marketing plans were pursued and the geothermal developers found that the traditional utilities looked upon the resource as more of an R&D opportunity rather than a significant near term power development. Joint Ventures between geothermal developers and utilities were formed and small pilot plants (normally 10 megawatts) where developed to demonstrate process technology and provide information on reservoir characteristics.

Utility concerns about reliability and reservoir capability, made it difficult for geothermal developers to obtain contracts from utilities to build commercial sized plants at proven resources other than The Geysers, where many years of operational data was available.
Oil embargoes and concern about the availability of natural gas along with the environmental legislation created a situation in the 1970's which promoted energy efficiency and renewable resources. The upshot of this was the passage in 1978 of the Public Utilities Regulatory Policy Act (PURPA).

HIGHLIGHTS OF PURPA.

Two items in the legislation made it beneficial to the geothermal industry. It mandated that utilities purchase power from geothermal projects (small power producers). The price to be paid was stated to be "the cost to the utility of the electric energy which, but for the purchase from the cogenerator or small power producer, such utility would generate or purchase from another source."

With the passage of the Public Utility Regulatory Policy Act geothermal development took a new turn in how the business of exploration was done. It required geothermal developers to get into the business of building generating facilities in addition to the development of resources. In many instances the power plant required an investment 3-4 times the cost of developing the resource. This is similar to the situation in which a crude oil producer would be in if he had to build a refinery to market his crude.

The State of California participated in the implementation of the Federal PURPA legislation by establishing standard contracts which the utilities used to purchase power from geothermal developers. A selection could be made of a quarterly adjustment of the price, or a ten year firm price based on a forecast of what oil and gas prices would be during the 10 year period. The ten year firm price contract was provided to assure certainty and thus allow project financing to be used.

This firm price option provided geothermal developers the ability to finance significant developments in the 1980's. The sizable increase in geothermal capacity in the last decade was due to these standard contracts being available.

The use of these contracts was suspended in 1985 and a new process begun to establish the need for additional capacity as well as a determination of how to fill such needs. The price of oil and gas dropped dramatically during the last half of the 1980's. It therefore became obvious that geothermal and other renewable sources would become more costly than fossil fueled (particularly natural gas fired) resources. This brought about a debate in government to determine methods to enhance the ability of renewables to compete. Tax benefits and Integrated Resource Planning (IRP) were the result of this debate.

TAX BENEFITS

The Energy Tax Act of 1978 established Energy Tax Credits which enhanced the economics of development of geothermal energy. Subsequently sunset dates for this credit were established with the sunset date periodically being extended. Finally in 1992 the credits were made permanent. The Tax Reform Act of 1986 gave accelerated depreciation for tax accounting. These two tax benefits have been extremely beneficial in that they could be allocated to a Joint Venture partner who had a large need for tax benefits, thereby providing financing ease.

CALIFORNIA LEGISLATURE DIRECTION IN INTEGRATED RESOURCE PLANNING.

The State of California enacted legislation giving direction to consider other things than price in the integration of conservation and supply projects in the state plan, taking into effect the environmental benefits of non fossil power generation, such as geothermal power. This aided in establishing that renewables were "cost effective" in the mix of power sources for the future. It was also indicated that diversity of fuel, by using non-fossil sources was of value as a hedge against escalation fossil fuel price.

A bill was passed in the California State Legislature directing the California Public Utilities Commission to set aside a certain amount of the new power source to come from renewable sources until a concrete value for diversity is established. This resulted in approximately 300 megawatts out of a total 1359 megawatt solicitation to be "renewables only".

There has been an emphasis in integrated resource planning throughout the U.S.A. to assure that the environmental values associated with development of renewable resources are used to make decisions on what is to be the new power generation scheme.

HIGHLIGHTS OF THE ENERGY POLICY ACT OF 1992

The Energy Policy Act of 1992 was a comprehensive bill with significant impact on the future of geothermal development. In the transmission access portion of the bill, it states that "it is the desire of the Federal Government to assure transmission access for geothermal producers and other renewables."

In the U.S. the transmission systems for moving electric power have developed over the years through decisions made by the utility industry, both private and government owned. They were primarily designed to move power from utility owned power plants to the markets of the utility. Joint planning of the facilities has been done by voluntary form utility associations.

It has been very difficult for independent power operators to serve markets which are not offered to them by the utilities because of control of the transmission facilities by the utility industry. The enactment of the Energy Policy Act of 1992 requires that transmission systems are opened up to other providers than the utilities and will pave the way for open competition in the electric energy market.

An important aspect in the future, affecting geothermal exploration and development, is the competitiveness of geothermal power relative to other sources. Wind power will be the prime renewable competitor. Photovoltaics are considered an R&D project at the moment with significant breakthroughs needed to make it competitive. In the fossil fuel category, natural gas fired power generation, particularly if a steam host is available and cogeneration can be accomplished, is the competition. New generation based on coal as a fuel will put the upper limit on price if natural gas supplies decline.

Wind power has made great improvements in the technology and has become very competitive. Wind, however, must be considered primarily a source of energy for a utility and not capacity, due to the uncertainty of the wind blowing at the time the power is at it greatest need. This burdens long distance transmission systems since large quantities are required to be delivered when the wind power is on line. The line then sits idle when the wind is not blowing. Geothermal, on the other hand is

a base load generator and will efficiently us a long transmission line.

The results of the **1993** California power auction shows geothermal is competitive with all technologies (with the possible exception of large gas fired projects). There should be a good incentive for geothermal exploration and development. Why isn't there much new development going on?
Since geothermal development is tied to the electric power requirements an evaluation of those requirements will give insight into the need for geothermal development.

With the advent of the PURPA legislation the electric power industry has been in transition. It has moved from a vertically integrated industry with the monopoly utilities doing all the production of electric power to an industry with independent power producers participating in that phase of the industry. Most new sources of power coming on line in the last ten years have been independent power projects.

The utilities have been resistant to the trend. They have quite often gone out to bid for new projects but have not completed the process by issuing contracts due to the fact, in my opinion, the RFP's were really done to show that their own projects were cost competitive. Unfortunately for them there have been very few utility projects which have proven to be competitive with the private projects - therefore a tendency to do nothing, until required by an oversight agency or the lights go out, is the utility mindset.
There were many large nuclear and coal plants that came on the line in the late 70's and early 80's and the electric requirements projected did not materialize. This with the combination of a major build up of independent power in the late 80's caused a surplus of power to occur.

This has allowed the debate in government circles to go on as to how the cost of power from various alternatives should be determined in the future. The passage of the **1992** Energy Policy Act (EPACT) sets the stage for more competition in the power generation field by outlining the requirements for access on the transmission systems. Also various state commissions have established guidelines for Integrated Resource Planning (IRP) with specific direction in the handling of the benefits of renewable resources such as geothermal.

The California Public Utilities Commission has recently announced a new proposal which considers enhancing the competitiveness of the electric production part of the utility industry by allowing consumers to directly contract with producers. California's proposal indicates that large customers would have direct access by **1996** and all by **2002.**

It will probably be a few more years before the transition in the electric power industry is completed and a clear direction is established. With the continued support by all government agencies integrating renewable power in the system, and the growing competitiveness of geothermal there is a bright future for the geothermal industry.

GOVERNMENT SPONSORED RESEARCH AND DEVELOPMENT

To assist the industry during the transitional period in the power market, the US. Department of Energy has proposed some government support in the exploration arena. They have proposed allocating **$2** million toward joint venturing with industry in drilling exploration wells and have a project to jointly fund with industry a **20-30** megawatt plant on a discovered field which does not have an operating plant.

Federal and State governments in the USA have played a key role in the developing of the market for geothermal resources in the leasing, marketing, research and development and utility relations. If anything has not been ideal it is the occasions when regulatory agencies are uncertain as to the direction in which they are going to move.

CONCLUSION

If developers and government work together on all aspects of the needs to develop a dynamic geothermal industry all parties win. A country's indigenous resource is developed in a safe manner, royalties are paid to owners of the resource, good jobs are created and consumers have a power component which is very environmentally sound.