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California Geothermal Resources—How Well Are We Doing?

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ABSTRACT

The State of California is the location of the largest geothermal electrical generation complex in the world. The legal framework which permitted and guided development of this resource on state-owned lands is contained in the Geothermal Resource Act of 1967.

An incentive measure based largely on experience gained in regulation of oil and gas developments, the legislation is credited with assisting in the rapid geothermal development at The Geysers.

Environmental concerns, institutional barriers such as unequal tax treatment on both the state and federal levels, and the need for streamlining permitting procedures has resulted recently in passage of some far-reaching new energy legislation including the Warren-Alquist Act of 1974. The legislature is now considering measures to remove some of the remaining legal disincentives and is reviewing the basic geothermal law to require performance from developers while insuring access to the resource to all able developers.

GEOTHERMAL RESOURCES ACT

California now leads the world in electrical generating capacity utilizing geothermal energy, and much of the credit for achieving this leadership role has been attributed to the regulatory framework of our state public resource laws.

The Geothermal Resources Act of 1967 established the basic framework within which the State Lands Commission may lease state-owned lands. The leasing policy, an incentive program to promote exploration and exploitation of the resource, has been established by the State Lands Commission in the form of comprehensive and detailed lease terms and conditions.

The Commission has the authority and responsibility for administration and control of public lands for development of geothermal resources. These lands fall into three categories:

1. School lands. Usually sections 16 and 36 granted by the federal government to the state.
2. Tide and submerged lands including navigable rivers and lakes.
3. Proprietary lands. These are lands under the jurisdiction of other state agencies.

The law provides for the Commission to issue short-term prospecting permits on a first-come, first-served basis; or

it may issue long-term leases, preferentially under certain conditions or by competitive bid. The prospecting permit gives the permittee exclusive right to explore the land for a period of three years, and that must be extended by the Commission for one additional period of two years if the permittee requests an extension. The permit provides for an annual rental of \$1 per acre.

Upon discovery of geothermal resources under the terms of a prospecting permit, the permittee has a preferential right to a geothermal lease for a period of 20 years and for so long thereafter as geothermal resources are produced. No lease, however, may exceed 99 years.

In addition to the annual rental of \$1 per acre, terms of state geothermal leases call for a maximum royalty of 10% of the gross revenue from the steam and a royalty of 1 to 10% on mineral or commercial compounds taken from the resource. After discovery, and until production has begun, the lessee is required to pay a minimum royalty of \$2 per acre.

If an area is classified as a Known Geothermal Resources Area (KGRA), land may be leased on a competitive bid basis, if the land is not already under permit. To declare a KGRA, an area must have at least one well capable of commercial production. Competitive bidding may be on the basis of cash bonus, percentage of net profit, or any other single factor that can be bid on.

The second unit of government involved in geothermal resource development is the Geothermal Unit of the State Division of Oil and Gas. Resource development on state lands remains under the jurisdiction of the State Lands Commission and the State Lands Division, but once drilling and/or production commences on either state or private lands, the Geothermal Unit of the Division of Oil and Gas is responsible for enforcement of regulations for sound drilling practices, blow-out prevention, and well abandonment.

Both the State Lands Division and the Division of Oil and Gas gather data for environmental impact reports required by the California Environmental Quality Act. This segment of the resource development is taking more and more of the time of both the state agencies and the developer and the Legislature is looking at a number of ways to shorten and speed up the environmental impact reporting procedures.

INCREASED ATTENTION

The original Geothermal Energy Act of 1967, designed as an incentive to developers, has worked well in the past.

Until fairly recently, we in the California Legislature, quite frankly, paid relatively little attention to development of geothermal resources. We were pleased with what we had and pretty much let it go at that. This is not to suggest that the legislature has not been working to improve the law in California so as to encourage development of geothermal development. Since 1966, when the first report on the geothermal energy potential in California was published by the Joint Committee on Public Domain, the legislature has attempted to identify and deal with problems associated with geothermal development and utilization. These problems have included unequal tax treatment in relation to developers of oil and gas, the impact of ad valorem taxation during early development stages, the need for more rapid amortization of generating facilities using geothermal energy, the need for streamlining environmental reporting procedures, and the need for other fiscal incentives to spur development. However, recent worldwide events relating to energy shortages have affected our state in such a way that new and increased attention is being focused on developing this potentially large energy source as rapidly as possible.

The attention that our recent and recurring energy shortages has brought to bear on geothermal energy development in California has made many in state government ask the same question posed by the title of this paper—How well are we doing? In many cases, the answer is: not well enough and not fast enough.

WARREN-ALQUIST ACT

Our first approach to this problem was an attempt to design a state agency which would eliminate some of the cumbersome permitting procedures which are impeding development and, at the same time, provide for long-range planning and development.

The California Legislature last year passed what is now known as the Warren-Alquist Act, which created the California Energy Resource Conservation and Development Commission. The Energy Commission which is now beginning operation has many energy responsibilities, the most important of which is to attempt to bring electrical energy demand and supply requirements into equilibrium by means of conserving energy by elimination of wasteful, inefficient, or unnecessary uses of energy and stimulation of environmentally benign sources, particularly geothermal and solar.

Quite frankly, the bill is biased in favor of geothermal development by expediting the siting of geothermal electrical facilities and by specifically identifying geothermal as an area of unique value for state research and development projects. Such projects are to be designed to encourage development, as well as to facilitate hardware design, demonstration projects, and so forth. California has imposed an electricity surcharge of 0.1 mill/kWh; this will raise about \$10 million for research and development projects.

PENDING LEGISLATION

When the federal government in early 1974 finally started proceeding with the geothermal leasing provisions of the Geothermal Steam Act of 1970, we, in California, started taking a new look at our own geothermal laws. One of the key questions was one of value; whether or not, in light of what had been paid on nearby federal leases for

similar resources, the state was receiving fair value for resources being sold from the public domain. As a result of that inquiry, legislation is currently pending to revise state geothermal royalty provisions, to eliminate the exploration permit procedure and KGRA designation in an effort to open all state-owned lands to exploration on a nonexclusive basis, and to require all leases to be issued on a competitive-bid basis.

The thrust of this legislation is to insure that the people of the state are receiving fair value for geothermal resources and at the same time open lands with geothermal potential to exploration and development by all able developers, so that the resource can be developed as rapidly as possible.

We are cognizant of the problems faced by this type of high-risk enterprise and several pieces of legislation have been introduced this year to provide a variety of fiscal incentives to the developer of geothermal energy. These range from taxing the resource separately from the land overlying it to a measure to create a series of tax credits which would allow the developer to eventually recapture all costs of research and development. While this kind of legislation is clear evidence of the willingness of those in state government to assist the private sector in developing this energy source, there is also evidence of growing impatience with developers because there has not been a greater increase in exploration and development. This kind of thinking can be seen in legislation which would require major integrated oil companies to divest themselves of geothermal holdings. Whatever the merits, in California and in most of the western states, the major oil companies are heavily involved in geothermal energy development. This legislation concludes that the oil companies, for whatever reasons, are not moving rapidly enough with geothermal energy development.

VAST POTENTIAL

We have a vast store of geothermal energy in California and projections for the potential of geothermal energy development in other western areas of our country are also very large. Conservative estimates of geothermal potential for producing electrical energy in California are in the neighborhood of 41 000 MW while more optimistic reports indicate potential as high as 100 000 MW. To put this in perspective, Californians currently use about 40 000 MW, which means that even the conservative estimates would be sufficient to supply all the electrical energy now needed in California.

On a larger scale, Robert Rex, formerly with the University of California at Riverside, has estimated that there are sufficient geothermal reserves in the U.S. alone to provide a billion kilowatts of energy—three times the present installed generating capacity of the entire nation.

There will always be debate on both sides about these kinds of estimates, but anyone familiar with California's Imperial Valley knows the heat source there is very large indeed and the success story already accomplished at The Geysers field is well known. People in and out of government, armed with these figures, are asking why the potential remains just that—potential? If the power source is there, why is it not being utilized? We, who are elected to make public policy, must respond to the growing number of these kinds of inquiries, and to do that we have to seek answers.

One of the responses in California has been to create

a central energy mechanism which will do long-range planning and is also equipped to do research and development work in an attempt to solve some of the technical problems which we have been told are the reasons for the slowdown in utilization of this resource. We are also proceeding on incentives to assist the developer during the costly early stages of development.

OBSTACLES TO DEVELOPMENT

Despite these sympathetic efforts to help the private sector help itself, there is a growing tide of scepticism that the reason there has not been greater utilization of geothermal energy in this state and nation is because those in control of the resource do not find it convenient or profitable to develop it at this time.

Of course, the problem is not that simple. In fact, the resource development or lack of it, is a result of a variety of problems. A recent conference sponsored by the U.S. National Science Foundation in Santa Barbara, California, raised some of the following issues dealing with how to stimulate development of geothermal resources in the public interest. The panel involved with defining public-interest issues found tax and other assistance, lease provisions, the competitive structure of industry, secondary uses, environ-

mental considerations and governance to be the key public interest questions to be solved.

It might be noted that there is a growing feeling in the legislature that the secondary or nonelectrical uses of geothermal energy, which have received little attention until recently, could well be the largest use of the resource in the future.

CONCLUSION

There is a policy commitment in government that geothermal energy should be developed as rapidly as possible, but those familiar with resource development are painfully aware of the scope of the problems still to be solved. We must make decisions which take into consideration not only the need to remove the institutional impediments which are hindering development of the resource by industry, but also to design new long-range public-policy goals which serve the public as a whole. Often there is a gap between these two goals.

Our goal, then, in both the short and long term, will be to work with industry to create a climate in which the resource can be developed, and both private and public benefit can be maximized.