

GEOHERMAL RESOURCE DEVELOPMENT



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OF THE
LEGISLATIVE COUNSEL BUREAU
STATE OF NEVADA

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REPORT OF THE LEGISLATIVE COMMISSION

TO THE MEMBERS OF THE 61ST SESSION OF THE NEVADA LEGISLATURE:

Pursuant to its authority provided for in NRS 218.682(5), the legislative commission formed a committee to study geothermal energy in the State of Nevada. This action was taken at the legislative commission's meeting on August 30, 1979, in response to the National Conference of State Legislatures's (NCSL) proposal to assist the Nevada legislature by reviewing regulatory policy, suggesting policy options, and preparing recommendations.

The legislative commission appointed a subcommittee to make a study and recommend appropriate legislation to the next session of the legislature. Senator Lawrence E. Jacobsen was designated chairman of the subcommittee. The following legislators were named as members: Senator Thomas R. C. Wilson and Assemblymen Robert G. Craddock, Joseph E. Dini and Virgil M. Getto.

In this report the subcommittee has attempted to present its findings and recommendations briefly and concisely. A great deal of data was gathered in the course of the study. Much of it was provided in the form of exhibits that became part of the minutes of the subcommittee. This information is on file in the research library and is readily available to any member.

This report is transmitted to the members of the 1981 legislature for their consideration and appropriate action.

Respectfully submitted,

Legislative Commission
Legislative Counsel Bureau
State of Nevada

October 1980

LEGISLATIVE COMMISSION

Senator Keith Ashworth, Chairman
Senator Melvin D. Close, Jr., Vice President

Senator Richard E. Blakemore	Assemblyman Robert R. Barengo
Senator Carl F. Dodge	Assemblyman Joseph E. Dini, Jr.
Senator Lawrence E. Jacobsen	Assemblyman Virgil M. Getto
Senator Thomas R. C. Wilson	Assemblyman Paul W. May
	Assemblyman Robert F. Rusk
	Assemblyman Darrell D. Tanner

SUMMARY OF RECOMMENDATIONS

1. Redefine geothermal resources statutorily so that the definition specifies heat and the byproducts, but does not include the fluid components.
2. Expand the state engineer's statutory authority to provide for planning and evaluation of geothermal development, including well spacing and pooling orders, limits on production and reinjection, and cooperative development.
3. Require persons desiring to drill geothermal wells to file an application with the state engineer. Approval is to be based on resource ownership or control, environmental impacts, and the public interest.
4. Establish statutorily the policy that the use of groundwater for its energy content, including heat and pressure, is deemed to be a beneficial use of such groundwater, whether accomplished through an actual diversion or through a nondiversionary heat extraction process. In either case, a water right may be obtained to protect such groundwater energy utilization.
5. Extend provisions of the proposed act to all lands in the State of Nevada subject to its police powers.
6. Require at least two alternative energy system feasibility studies to be done before construction or repair of state owned buildings larger than 20,000 square feet. Life cycle cost analysis is to be employed in the study.
7. Require political subdivisions of Nevada to maintain compatibility between building codes and zoning ordinances and the utilization of alternative energy systems including geothermal or hot water resources where available.

8. Deregulate the sale of heat to existing utilities.
9. Reduce the regulation of direct heat suppliers to requiring an operating permit which gives the right of eminent domain, allow encroachment on existing utility franchise areas, require contractual arrangements with buyers, require a bond, but does not grant exclusive franchise.
10. Require examination of conservation measures and alternative energy sources prior to constructing new fossil or nuclear capacity; allow recovery of costs for resource or facility failure; allow cost-of-work-in-progress in rate base; establish liberal interconnection and wheeling policies; and establish non-discriminatory standby rates for backup power needs.
11. Direct the division of water resources to upgrade its geothermal drilling regulations, including the requirement of individual or blanket surety bonds, and add geothermal reinjection/stimulation to the class of exempted "water pollutants."
12. Encourage expanding available incentives to promote renewable resource use through property tax credit to commercial installations, sales tax exemption for geothermal equipment, and tax producing geothermal leases under the net proceeds of mines statute.
13. Encourage the legislature to consider earmarking federal lease revenues to a state geothermal fund to be used for geothermal research, development, and demonstration projects in Nevada.

REPORT OF THE LEGISLATIVE COMMISSION
FROM THE SUBCOMMITTEE TO STUDY
GEOTHERMAL ENERGY

I. INTRODUCTION AND BACKGROUND

The legislative commission formed a committee pursuant to its authority granted in Nevada Revised Statutes (NRS), chapter 218 to study geothermal energy in the State of Nevada. The commission's action was in response to the National Conference of State Legislatures' (NCSL) proposal to assist a study committee in reviewing Nevada's geothermal policy, suggest policy alternatives and draft legislation at the request of the committee.

To carry out the study assignment, the legislative commission appointed a subcommittee composed of the following legislators:

Senator Lawrence E. Jacobsen, Chairman, Minden
Senator Thomas R.C. Wilson, Reno
Assemblyman Robert G. Craddock, Las Vegas
Assemblyman Joseph E. Dini, Yerington
Assemblyman Virgil M. Getto, Fallon

The subcommittee held four meetings, all of which were conducted in Carson City. At the first meeting, NCSL staff and other witnesses provided background information on geothermal resources and applications in Nevada, the status of geothermal resource regulation, and policy areas which might be addressed in order to encourage geothermal resource development in Nevada.

Subsequent meetings were spent reviewing policy options in detail, hearing testimony on the merits of the various options, and selecting the policies to be recommended to the 1981 legislature.

Testimony was received from a wide variety of sources. Hearing participants included interested citizens, state and local government representatives, federal agency officials, direct geothermal applications professions, geothermal utility representatives, and university faculty. Consequently, information was accumulated from a cross section of the geothermal energy industry.

II. GEOTHERMAL RESOURCES AND APPLICATIONS

"* * * these springs (Steamboat Springs) are among the greatest natural curiosities of the State... Nature, in an eccentric mood made these springs for the benefits of mankind, and in this, as in others of her wonderful creations, succeeded admirably." (From History of Nevada - 1881)

A. PHYSICAL CHARACTERISTICS

Steamboat Springs is far from alone in Nevada - there are over 300 known thermal springs in the state. Nearly all of the state lies within the basin and range physiographic province, which is characterized by recent volcanism, high heat flow anomalies, and mineral and thermal springs.

The predominant geothermal resource in Nevada is likely to be the hydrothermal reservoir. This type of system may consist of either dry steam or a mixture of steam and water. No dry steam systems have yet been discovered in Nevada, but numerous moderate to high temperature reservoirs (over 90° C or 174° F) exist. Additionally, low temperature reservoirs abound in Nevada and offer particular promise for direct (non-electric) applications.

Although geothermal resource knowledge is more developed in Nevada than in most states, this knowledge is by no means adequate. Various studies have been undertaken to assess the resource, the most recent by the Nevada bureau of mines and geology, and the U.S. Department of Energy (DOE) has contracted with eight private firms to explore the areas of highest potential. But more detailed and less conflicting resource knowledge is necessary before the geothermal potential can be fully assessed.

B. LOCATION

The northern part of the basin and range province contains most of Nevada's geothermal resources. (See map, figure 1.) The area of highest activity is the Battle Mountain heat flow high, a thermal anomaly which stretches from Carson City past Elko, including most of northwest Nevada.

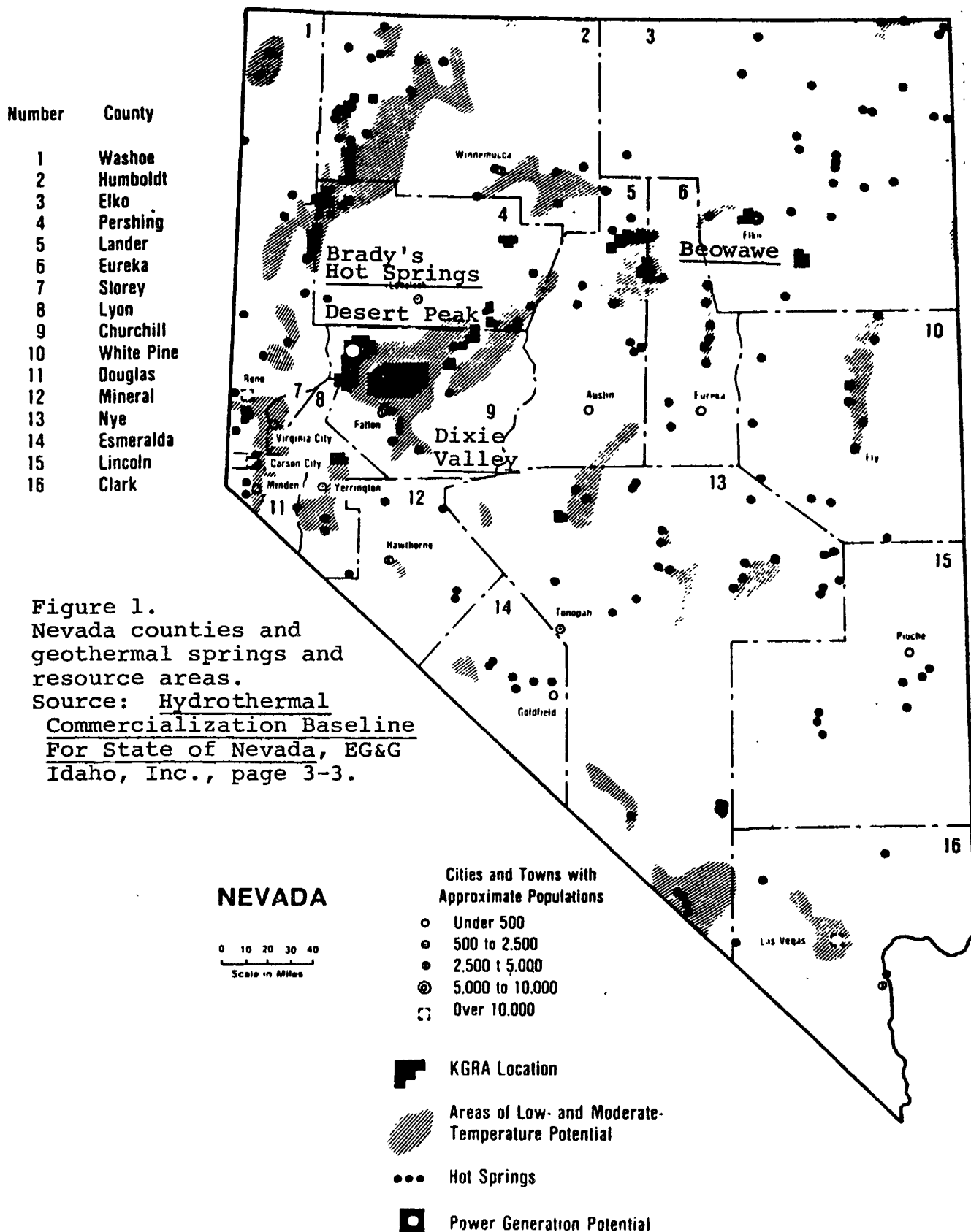


Figure 1.
Nevada counties and
geothermal springs and
resource areas.
Source: Hydrothermal
Commercialization Baseline
For State of Nevada, EG&G
Idaho, Inc., page 3-3.

The U.S. Geological Survey has identified 30 known geothermal resource areas (KGRA's) in Nevada, amounting to 648,707 acres, most of which is owned by the Federal Government. Eight reservoirs with prospective temperatures greater than 150° C (302° F), and over 30 with prospective temperatures in the 20 to 150° C (68 to 302° F) range are reported to exist. The Nevada bureau of mines and geology study map lists 12 wells and springs with temperatures above 100° C (212° F).

The prime candidates for geothermal development include Beowawe, Desert Peak, Dixie Valley, Steamboat Hot Springs, Humboldt House, Soda Lake, San Emidio Desert, and Brady Hot Springs. The former three are likely possibilities for electrical generation; all may be used for direct applications. The latter two are already in use.

C. EXISTING APPLICATIONS

Nevada provides numerous examples of the direct use of geothermal energy, particularly in the Reno/Steamboat Springs area. Hot springs were used by Indians for bathing and for scalding ducks and geese; they were used for drinking, bathing and watering stock by pioneers. Presently geothermal hot waters furnish heat for homes, greenhouses, spas, the safe manufacture of explosives and vegetable washing and dehydration.

The most prominent vegetable drying plant in Brady Hot Springs is operated by the Geothermal Food Processors, Inc. (GFP). Utilizing the U.S. Department of Energy Geothermal Loan Guarantee Program, GFP secured loans for \$2.7 million of the \$3.8 million construction costs of the plant. GFP saves an estimated 117 million cubic feet of natural gas (about \$235,000 worth) to process 4.3 million pounds of onions a year. This high quality geothermal resource can be used directly, requiring neither supplemental heating (it reaches ground level at 130° C [270° F]) nor demineralization, and yields a product meeting the industry's highest standards. Furthermore, additional contracts to process carrots, celery, garlic, and/or potatoes are possible, permitting year-round operation.

D. POTENTIAL APPLICATIONS

The potential for increased geothermal use in Nevada is considerable. Direct uses can proliferate including resources in the Reno/Steamboat Springs area which are under examination to increase spaceheating and greenhouse use. Various other projects are under consideration, including the possibility of using geothermal energy to distill grain in the production of up to 10 million gallons of gasohol.

Another near term application is in the generation of electrical power. A consortium of five western power companies, including Sierra Pacific Power Company, is currently evaluating the feasibility of constructing a 50 megawatt power plant, using geothermal steam purchased from private developers. The joint utility geothermal project expects to have the plant on line by 1983 and may perhaps participate in additional development. The electrical generating potential of Nevada's geothermal resources has been estimated at 500 megawatts or more. For comparison, Nevada's current average electricity demand is about 1,200 megawatts.

The economic utilization of a particular reservoir is dependent on three general factors: the physical characteristics (temperature, volume and pressure), the cost of exploration, development and distribution, and the suitability to local end users. Furthermore, the energy and economic efficiency of geothermal utilization can be increased by "cascading," that is, reusing geothermal waters in progressively lower temperature applications. This holds particular promise for electrical generation in conjunction with residential and commercial spaceheating.

Since geothermal energy represents a relatively new technology, there are still numerous barriers and market uncertainties which impede its development. The Department of Energy's Geothermal Loan Guaranty Program helps to ameliorate the difficulties in attracting capital; it can secure loans for three-quarters of a project's cost up to a \$100 million limit. As mentioned, the guaranty program has been used to support geothermal development in Nevada.

E. ENERGY AND ECONOMIC VALUE

Geothermal energy represents a major underdeveloped resource for the State of Nevada. As of 1975, Nevada imported fully 97 percent of its energy (in the form of fossil fuels) for use primarily in transportation and for space conditioning. The aggressive development of geothermal resources can displace the consumption of costly, high-grade fossil resources for many purposes. Geothermal energy is relatively benign environmentally, not producing the air and water pollutants associated with fossil fuel use. Furthermore, geothermal resources are not subject to spiraling costs of fossil fuels or their supply uncertainty. These fossil reserves may prove more valuable in the long term as raw materials for the petrochemical industry rather than as heating fuels.

Nevada is a net exporter of electricity. But, the state is experiencing increasing electrical demand, particularly in the geothermal-rich northern part of the state, for which a 10 percent per annum growth in demand is projected. Geothermal resources can serve to meet these needs, as well as improve the state's economic posture.

Geothermal energy is most efficiently used near its production site. This factor, along with the diversity of end uses it can meet, makes it particularly amenable to small-scale, locally determined energy needs. Geothermal utilization will not only promote a more diversified energy future for Nevada, but will permit greater local participation in solving energy problems.

III. STATUTES AND REGULATIONS

A. FEDERAL LAW

Various federal laws and policies affect geothermal development by establishing procedures for the use of federally owned geothermal resources, levying taxes and providing incentives. Particularly important are the Geothermal Steam Act of 1970 (30 USC 23 §§ 1001-1025) and the comprehensive National Energy Act [Public Laws (P.L.) 95-617 through 95-621]. The key provisions of these acts and their corresponding regulations follow.

Geothermal Steam Act of 1970 (see also CFR 270-271 and 43 CFR 3000 et seq. regulations):

1. The Secretary of the Interior may issue leases for the development of geothermal resources for all federally owned lands including mineral reservation lands.
2. Lands within KGRA's must be competitively leased; non-KGRA lands are non-competitively leased.
3. The Bureau of Land Management (BLM) conducts lease sales, contingent on the completion of environmental impact statements (EIS's) by the surface management agency.
4. National park, recreation and wilderness lands cannot be leased; tribal lands are under the jurisdiction of the Indian nations.
5. Lease size and terms, maximum holdings and environmental requirements are specified.

National Energy Act:

Two of the five acts within the National Energy Act are particularly important to geothermal energy.

1. Energy Tax Act of 1978 (P.L. 95-618):
 - (a) The act authorizes the deduction of intangible drilling costs on the same basis as for oil and gas wells.
 - (b) A declining depletion allowance is granted for geothermal resources.
 - (c) A residential energy tax credit for the use of geothermal energy is allowed.
 - (d) The act establishes a supplemental business investment credit for equipment used to produce or use geothermal energy (although not available to utilities).

2. Public Utilities Regulatory Policies Act of 1978
(P.L. 95-617):

- (a) Qualifying small power producers (one which generates not more than 80 megawatts of electricity from renewable resources, which is presumed to include geothermal energy) can be interconnected to existing transmission facilities by order of the Federal Energy Regulatory Commission (FERC).
- (b) The Federal Energy Regulatory Commission can require utilities to sell or purchase electricity from small power producers.
- (c) Power producers generating not more than 30 megawatts may be exempted by FERC from the regulatory control of the Federal Power Act and state utility commissions.

B. LAND OWNERSHIP

The Federal Government owns 86.7 percent of the more than 70 million acres in Nevada. Although the U.S. Forest Service administers some of the federal lands, the Bureau of Land Management is responsible for the unassigned federal lands -- the public domain. Since only 0.2 percent of the land is state-owned, federal legislation (described above) and leasing activities are crucial to geothermal development. As of March 1979, a total of 752,823 acres were under federal (including Indian) leases, 19 percent of which were competitive leases in KGRA's.

Since the state owns very little land, only a small part of which is not currently being utilized, none has been leased for geothermal use. The single largest private owner is the Southern Pacific Railroad, which has contracted with Phillips Petroleum to explore and develop any geothermal resources they hold. About 30 companies are exploring the private and federal lands in the state, hoping to locate developable resources.

C. STATE STATUTES

The Nevada legislature has enacted numerous statutes which relate to the exploration and development of geothermal resources. In addition, an appreciation of state water policy is needed to fully understand Nevada geothermal law. Only the legislation which directly pertains to geothermal energy, however, will be discussed below.

1. Senate bill 158 (1975) defined geothermal resources as "heat or other geothermal energy," authorized the state engineer to adopt regulations to "insure the proper development, control and conservation of Nevada's geothermal resources" and placed geothermal water and steam under the same control as all other underground waters in the state.
2. Assembly bill 158 (1975) authorized the division of state lands to lease state lands for geothermal exploration and development, and established rents and royalties for the leased lands.
3. Assembly bill 277 (1977) allowed up to \$2,000 property tax credit for homeowners who install equipment which utilizes alternative energy sources.
4. Assembly bill 144 (1979) exempted geothermal leases which have not been put into commercial production from property taxation.
5. Senate bill 506 (1979) authorized general improvement districts to "develop natural sources of energy...for space heating." This is an important step in promoting the distribution and direct use of geothermal resources.

D. STATE REGULATIONS

As described above, the 58th session of the Nevada legislature enacted two bills which govern the regulation of geothermal resources.

In accordance with senate bill 158, the division of water resources has adopted regulations governing drilling for the exploration of geothermal resources. The main provisions are:

1. Geothermal resources are defined as "heated water, steam, heat or other geothermal energy."
2. An individual need not be a previously licensed well driller; but, if not, the driller must prove competency and acquire a specific exploratory license.
3. A notice of intention to drill must be filed with the state engineer, as well as up-to-date logs.
4. All holes, regardless of depth or diameter, must be sealed at the surface.

Production of geothermal resources is regulated as are other underground water supplies (requiring an appropriation), and therefore, the state engineer has not promulgated regulations specific to geothermal production.

Since only 0.2 percent of Nevada is state-owned, leasing for any mineral purposes is not of critical importance. But the Nevada Revised Statutes (chapter 322; § 361.607) do contain sparse provisions for the geothermal-related leasing of state owned lands:

1. Method - Lands are competitively leased to the highest responsible bidder.
2. Acreage limits - minimum per lease: 40 acres; maximum: 1,280 acres.
3. Royalties - 10 percent of the gross revenues of energy production, five percent of value of byproducts.
4. Annual rental - \$1 per acre; no other leasing provisions currently exist.

IV. POLICY CONCERNS

Many of the issues affecting the development of geothermal energy are not within the scope of the Nevada legislature or executive agencies. Federal and private decisionmaking will remain critical. But action by Nevada will have significant consequences. An initial review of unresolved policy follows.

A. Resource Characterization

Geothermal resources possess distinctive characteristics which can be recognized in a statutory definition. In addition, geothermal resources in Nevada may occur in a variety of settings, including hydrothermal reservoirs (steam or fluids), hot dry rock and anomalous thermal gradients associated with groundwater. The basic element of value is heat energy (enthalpy); however, some transfer medium, usually water, is a necessary component. The transfer medium itself may be valuable for its dissolved or entrained minerals and gases (byproducts). All these elements could be contained in a definition to avoid conflicting ownership claims to different constituents of the resource.

Geothermal resources have generally been classified as water, mineral or sui generis (unique). Nevada has defined geothermal resources¹ as heat for regulatory purposes, while for tax purposes, geothermal resources are defined² to include heat and associated energy; fluids and gases, whether naturally occurring or injected; and byproducts, excluding hydrocarbons.

Nevada's differing statutory definitions have created some confusion among developers. A single, comprehensive geothermal definition encompassing all the resource elements can be adopted. In addition, the definition could distinguish deeper, high-grade geothermal resources suitable for electrical generation from shallower, low-enthalpy

¹NRS 322.005 and 534A.010.

²NRS 361.027.

fluids suitable for direct applications. Development of these two types of thermal resources is likely to result in significantly different impacts on established water uses.

Nevada applies the appropriation doctrine to all water,³ whether surface or subsurface, including the steam, water or brines associated with geothermal energy.⁴ There are, however, a number of specific features of Nevada water law which may operate as an impediment to geothermal development.

First, the state engineer may disapprove any application (original appropriation or water right transferral) for water intended to be used to generate power for export from the state.⁵ While this may be appropriate regarding scarce "standard" water resources, it is probably inappropriate if applied to geothermal fluids "developed" in conjunction with geothermal energy production and which are not part of the established water use regime.

Second, the general policy of the state engineer is to limit groundwater withdrawal to annual recharge rates or "perennial yields."⁶ In many cases the economic feasibility, as well as the maximum energy recovery, of a particular geothermal reservoir may depend on "mining" the resource.

In general, a water applicant must show "proof of commencement" of his diversion (well) within 6 months of receiving a permit and "proof of completion" within 18 months.⁷ These time periods are probably too short with regard to geothermal

³See generally: exhibit B--General History of Western and Nevada Water Law; submitted by the office of the state engineer to the legislative commission to study water problems and priorities for water usage in the state (October 25, 1979).

⁴NRS 534A.010-534A.040.

⁵NRS 533.370.

⁶Supra note 3.

⁷NRS 533.380.

well construction. One year extensions are available; however, the developer cannot be certain of his status at each expiration point. Diligent development of geothermal systems is more appropriately ensured via lease requirements and escalating rentals than by the threat of losing a water right application.

Finally, no application to change the point of diversion from one water source to another may be granted.⁸ Where interference between geothermal development and existing water uses occurs, the geothermal producer will usually attempt to acquire the impaired right for his own "beneficial use." In most cases this means the point of diversion will be shifted between distinct (although interconnected) aquifers or from surface water to groundwater (as is occurring at the Baca Project in New Mexico). Under Nevada law, it appears that this transfer procedure is unavailable; the geothermal developer will have to be able to retire the impaired right and obtain a separate appropriation.

Beyond these specific problems, there are general difficulties with the blanket application of western water law to geothermal development.⁹ The most serious relate to ownership and allocation. Regarding ownership, making geothermal fluids available for appropriation may result in conflicting ownership. That is, the lessee would claim the heat component of the resource while the appropriator would claim the fluid component. The resulting litigation¹⁰ could

⁸Supra Note 3.

⁹See: Olpin and Tarlock, "Water That Is Not Water;" 13 Land and Water L.R. (2) 391 (1978) and "Geothermal Development and Western Water Law" Utah L.R. (4) 773 (1979).

¹⁰The question of whether geothermal property rights derive from water ownership or mineral (lease) ownership has been litigated in a series of cases--in all of which mineral ownership has been upheld: Union Oil v. United States 369 FS 1289 (1973) reversed 549 F2d 1271 (CA 9, 1977) cert. den. 434 US 930 (1978) reh. den. 435 US 911 (1978); Geothermal Kinetics v. Union Oil 75 Cal. Ap. 56 (1977); Pariani v. California No. 657-291 (Superior Ct.-San Fran. Cty., CA; 1977).

create significant delays in development. Regarding allocation, the creation of "quantified priorities" in a geothermal reservoir through the appropriation doctrine could preclude the application of the more efficient rule of correlative rights (see section B).

The appropriation doctrine has two basic purposes: first, to grant an applicant a property right to water; and second, to protect the owners of prior water rights. Only the second of these purposes is relevant to geothermal development. Geothermal resource ownership will derive from an interest in real property. Clearly, this is the position of the Federal Government, which owns the vast majority of Nevada's geothermal reserves.

Protecting prior water rights from impairment due to geothermal development can be accomplished without the wholesale application of the appropriation doctrine and its attendant property implications and inappropriate mechanisms. Such a course of action will assuage industry concerns, as expressed in a previous report of the Nevada legislative commission.¹¹

Finally, it should be noted that the above discussion relates to deep, hot geothermal resources, whose production is likely to interfere with existing water uses. The treatment of shallower, low temperature aquifers as water is appropriate with regard to both the acquisition of property rights and the protection of prior rights, as well as financial liabilities (see section D).

B. Access and Allocation

There are three basic issues in the area of access and allocation: the establishment of property rights; conveying development rights; and assigning production among competing developers. As was discussed in the previous section, resource characterization will have implications regarding all these issues. At present Nevada would appear to have a dual regime involving both leasing¹² and appropriation.¹³

¹¹Assessment and Taxation of Geothermal Resources (Bulletin No. 76-16); legislative commission, August 1978 (at 16-17).

¹²NRS 322.010.

¹³NRS 534A.010.

Given the present pattern of land ownership in Nevada (87 percent federal, 0.2 percent state), the federal ownership regime will be dominant. This means that the United States controls all geothermal resources where it owns or reserves the subsurface (mineral) estate (see note 10). The Federal Government conveys development rights via leases pursuant to the Geothermal Steam Act of 1970.¹⁴ Nevada also has authorized a geothermal leasing system for state-owned lands.¹⁵ The outstanding question is whether geothermal owners/lessees only may file to appropriate geothermal fluids, or whether anyone may file on geothermal resources (obtaining surface access through the use of eminent domain¹⁶). The possibility of conflicting ownership claims could be avoided by restricting geothermal appropriations to persons possessing a real property interest in the resource.

Again, the federal leasing system will be dominant in Nevada. Private landowners may negotiate their own arrangements, usually through leasing also. Nevada's leasing system will find limited application and does not appear to present any special difficulties. Should the "Sagebrush Rebellion" prevail,¹⁷ however, the state leasing method will become very important and would be worthy of a reassessment.

With regard to ownership and access, it is unclear to what extent federal geothermal control includes shallow, low-enthalpy aquifers. Assuming it is limited to deep, hot geothermal resources proper, Nevada would control these

¹⁴Thirty use 23 §§ 1001-1025.

¹⁵Supra note 12.

¹⁶Act of March 22, 1913; chapter 140.

¹⁷It should be noted that under the Geothermal Steam Act, the state receives 50 percent of all rentals and royalties on federal leases, without incurring any administrative costs. It has been estimated that the state share of federal lease revenues exceeded \$300,000 in 1978--a figure which does not include royalties as no leases were then in commercial production. (See note 11.)

groundwater resources (absent federal reserved water rights). Such groundwater would then be in the public domain, subject to appropriation. In this regard the United States Congress should clarify and restrict federal geothermal ownership.

There are three basic options for allocating geothermal resources among competing producers: appropriation (first in time, first in right); the rule of capture; and correlative rights. Nevada presently applies the appropriation doctrine. This may run afoul of the federal method (absent unitization)--the rule of capture. Neither method, moreover, is likely to result in maximum economic recovery of geothermal resources.

While the earth's internal thermal energy may be virtually inexhaustible, it takes time for that heat to build up locally into useful concentrations. Moreover, the geothermal fluids containing and transmitting that enthalpy are limited and usually slow to recharge (re injection may extend their availability). Therefore, a geothermal reservoir is often a "wasting" resource with a finite useful life.¹⁸ Further, reservoir dynamics may produce drawdowns in some areas as production occurs in others. Thus, the geothermal resource is also a "fugitive" resource.

Resources of this type--oil and gas, for instance--are generally allocated under the rule of capture or correlative rights. The rule of capture implies that whatever is reduced to possession becomes the property of the producer. However, it is difficult to reduce enthalpy to possession; it can be neither stored nor transported over significant distances. In addition, the rule of capture may lead to a wasteful "race to capture" the resource, with overdrilling and reservoir damage. Therefore, the rule of capture is usually modified by well spacing orders or production limits.

The trend in geothermal resource allocation has been to a system of correlative rights, that is, each producer obtains a pro rata share based on acreage, well productivity, and so

¹⁸Congress recognized this fact in granting geothermal production a depletion tax allowance in the Energy Tax Act of 1978 (P.L. 95-618).

on, and the reservoir as a whole is managed for optimal utilization. Correlative shares in a reservoir may be assigned by a state agency or through cooperative development/unitization. Unitization usually requires a specified percentage of operators to agree to the unit operation.

C. Regulation

Geothermal regulation encompasses drilling control, pollution control, facility siting and fiscal responsibility. Given the extent of federal land ownership, U.S. authority is superior in some of these areas. Nevertheless, Nevada has authority sufficient to assert its jurisdiction over all lands in the state (possibly excepting Indian lands).

The prime concern regarding the regulation of geothermal development relates to drilling activities. The protection of potable aquifers is paramount. Also important is preventing waste of the geothermal resource.

The division of water resources has promulgated regulations which apply to geothermal wells¹⁹ requiring adequate casing and logging of the well. In addition, all well drillers must be licensed and must file a notice of intent to drill. In designated groundwater basins, an appropriation permit is required before drilling commences (a waiver for exploratory wells is possible). In nondesignated basins an appropriation permit is not required until after well construction is completed and diversion is to start.

Common drilling provisions not found in the Nevada regulations relate to blowout prevention, reinjection requirements, prevention of waste, well abandonment and bonding. A comprehensive regulation specific to geothermal wells, as well as stating its policy regarding reinjection and waste prevention, could be promulgated by the division of water resources.

¹⁹Department of conservation and natural resources--division of water resources: Rules & Regulations for Drilling Wells and Other Related Material and Regulations Pertaining to Exploration Drilling.

Nevada has statutes relating to water²⁰ and air²¹ pollution which are applicable to geothermal development. An outstanding question is whether reinjection of geothermal fluids or the "artificial" injection of a transfer medium to a hot dry rock system would constitute water "pollution" requiring a permit. The reinjection of oilfield brines and the injection of water or gas to stimulate oil and gas recovery are excluded from the definition of water pollutants.²² Geothermal reinjection and stimulation could be included in this exemption.

Air pollution problems associated with geothermal development primarily relate to hydrogen sulfide. Technology to ameliorate this problem is available. Other potential environmental impacts include subsidence, induced seismicity and noise. Given the preliminary stage of geothermal activity in Nevada, the time to address these issues may not be ripe.

Geothermal development is subject to the land use (zoning) powers of political subdivisions of the state. For example, the public service commission must find new facilities to be in compliance with local laws²³ before approving such construction. The legislature may wish to exempt geothermal facilities from this requirement given the site dependent nature of the resource, that is, geothermal resources must be used where found or nearby. Thus, flexibility regarding facility siting is severely reduced.

Given the initial state of geothermal development in Nevada, it is probably too early to make a judgment about environmental controls. This is an area, however, to be monitored. Many streamlining options, not limited to geothermal, are available, including regulatory ombudsman service; one stop licensing; lead agency licensing; time limits for agency decisions, etc. Distinguishing high temperature development from low temperature development, and exploration impacts

²⁰NRS C. 445

²¹Id.

²²NRS 445.178 (2).

²³NRS 704.890.

from development impacts are additional streamlining measures.

Fiscally responsible geothermal development may be ensured by requiring geothermal developers to designate instate agents for service of process and agency notices. Further, requiring developers to post adequate individual or blanket surety bonds could ensure compliance with state laws and regulations.

D. Finance and Marketing²⁴

Finance and marketing is a broad area involving the financial incentives and liabilities of geothermal developers, consumer incentives and utility regulation. Nevada has already enacted several statutes in this area, including assembly bill 277 (1977), assembly bill 144 (1979) and senate bill 506 (1979) summarized in section III C. One other law is senate bill 253 (1979) which authorizes counties to sell bonds backed by state credit for electrical generation projects. These are significant acts to foster geothermal development in Nevada.

Nevada receives 50 percent of federal geothermal lease revenues (see note 17). Given the preponderance of federal ownership of Nevada's geothermal resources, this financial share is likely to represent the most significant fiscal return to the state from geothermal development. Of course, the state will collect its own rentals and royalties from its leases. The reduction, suspension, or waiver of these fiscal liabilities could determine whether a geothermal lease would be economical to develop. The state would still receive the tax, employment and fossil fuel displacement benefits attendant to geothermal development. Further, exempting low temperature development from rentals and royalties would provide similar incentives.

²⁴See in this regard: Nevada Geothermal Commercialization Planning/Semi-Annual Progress Report (Jan.-July 1979) prepared by the Nevada Department of Energy (at pp. 7-11).

The state will also receive benefits from the taxation of geothermal resources. While nonproducing leases are exempt from ad valorem taxation, the taxing of producing leases is uncertain. The legislative commission has previously recommended (see note 11) that geothermal resources be taxed under the net proceeds of mines statute. This would also result in exempting the sale of geothermal energy from sales and use taxes. The remaining tax on geothermal development would be the county corporate franchise fee (2 percent net profit).²⁵

An obvious financial incentives option is expansion of the existing property tax credit to include commercial, as well as residential, expenditures. Another option is to create a state research and demonstration fund for direct use projects. State funded exploration and confirmation drilling for political subdivisions would be very helpful as neither revenue nor general obligation bonding are appropriate for such risk bearing activities.

Regarding utilities, the following two options are clear incentives for geothermal resource development. The first is to allow geothermal facility "construction work in progress" costs to be included in utility rate bases, perhaps on an incremental basis. The second is to authorize a higher rate of return for utility investments in geothermal energy facilities.

The utility market may be strengthened in a number of ways. The following five options are examples. First, require utilities to purchase the output of geothermal resources producers at a fair price to both parties.²⁶ Second, exempt geothermal developers producing electricity for wholesale to existing utilities from public service commission jurisdiction.²⁷ Also require utilities to consider geothermal

²⁵L. Bronder and R. Meyer. Western Energy Planners: Survey of State Taxation of Geothermal Resources (1979).

²⁶The federal PURPA (PL 95-617; 1978) provides for this option.

²⁷Id.

energy sources for new construction before turning to conventional fuels. Expand the authorization to general improvement districts to provide space heating to include cooling as well. Finally, allow geothermal heating districts to be formed within existing utility franchise areas.

There are numerous additional options to foster geothermal development. Some of these include consumer education and technical assistance programs; funding a research and development arm within the Nevada department of energy; requiring the consideration of alternative energy systems and life cycle costing in public buildings; requiring local zoning ordinances and building codes to be compatible with geothermal development and use; requiring new construction to use geothermal space conditioning where feasible and economical;²⁸ establishing a low interest loan program for residential expenditures for alternate energy systems; mandating an insurance risk pool regarding geothermal reservoir and facility performance, and establishing a geothermal equipment certification program and consumer complaint bureau. This list is not comprehensive, but suggests some innovative approaches.

V. RECOMMENDATIONS

The policy considerations discussed in the previous section led to the adoption of 13 recommendations by the subcommittee. The recommendations are summarized at the beginning of this report, and the suggested legislation appears in section VIII.

²⁸By analogy, San Diego County (CA) has required all new construction to utilize solar hot water heating.

VI. CREDITS

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VII. SELECTED BIBLIOGRAPHY

Collie, M. J. Geothermal Energy - Recent Developments, Noyes Data Corporation, Park Ridge, New Jersey, 1978.

Eadington, William R., Taylor, Phillip, and Tissier, Michel. The Prospects for Development of Geothermal Resources in Northern Nevada: Impacts and Considerations, College of Business Administration, Paper No. 79-20R, University of Nevada-Reno, February 1980.

Garside, Larry J., and Schilling, John H. Thermal Waters of Nevada, Nevada Bureau of Mines and Geology, Bulletin 91, Mackay School of Mines, University of Nevada-Reno, 1979.

Geothermal Resources Council. Direct Utilization of Geothermal Energy: A Symposium, CONF-780133, U.S. Department of Energy, April 1978.

Hanny, J.A., and Lunis, B.C. Nevada Hydrothermal Commercialization Baseline, prepared for the United States Department of Energy - Idaho Operations Office by EG&G Idaho, Inc., Idaho Falls, Idaho, August 1979.

King, Diana, Nimmons, John T., and Hanemann, W. Michael. The Role of Gas and Electric Utilities in Direct Applications of Geothermal Resources, Geothermal Commercialization Project, The Earl Warren Legal Institute, University of California, Berkeley, March 1980.

Lienau, Paul J., and Lund, John W. Multipurpose Use of Geothermal Energy, Proceedings of the International Conference on Geothermal Energy for Industrial, Agricultural and Commercial-Residential Uses, October 7-9, 1974, Geo-Heat Utilization Center, Oregon Institute of Technology.

Nimmons, John T. State-by-State Analysis of Public Utility Laws Affecting Geothermal Direct Heat Applications, The Earl Warren Legal Institute, University of California, Berkeley, June 26, 1979.

Nimmons, John T., Ross, Leonard, and Metzger, Julia. Overview of State Public Utility Regulation Impact on Geothermal Direct Heat Applications, Geothermal Commercialization Project, The Earl Warren Legal Institute, University of California, Berkeley, April 23, 1979.

Riva, Joseph P., Jr., and Mielke, James E. Energy from Geothermal Resources, prepared for the Committee on Science and Technology, U.S. House of Representatives 95th Congress Second Session, Science Policy Research Division, Congressional Research Service, Library of Congress, June 1978.

Sacarto, Douglas M. State Policies for Geothermal Development: Uncovering a Major Resource, Renewable Energy Resources Project, National Conference of State Legislatures, November 1976.

Staats, Elmer B. Geothermal Energy: Obstacles and Uncertainties Impede Its Widespread Use, Report to the Congress by the Comptroller General of the United States, United States General Accounting Office, January 16, 1980.

Staats, Elmer B. The Geothermal Loan Guarantee Program: Need for Improvements, Report to the Chairman, Subcommittee on Energy and Power, Committee on Interstate and Foreign Commerce, House of Representatives by the Comptroller General of the United States, United States General Accounting Office, January 24, 1980.

Staats, Elmer B. How to Speed Development of Geothermal Energy on Federal Lands, Report by the Comptroller General of the United States, United States General Accounting Office, October 26, 1979.

Willetts, Cynthia. "Why the state has been slow to develop geothermal energy," California Journal (May 1980) pp. 204-205.

VIII. SUGGESTED LEGISLATION

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BDR 48-156 Relates to the development of geothermal resources; provides for administration and utilization.....	29

SUMMARY--Relates to the development of geothermal resources; provides for administration and utilization. (BDR 48-156)

Fiscal Note: Effect on Local Government: No.

Effect on the State or on Industrial Insurance: No.

AN ACT relating to the development of geothermal resources; providing for their administration and utilization; and providing other matters properly relating thereto.

THE PEOPLE OF THE STATE OF NEVADA, REPRESENTED IN SENATE AND
ASSEMBLY, DO ENACT AS FOLLOWS:

Section 1. NRS 533.030 is hereby amended to read as follows:

533.030 1. Subject to existing rights, all such water may be appropriated for beneficial use as provided in this chapter and not otherwise.

2. The use of water, from any stream system as provided in this chapter and from underground water as provided in NRS 534.080, for any recreational purpose, is hereby declared to be a beneficial use.

3. The use of groundwater for its energy, including heat and pressure, is a beneficial use of the groundwater, whether it is accomplished through an actual diversion or a process which is not diversionary but extracts heat. A water right may be obtained to protect either type of utilization of the energy produced by groundwater.

Sec. 2. Chapter 534A of NRS is hereby amended by adding thereto a new section which shall read as follows:

1. The state engineer shall require the filing of a plan of development by a developer of a geothermal resource. The plan must be approved by the state engineer before the resource may be developed. The plan must contain sufficient information to allow the state engineer to:

(a) Ascertain the probable impact of the proposed development on local hydrology, local supplies of groundwater and prior water rights; and

(b) Determine whether or not the proposed development is consistent with the prevention of waste and maximum economic recovery of the resource.

2. The state engineer may issue an order requiring the spacing or pooling of wells, a limit on production or requirements for reinjection which are designed to promote the maximum economic recovery of the geothermal resource. The order may be attached to the plans of development as a condition of approval.

3. A lessee of all or part of a geothermal system may enter into an agreement for cooperative development after receiving the approval of the state engineer. The state engineer may suspend or modify the approved plan in accordance with the agreement.

Sec. 3. NRS 534A.010 is hereby amended to read as follows:

534A.010 As used in this chapter, unless the context otherwise

requires, "geothermal resource" means [heat or other associated geothermal energy found beneath the surface of the earth.] the natural heat of the earth, including the energy that is created or may be extracted from the natural heat, and all dissolved or entrained minerals that may be obtained from the medium used to transfer that heat, but excluding hydrocarbons and helium.

Sec. 4. NRS 534A.020 is hereby amended to read as follows:

534A.020 1. The state engineer may adopt such regulations as are necessary to insure the proper development, control and conservation of Nevada's geothermal resources.

2. The regulations may include but are not restricted to:

- (a) Defining geothermal areas;
- (b) Establishing security requirements;
- (c) Establishing casing and safety device requirements;
- (d) Establishing recordkeeping requirements;
- (e) Establishing procedures to prevent pollution and waste;
- (f) Authorizing investigations and research which may be in conjunction with other governmental and private agencies; and
- (g) Establishing well-spacing requirements.
- (h) Requiring the person drilling a geothermal well to provide an individual or blanket surety bond before he may begin drilling.

Sec. 5. NRS 534A.040 is hereby amended to read as follows:

534A.040 [Any water and steam encountered during geothermal exploration is subject to the appropriation procedures of chapters 533 and 534 of NRS.]

1. Before drilling or constructing a geothermal well, the person owning the land on which the well is to be drilled must file an application with the state engineer to appropriate the groundwater which is to be used to transfer the geothermal resource to the surface.

2. The state engineer shall approve the application if he finds that the applicant has demonstrated ownership or control of the geothermal resource he wishes to develop and:

(a) The proposed operation will not significantly interfere with or impair a prior water right;

(b) The owner of the geothermal resource has acquired the prior right to the extent of the potential interference or impairment by purchasing or condemning the rights; or

(c) The owner of the geothermal resource has obtained and dedicated an equivalent amount of water of comparable quality to the holder of the prior right to replace the water which will be used.

3. The state engineer shall consider the following factors, but is not limited to these factors, in determining whether or not to approve an application to develop geothermal resources:

(a) The extent to which the origin of the geothermal resource is hydrologically separated from groundwater aquifers which are currently in use; and

(b) The extent to which the proposed or required reinjection of geothermal fluid will replenish and maintain supplies of groundwater.

4. When granting an application to appropriate geothermal resources, the state engineer shall attach conditions which he finds necessary to protect the public interest. This may include a stipulation which subjects the appropriation to pooling orders and limits on production which have been issued under his authority.

Sec. 6. NRS 322.005 is hereby amended to read as follows:

322.005 As used in this chapter, "geothermal resource" means [heat or other associated geothermal energy found beneath the surface of the earth.] the natural heat of the earth, including energy that is created or may be extracted from the natural heat and all dissolved or entrained minerals that may be obtained from the medium used to transfer that heat, but excluding hydrocarbons and helium.

Sec. 7. Chapter 341 of NRS is hereby amended by adding thereto the provisions set forth as sections 8 to 10, inclusive, of this act.

Sec. 8. As used in this chapter, "alternative source of energy" has the meaning ascribed to it in section 14 of this act.

Sec. 9. A study to determine the feasibility of a system using an alternative source of energy must be prepared before the site of a building which is to be owned by the State of Nevada may be chosen or its construction or renovation is begun. This section applies only to a building with more than 20,000 square feet of usable floor space.

Sec. 10. Each political subdivision of the State of Nevada shall review its building code and zoning ordinance to ensure compatibility with the utilization of alternative sources of energy.

Sec. 11. NRS 361.027 is hereby amended to read as follows:

361.027 "Geothermal resource" means [:

1. All products of geothermal processes, embracing indigenous steam hot water and hot brines;

2. Steam and other gases, hot water and hot brines resulting from water, gas or other fluids artificially introduced into subsurface formations;

3. Heat or other associated energy found beneath the surface of the earth; and

4. Byproducts of any of the items enumerated in subsections 1 to 3, inclusive, such as minerals (exclusive of oil or hydrocarbon gas that can be separately produced) which are found in solution or association with or derived from any of such items.] the natural heat of the earth, including the energy that is created or may be extracted from the natural heat and all dissolved or entrained minerals that may be obtained from the medium used to transfer that heat, but excluding hydrocarbons and helium.

Sec. 12. NRS 445.178 is hereby amended to read as follows:

445.178 "Pollutant":

1. Means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological

materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water;

2. Does not mean water, gas or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil or gas production and disposed of in a well, if the well is used either for facilitating production or for disposal purposes and if the department determines that such injection or disposal will not result in the degradation of ground or surface water resources.

3. Does not mean water, gas or other material injected into a well or used to stimulate a reservoir of geothermal resources if the department determines that the injection or stimulation will not result in the degradation of ground or surface water resources.

Sec. 13. Chapter 704 of NRS is hereby amended by adding thereto the provisions set forth as sections 14 to 17, inclusive, of this act.

Sec. 14. As used in this chapter, "alternative source of energy" means the sun, a geothermal resource, wind, solid waste, hydroelectricity or any other source of energy which the commission determines to be renewable. The term excludes coal, oil and natural gas.

Sec. 15. The commission may promote the utilization of alternative sources of energy by:

1. Including construction in progress in the rate base.
2. Establishing liberal policies for interconnection of transmission lines and the sale and transmission of power from one utility to another.
3. Establishing long-term rates for the sales of power from alternative sources of energy to existing utilities.
4. Establishing rates which increase, remain constant or decrease based on the cost of producing equivalent power from conventional sources.

Sec. 16. 1. The commission may make just and reasonable regulations governing the sale of direct heat by suppliers.

2. The regulations must provide for a system of operating permits which:

(a) May not be denied because of an encroachment by the supplier of direct heat upon the existing area of a utility;

(b) Do not grant an exclusive franchise to a supplier of direct heat;

(c) Require the supplier to obtain a performance bond which is equivalent to the maintenance reserve of the utility; and

(d) Require each supplier to provide each customer with a contract which contains:

(1) A provision which sets a minimum period of 3 to 5 years for the service;

(2) The rates to be charged for the duration of the contract;

(3) A requirement for the supplier to submit to binding arbitration to determine the amount of damages suffered by a customer as a result of inadequate service; and

(4) A requirement for the supplier to pay liquidated damages if service is unilaterally terminated by the supplier.

Sec. 17. The commission may by regulation authorize public utilities to recover the undepreciated costs attributable to plants and facilities which generate electricity from sources of alternative energy if the useful life of the plant or facility is shortened because the source proves to be inadequate or unforeseen technical problems arise. The regulations must include provisions which:

1. Restrict their application to plants or facilities which generate electricity, were authorized by the commission or other appropriate entity on or after July 1, 1981, and utilize a source of alternative energy to supply at least 50 percent of the energy which generates the electricity produced by the facility.

2. Require a utility company which requests the rate authorized pursuant to this section to show that it has exercised due care in the construction, location and operation of the facility and that it has taken all reasonable steps to continue the operation of the facility.

3. Restrict the recovery to the undepreciated costs which the utility expended to construct the electrical generating plant and associated transmission facility and any unrecovered costs for their operation.

4. Except as otherwise authorized by this paragraph, require that these costs be amortized over a period equal to the useful life of the plant minus the number of years that elapse between the date of construction of the facility and the date on which the commission authorizes the utility to recover such costs. The commission may authorize the recovery of costs over a different period if it is shown that an alternative treatment will benefit the customers of that public utility.

Sec. 18. NRS 704.030 is hereby amended to read as follows:

704.030 "Public utility," as used in this chapter, does not include:

1. Corporations, partnerships, sole proprietorships, associations of natural persons, their lessees, trustees or receivers (appointed by any court whatsoever) insofar as they own, control, operate or manage motor vehicles operated as hearses, ambulances or hotel buses engaged in the transportation of persons for hire exclusively within the limits of a city of this state.

2. Corporations, partnerships, sole proprietorships or associations of natural persons engaged in the production and sale of

natural gas, other than sales to the public, or engaged in the transmission of natural gas other than as a common carrier transmission or distribution line or system.

3. Corporations, cooperatives, nonprofit corporations or associations, partnerships, sole proprietorships, associations of natural persons, their lessees, trustees or receivers appointed by any court whatsoever, engaged in the business of furnishing, for compensation, water or sewer services, or water and sewer services, to persons within this state if:

(a) They serve 25 persons or less; or

(b) Their gross sales for water or sewer services, or water and sewer services, amounted to \$5,000 or less during the immediately preceding 12 months,

and in either case they do not own or control any other such business entity furnishing water or sewer service or water and sewer service within this state.

4. Any common motor carrier, contract motor carrier of passengers or property, or private motor carrier subject to the provisions of chapter 706 of NRS.

5. Corporations or other persons not normally engaged in water production and sales and which sell or furnish water as an accommodation in an area where water is not available from a public utility, cooperative corporations and associations or political

subdivisions engaged in the business of furnishing water, for compensation, to persons within the political subdivision.

The commission may by subpoena require any person claiming to be exempt from regulation by reason of this section, to appear before it with all of his relevant books, papers and records, and to testify concerning the scope, nature and conduct of his business.

6. Corporations or other persons who are engaged in supplying direct heat to any other person for business, manufacturing or household use.

Sec. 19. NRS 704.870 is hereby amended to read as follows:

704.870 1. An applicant for a permit shall file with the commission an application, in such form as the commission may prescribe, containing the following information:

(a) A description of the location and of the utility facility to be built thereon;

(b) A summary of any studies which have been made of the environmental impact of the facility;

(c) A statement explaining the need for the facility;

(d) A description of any reasonable alternate location or locations for the proposed facility, a description of the comparative merits or detriments of each location submitted, and a statement of the reasons why the primary proposed location is best suited for the facility; [and]

(e) A summary of the examination of conservation measures and alternative sources of energy which was made before the construction of a facility using fossil fuel or nuclear energy; and

(f) Such other information as the applicant may consider relevant or as the commission may by regulation or order require. A copy or copies of the studies referred to in paragraph (b) [shall] must be filed with the commission and be available for public inspection.

2. A copy of the application [shall] must be filed with the chairman of the state environmental commission created pursuant to NRS 445.451.

3. Each application [shall] must be accompanied by proof of service of a copy of such application on the clerk of each local government in the area in which any portion of such facility is to be located, both as primarily and as alternatively proposed.

4. Each application [shall] must also be accompanied by proof that public notice thereof was given to persons residing in the municipalities entitled to receive notice under subsection 3 by the publication of a summary of the application in newspapers published and distributed in the area in which such utility facility is proposed to be located.

IX. APPENDICES

Comments on Proposed Legislation

During the course of the study, several state agencies were intimately involved with the policy issues before the subcommittee. These included several divisions of the department of conservation and natural resources, the Nevada department of energy, and the public service commission of Nevada.

At the conclusion of its deliberations, the subcommittee solicited comments from these agencies on the proposed legislation. Because of time limitation, the subcommittee was unable to consider the comments. Therefore, a copy of each of the responses received is included in this appendix. Also included are additional comments submitted by the National Conference of State Legislatures' staff assistant to the subcommittee.

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APPENDIX A

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Conservation Districts
Environmental Protection
Forestry
Historic Preservation and Archeology
State Lands
Mineral Resources
State Parks
Water Planning
Water Resources

COMMISSIONS

State Conservation Commission
State Environmental Commission

STATE OF NEVADA

Department of Conservation and Natural Resources

OFFICE OF THE DIRECTOR

CARSON CITY, NEVADA 89710

October 13, 1980

M E M O R A N D U M

To: Samuel F. Hohman, Senior Research Analyst
Science and Technology

From: Roland D. Westergard, Director *(Roland D. Westergard)*

Subject: Legislative Proposals of the Legislative
Commission's Subcommittee to Study Geothermal Energy

The proposed change to NRS 533.030 (See page 1), may still leave some confusion as to whether or not a water right is required if no diversion of geothermal fluid is made. The Division of Water Resources takes the position that if water from another source, such as a municipal distribution system, is circulated into a geothermal well for the purpose of domestic heating, a permit is not required as long as there is no actual diversion from the geothermal resource. Perhaps this type of use could be administered by treating it as coming under domestic well use and, therefore, not requiring a permit.

The proposed changes to NRS 534 A will result in appropriations of geothermal fluids without advertising applications, protest periods, beneficial use, etc. I see no good reason to make this change. The argument has been made that our permitting procedure takes too long, but now, under the waiver statute (NRS 534.050), exploratory wells can often be drilled long before a permit is issued. Under the proposed statute it may be difficult to determine what qualifies as a geothermal resource, eligible for the simplified permitting procedure. Due diligence to hold a permit is not required.

The new definition of geothermal energy including "all dissolved or entrained minerals" (See pages 2, 4 & 5), may conflict with mining and mineral laws.

This proposed legislation seems to have been inspired primarily by private industry acting in part through the U.S. Department of Energy and the National Conference of State Legislatures. The objective is to weaken or remove State

Samuel F. Hohman
October 13, 1980
Page Two

authority over the geothermal resource under Nevada Water Law. One of the most objectionable parts of Nevada Water Law to private industry is the "use it or lose it principle." Which, in theory at least, prevents geothermal resources from being locked away until the opportune time for marketing has arrived. Federal agency objections to state control of water resources are well known.

RDW:vjw

APPENDIX B



STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION

CAPITOL COMPLEX
CARSON CITY, NEVADA 89710
October 13, 1980

TELEPHONE (702) 885-4670

TO: Samuel F. Hohmann
Senior Research Analyst
Science and Technology

FROM: L. H. Dodgion, P.E. *LHD*
Administrator

Re: Legislative Proposals of the
Legislative Commission's Subcommittee
to Study Geothermal Energy

After reviewing the proposed legislation, I have the following comment regarding the proposed amendment to NRS 445.178 on Page 5.

Instead of the proposed subsection 3, revise subsection 2 to read:

"Does not mean water, gas or other material which is injected into a well to facilitate production of geothermal resources, oil or gas, or water derived in association with geothermal resources, oil or gas production and disposed of in a well, if the well is used either for facilitating production or for disposal purposes and if the department determines that such injection or disposal will not result in the degradation of ground or surface water resources.

LHD:mmw

5.58

APPENDIX C



PUBLIC SERVICE COMMISSION STATE OF NEVADA

October 17, 1980

Address of the Commission is the Commission
Telephone (702) 855-4100

HEBER P. HARDY, Chairman
JANET S. McDONALD, Clerk
ROGER C. BOSS, Commissioner
PATRICK A. JAGAN, Deputy Commissioner
WILLIAM W. PROSCHKE, Secretary

KINFAD BUILDING
505 EAST KING STREET
CARSON CITY, NEVADA 89601

TO: Samuel F. Hohmann, Senior Research Analyst,
Science and Technology

FROM: Heber P. Hardy, Chairman
Public Service Commission of Nevada

SUBJECT: Proposed Amendments to Chapter 704 Providing
for Development of Alternative Sources of
Energy (BDR 48-156)

Sec. 14 excludes coal, oil and natural gas from the definition of "alternative source of energy" and Sec. 15 authorizes the P.S.C. to promote utilization of "alternative sources of energy" by including construction work in progress in the rate base.

We have taken the position in the past that we already have the authority to include Construction Work in Progress (CWIP) in rate base and have allowed Sierra Pacific Power Company (SPPCo) to do so related to the construction of the Valmy coal-fired electric generation plant partially in recognition that a shift to abundant cheaper coal away from scarce expensive oil and natural gas is in the public interest. Because allowing CWIP in rate base is contrary to the traditional "used and useful" concept, we have only allowed CWIP in rate base the one time after a showing of special circumstances. We are concerned that legislative approval of use of CWIP in rate base to promote utilization of alternative sources of energy could be interpreted to mean that its use for other purposes has not been authorized by the legislature and therefore cannot be allowed by the P.S.C. under any circumstances.

Sec. 15 (2) authorizes use of liberal policies for interconnection of transmission of power from one utility to another. Liberal policies is a vague term. Is it intended to exempt construction of such lines from the Utility Environmental Protection Act? Is it intended to include CWIP in rate base? Is it intended to establish preferential rates and to somehow transfer jurisdiction from the Federal Energy Regulatory Commission (F.E.R.C.) to the P.S.C.? Is it intended to authorize preferential regulatory treatment in all respects without regard to other lawful requirements and the right or interests of any other party?

Sec. 15 (3) authorizes the establishment of long-term rates for the sales of power from alternative sources to existing utilities. Does the P.S.C. have the jurisdiction to regulate

Samuel F. Hohmann
October 7, 1980
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electric wholesale rates? The concept of long-term rates seems to conflict with Sec. 15 (4) which provides for fluctuating rates based on the cost of producing power from conventional sources. Does Sec. 15 (4) mean that rates should be identical to the cost of producing power from conventional sources without regard to the cost of producing power by alternative energy sources or merely that rates should simultaneously change in the same direction?

If Sec. 16 is intended to encourage the development of direct heating it may be the wrong approach. The provisions relating to performance bond, minimum service period, fixed rates for duration of the contract, binding arbitration to determine damages for inadequate service, liquidated damages for termination of service and non-exclusive franchises, all seem to be potential impediments to encouraging development. Perhaps it might be better to remove direct heat suppliers from economic regulation and provide minimum statutory safeguards for the consuming public.

The provisions in Sec. 17 authorizing the recovery of unpreciated costs of facilities which use alternative sources of energy when the useful life is shortened because of inadequate source or technical problems would tend to encourage the development of such energy sources by removing some of the risk. However, current regulatory practice already provides for such contingencies. If there is any question as to our present authority, then such provisions ought to be expanded to include facilities using conventional sources as well as alternative sources of energy.

It might be more appropriate to consider expanding tax incentives and to provide better means to obtain lower cost and lesser risk capital to encourage the development of alternative energy sources rather than provide special preferential regulatory treatment.

HPH:lm

APPENDIX D



**National
Conference
of State
Legislatures**

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President
Richard S. Hodes
Speaker Pro Tempore, Florida
House of Representatives

Executive Director
Earl S. Mackey

November 4, 1980

Sam Hohmann
Senior Research Analyst
Legislative Counsel Bureau
Capitol Complex
Carson City, NV 89710

Dear Sam:

Enclosed is a memo regarding suggested changes to the working bill draft you sent me. I went over these on the phone with Laurie (11/3); please give her a copy as well. She mentioned that the Commission had adopted the report; I hope there is a mechanism to incorporate at least some of these modifications. I have marked (*) those of most importance. If I can be of some help regarding the on-going resistance of the water people, let me know.

Best regards,

Ken
Ken Wonstolen
Geothermal Project Manager

Enclosure

KW/sas

November 4, 1980

MEMORANDUM

TO: Sam Hohmann, Laurie Barnet
FROM: Ken Wonstolen, NCSL
SUBJECT: BDR 48-156

- §2-3: The state engineer may suspend or modify the previously approved development plans in....
- §3:* Add pressure to definition: the natural heat of the earth including the energy that is created or may be extracted from the natural heat and the energy associated with such natural heat, including pressure, and all dissolved....
- §5-1:* Delete reference to landowner: Before drilling...well, the person owning the land on which the well is to be drilled the person proposing to develop the geothermal resource must file an application....
- §5-2(b): The owner...or impairment by purchaseing or condemnationing the rights.
- §6:* Same change as in §3 above.
- §9:* Additional material: A study...may be chosen or its building construction or renovation is begun. The study shall employ life-cycle cost analysis of such systems and shall guide the selection of building site and energy system design. This section....

- §10:* Restructure--zoning plan may exclude development for good reason: Each political subdivision ...shall review its building code [and zoning ordinance] to ensure...of energy. Land use plans and zoning ordinances shall also be reviewed to determine where development of alternative energy sources may appropriately occur.
- §11:* Same change as in §3 on the preceding page.
- §12-3:* Does not mean water, gas or other **[material]** geothermal transfer medium injected into a well for return to the geothermal source or used....
- §15-1:* Including construction work in progress costs in the rate base
- §15-3, 4* Combine and rewrite 4 with regard to PURPA implementation: Establishing long-term rates for the sale of power generated from alternative sources of energy to existing utilities. A rate established under this section shall reflect the avoided costs of producing equivalent power from conventional sources by the purchasing utility and shall be embodied in a long-term sales contract between the parties. Such rates may include an escalation factor representing increasing avoided costs over the term of the sales contract, or may be levelized or inverted so long as the total payments do not exceed the estimated avoided costs over the term of the sales contract. [delete 4 as written]
- §16-2(a): May not be...upon the existing service area....
- §16-2(d)(1): A provision which...period of **[3 to]** 5 years....

§17-1: Restrict their...utilize a source of alternative energy to ~~supply~~ generate at least 50 percent of the ~~energy which generates the~~ electricity....

§19-1(e): Rewrite: A description of any reasonable measures employing conservation techniques or alternative energy sources which might reduce the need to construct a facility using fossil fuel or nuclear energy; and

Additional Notes

1. The following material, as contained in the summary of recommendations, does not appear:

- tax incentives
- earmarking federal lease revenues to state geothermal fund

2. An additional utility incentive we discussed would be to authorize the Commission to allow a higher rate-of-return (up to 3 percent) for utility investments in alternative energy generation capacity.