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STATE GOVERNMENT WORKSHOP ON
BARRIERS AND INCENTIVES OF
GEOTHERMAL ENERGY RESOURCES

Quarterly Report
For Period January 15, 1978 - April 30, 1978

Rutherford C. Harris
Project Director

National Conference of State Legislatures
1405 Curtis Street
23rd Floor
Denver, Colorado 80202

May 1978

Prepared for the
U.S. Department of Energy
Division of Geothermal Energy
Under Contract ET-78-G-03-1795

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I. INTRODUCTION

With funds from the United States Department of Energy, Division of Geothermal Energy, the National Conference of State Legislatures has undertaken a project to stimulate and assist the review of state policies that affect geothermal development.

The NCSL Geothermal Policy Project has the following work tasks:

- Prepare background material for state geothermal policy reviews;
- Develop specific geothermal profiles for target states;
- Stimulate state decisions to review geothermal policies;
- Assist states in their analysis of geothermal issues;
- Review state policy analyses and legislative actions; and
- Formally review the project's methods and results.

State assistance will be in the form of

A. Reference Materials

1. "Packet of Background Materials" -- a comprehensive gathering of information on the nature of geothermal resources and the various development opportunities available including important state legislation and research studies;
2. "Geothermal Pamphlet" -- an introduction to the nature of geothermal resources, their beneficial uses, the role of state policies, and the NCSL Geothermal Policy Project;
3. "State Profile" -- a concise description of a state's leading policy concerns and potential benefits from geothermal development, including an outline of the location and character of the state's geothermal resources and their potential applications;
4. "Summary of State Actions" -- a summary of state study results and legislative actions taken during the year.

B. State Presentations and Technical Assistance

As part of the policy review process, the project will provide individual assistance at the request of the state. In the form of workshops or through more informal contacts, project staff will assist in such areas as analyzing policy alternatives, describing legislative action taken in other states, and identifying important studies, expert witnesses and concerned parties available for assistance.

C. Assistance from Experts

To insure that the policy reviews conducted are thorough and complete, the project is designed so that the states receive the expertise of all parties concerned with geothermal development. Participating in the multifaceted effort will be

1. State legislators;
2. State legislative staff;
3. State and local officials;
4. Geothermal developers, investors, utilities and other concerned private groups;
5. Consultants from public and private research institutions; and
6. Representatives of the Division of Geothermal Resources, U.S. Department of Energy.

This first quarterly report--covering the period of January 15 through April 30, 1978--includes a discussion of project activities in the areas of

- Selection of Project States
- Development of Project Materials
- Establishing Contacts

Potential problem areas also are identified and future plans are discussed including an assessment of prospects for future progress.

II. EXECUTIVE SUMMARY

In its initial quarter of activity, the NCSL Geothermal Policy Project concentrated its efforts in three areas: 1) Selection of project states, 2) Development of project materials; and 3) Establishing contacts.

In selecting project states, emphasis was placed on developing selection criteria that were inclusive of all pertinent factors. Close attention also was paid to the political sensitivities involved in working with state legislative and executive policy-makers. In particular, attempts were made to insure that persons who are central to the legislative decision-making process are involved in the project from its inception.

In developing project materials, efforts were concentrated on completing the reference materials that will be of most immediate use to the states. Work centered on three project deliverables: 1) the "Geothermal Pamphlet" which will be used to introduce geothermal energy and the NCSL project to state officials; 2) the "Packet of Background Materials" including an "Issue Paper" that outlines the major considerations in enacting legislation and regulations for geothermal development, a study on "State Geothermal Laws and Regulations" that gives updated information on and an overview of state actions in the geothermal area, and an outline of areas to be covered in analyzing the environmental regulation of geothermal development; and 3) the "Project Summary" that outlines the project's goals and method of operation.

In establishing contacts, efforts centered on meeting with individuals and organizations whose activities are pertinent to the NCSL project's goal of carrying out comprehensive policy reviews. Discussions were held to ensure close coordination of efforts.

III. ACTIVITIES

A. SELECTION OF PROJECT STATES

A major project activity during the first quarter was beginning the process of state selection. The following is a description of the workplan designed to guide the selection process and the actions taken:

- Step 1: Establish criteria for selection,
- Step 2: Ascertain state interest in the project,
- Step 3: Obtain necessary information on states, and
- Step 4: Make selection.

Step 1: Establish Criteria for Selection

Five major areas were designated as important considerations in selecting states for project participation. Within these major categories, specific criteria were developed to guide the selection process:

- a. Legislative Process and Procedures
 - Long session or established mechanism for interim work that allows for adequate policy review
 - Bill introduction process (type of bills and deadlines) that allows consideration of recommended legislation
- b. Legislative Political Climate
 - Support for energy initiatives (Examples: bills or resolutions passed, studies conducted, etc.)
 - An indication of preliminary interest in the project by leadership, committee chairmen and key staff persons
 - A 1978 election schedule (including posture of key legislators) that does not interfere prohibitively with project efforts
 - The state as a lead state on a regional or national basis in terms of addressing problems and arriving at solutions
- c. Legal and Institutional Considerations
 - Significant problems to be addressed (no laws or regulations or existing laws or regulations that are inconsistent with geothermal development)
 - Likelihood of successful resolution of existing problems
 - Opportunity for establishing especially innovative policies
- d. Resource Potential
 - Significant potential for development of geothermal resources (including amount of resources available for development and location near demand)
 - Push for development of geothermal resources (including industry interest and the likelihood of shortages of other fuels)

e. Availability of Information

--Opportunity to benefit from geothermal research or development activities such as state geological surveys, DOE/DGE's operations research projects, etc.

Step 2: Ascertain State Interest in Project Participation

It was decided that the first selection criterion to be addressed was "an indication of preliminary interest in the project by leadership, committee chairmen and key staff persons". To obtain this information, the decision was made to contact potential project states through a system of key contact persons. This system recognized the need to involve key legislative decision-makers in the project from its inception to help assure later success. Two criteria were established for designation of key contact persons:

- a. Persons who play important roles in the development of energy legislation and therefore need to be involved directly in project activities at its initial stages; or
- b. Persons who are central to the decision-making process of the legislature and therefore need to be apprised of the project at the initial stages of its development.

Identification of these key individuals was made through discussion with NCSL staff, who as a result of serving as the NCSL liaison/contact person, have established a thorough understanding of the unique characteristics of the legislative processes and personalities of the states to be contacted.

Using the criteria outlined above, the following list of initial contacts was developed:

Alaska	Jack Doyle, Director, Legislative Council Sen. Kay Poland, Chairman, Senate Resources Committee Rep. Alvin Osterback, Chairman, House Resources Committee
Arizona	Sen. William Swink, Chairman, Senate Committee on Natural Resources Rep. William Lewis, Chairman, House Committee on Natural Resources
Colorado	Sen. Fred Anderson, Senate President Lyle Kyle, Director, Legislative Council
Delaware	Sen. Harris McDowell, Chairman, Senate Energy Committee Rep. Ronald Darling, Chairman, House Energy Committee McDonald T. Coker, Assistant Director, Legislative Council

Georgia	Speaker Thomas Murphy, Speaker, House of Representatives Lt. Governor Zell Miller, Senate President Frank Edwards, Director, Legislative Council
Hawaii	Sen. T. C. Yim, Chairman, Senate Energy and Natural Resources Committee Rep. Ben Cayetano, Chairman, House Energy and Transportation Committee
Idaho	Sen. Marsden Williams, Chairman, Senate Natural Resources and Environment Committee Rep. Vard Chatburn, Chairman, House Resources and Conserva- tion Committee Myron Schlechte, Director, Legislative Council
Montana	Robert Person, Research Director, Legislative Council Eileen Shore, Staff Attorney, Environmental Quality Council
Nevada	Arthur Palmer, Director, Legislative Council
New Mexico	Sen. Joseph Gant, Chairman, Senate Conservation Committee Rep. William Warren, Chairman, House Natural Resources Committee Clay Buchanan, Director, Legislative Council
North Carolina	Clyde Ball, Director, Legislative Council
Oklahoma	James Johnson, Director, Legislative Council
Oregon	Sen. Ed Fadeley, Chairman, Senate Environment and Energy Committee Rep. Nancie Fadeley, Chairman, House Environment and Energy Committee
South Carolina	Charles T. Ferillo, Executive Director, House Office of Research and Personnel
South Dakota	Wesley Tschetter, Director, Legislative Council
Utah	Leon Sorenson, Research Director, Legislative Council
Virginia	Don Shull, Legislative Scientific Advisor Susan Gill, Legislative Research Associate
Washington	Speaker John Bagnariol, Speaker, House of Representatives James Bricker, Staff Director, Senate Research Center
Wyoming	Ralph Thomas, Director, Legislative Council

Telephone contact was made to explain the project's goals and method of operation. In all cases, the person contacted expressed initial interest in the project and requested more information. Follow-up letters (see Appendix A) and telephone calls were made to further determine legislative interest in the project.

In addition, personal visits were made to five potential project states:

Delaware
Maryland
New Mexico
South Carolina
Utah

During these visits, discussions were held with legislative and executive officials concerning geothermal development in their state, legal and regulatory problem areas that need to be addressed and their interest in the NCSL project.

Summaries of the responses of key contact persons are shown in Table I. In addition to verbal responses, written communication was received from five states (Delaware, Hawaii, Montana, Oregon and Utah) indicating their interest in the project. (See Appendix B.)

TABLE I
STATE SELECTION PROCESS — INITIAL RESPONSE

<u>State</u>	<u>Response</u>	<u>Remarks</u>
Eastern Region		
Delaware	Yes	Excellent opportunity—Joint Resolution passed expressing legislature's interest in project. Chairman of Senate Energy Committee especially interested.
Georgia	? (Chances Unknown)	Legislative Services Commission will meet on May 25 and discuss participation in the project.
Maryland	No	Not contacted due to recently enacted legislation. Chances good for later involvement.
North Carolina	? (Chances Unknown)	Discussion will be held following legislative elections in mid-May. Legislative response is unknown. To get participation, appropriate educational efforts probably will have to be undertaken.
Oklahoma	No	Not adequate interest at present. Would like to be considered for later involvement and with proper education could be convinced of need for NCSL project.
South Carolina	? (Chances good)	Interest has been expressed at staff level. New joint energy study committee will be in operation during this interim period, and the agenda has not been set.
South Dakota	? (Chances good)	Director of Legislative Council has expressed interest in project. Legislator response is unknown.
Virginia	? (Chances good)	Meeting of Interim Committee on Coal & Energy on May 10 to discuss possible participation. Positive response is expected.
Rocky Mtn. Basin & Range Region		
Arizona	? (Chances Unknown)	Current legislation held up in caucus because of concern over provision allowing Oil & Gas Commission to test drill. Everyone interested in project but want to wait until current policy bill is resolved before considering future study. Decision expected by end of May.
Colorado	? (Chances Unknown)	No decision has been made because of end of legislative session. Legislator response unknown.
Idaho	?	Chairmen of Senate Natural Resources & Environment Committee and House Resource and Conservation Committee interested if problem areas can be identified to show need for project. With proper follow-up, participation likely.

StateResponseRemarks

Montana

?
(Chances good)

Interest has been expressed by Legislative Council and Environmental Quality Council if appropriate staff availability can be determined. Legislator response has been positive.

Nevada

No

Interim study underway on taxation aspects of geothermal development. Report will be completed by mid-June. Would be interested in future assistance if legislature directs interim study efforts in geothermal area in 1979. Good chance for later involvement.

New Mexico

?
(Chances good)

Chairman of Senate Conservation Committee very interested. Proposal must be cleared through Legislative Council.

Utah

Yes

Letter from Senate President and House Speaker expressing interest in project. Director of Legislative Research Office very interested.

Wyoming

No

Management Council discussed and decided not to undertake an interim study in geothermal area. Felt work that needed to be done was of executive nature. With proper education probably could be convinced of need for NCSL Project.

Pacific Region

Alaska

?
(Chances Unknown)

Staff feels no priority placed on geothermal at present. Legislator response is uncertain.

Hawaii

Yes

Letter from Chairman of Senate Energy & Natural Resources Committee expressing interest.

Oregon

Yes

Letter from Chairman of House Environment & Energy Committee expressing interest.

Washington

No

Political considerations negate any opportunity at present. Chances good for participation in 1979.

Step 3: Obtain Necessary Information on States

Having identified the level of interest in the states, collection of the information necessary to complete the other categories of the selection criteria was begun. Four sources of information were identified (with selection criteria to be obtained from each source):

- a. Legislative Council (or central staff agency)
 - Session length/interim structure that allows for adequate policy review
 - Bill introduction process that allows consideration of legislation
 - Support for energy initiatives (bills passed, studies conducted, etc.)
 - Election schedule (that does not interfere)
- b. U.S. Department of Energy/Division of Geothermal Energy
 - Potential for development of geothermal resources (location near demand, amount). USGS "Resource Potential".
 - Opportunity to benefit from geothermal research or development activities (state geological surveys, OR projects, etc.)
 - Significant problems
- c. Private individuals or groups (to include geothermal developers, investors, utilities, consultants from public and private research institutions, etc.)
 - Push for development of geothermal resources
 - Significant problems
- d. State executive agencies
 - Support for energy initiatives (bills passed, studies conducted, etc.)
 - Potential for development of geothermal resources
 - Opportunity to benefit from geothermal research or development activities
 - Significant problems
 - Push for development of geothermal resources

Information was collected in two ways: first, by the discussions held with legislative and executive officials in the process of ascertaining interest in the project; and, secondly, as a result of contacts with executive officials during the review of state statutes and regulations conducted by project staff.

B. DEVELOPMENT OF PROJECT MATERIALS

The project contract calls for reference materials to be provided to states to assist in the policy review process. During the first quarter, work centered on three project deliverables:

1. "Geothermal Pamphlet" -- an introduction to the nature of geothermal resources, their beneficial uses, the role of state policies, and the NCSL Geothermal Policy Project;
2. "Packet of Background Materials" -- a comprehensive gathering of information on the nature of geothermal resources and the various development opportunities available including important state legislation and research studies; and
3. "State Profile" -- a concise description of a state's potential benefits from geothermal development and leading policy concerns, including an outline of the location and character of the state's geothermal resources and its potential applications.

1. Geothermal Pamphlet

The following guidelines were used in developing the pamphlet:

- a. The major purpose of the pamphlet is to "sell" geothermal energy and the NCSL Geothermal Policy Project to state legislators. Because of the varying degrees of knowledge of geothermal energy among state legislators, the pamphlet will be designed as an introduction to the resource and the project.
- b. The pamphlet will have two major sections: 1) a description of geothermal energy and its potential and 2) a description of the NCSL Geothermal Policy Project.
- c. The text of the pamphlet will be kept to a minimum recognizing the inverse relationship between amount of written material and impact on legislators. Also, graphics will be used to the maximum extent possible to make the pamphlet visually appealing.

The written portion of the pamphlet was completed and submitted to a graphics art consultant. Also, an extensive search was carried out for pictures that would be suitable for inclusion in the pamphlet. California Oil and Gas Commission, Pacific Gas and Electric Company, United States Geologic Survey, U.S. Department of Energy, and a commercial photographer were contacted.

2. Packet of Background Material

- a. Issue Paper. In response to the rapid pace with which geothermal legislation is being considered by state legislatures--especially in Eastern states--project staff drafted a preliminary "Issue Paper" that outlines major considerations in developing state geothermal laws and regulations. In addition to making it available to states on request, the "Issue Paper" will be included in the project's "Packet of Background Material" and serve as a guide for future research by project staff.
- b. Review of State Statutes and Regulations. A significant part of the "Packet of Background Material" will be a review of existing state statutes and regulations that affect the development of geothermal resources. The data collection phase of this review was begun by analyzing existing files for content and currency. Executive agencies with authority over geothermal activities then were mailed a request for the following information:
 - current geothermal laws and regulations
 - other involved agencies
 - state program status reports, resource assessment, etc.
 - municipal or county level programs
 - environmental requirements
 - utility regulations
 - financial considerations (tax provisions, loan programs, etc.)
 - citations to pertinent state or federal judicial decisions
 - pending legislation, proposed regulations

The review was continued by follow-up telephone calls to relevant executive agencies. Emphasis was placed on establishing contacts with key agency personnel, developing profiles of relevant issues and regulatory responses, and assessing levels of administrative expertise and activity regarding geothermal resources.

Summaries of state actions were completed and a final report--
"State Geothermal Laws and Regulations"--prepared. (See Appendix C.)

c. Information on Direct Use of Geothermal Energy. An important part of the "Packet of Background Material" will be an expanded analysis of areas not covered fully by State Policies for Geothermal Development. One area identified for such coverage is multiple, non-electric applications possible for geothermal resources. Collection of information on direct use was begun by contacting the following organizations:

- Geo-Heat Utilization Center, Oregon Institute of Technology
- U.S. Department of Energy: Regulation Assessment & Planning Branch, Buildings & Community Systems Branch, Barriers & Incentives Branch, and Institutional Barriers Panel
- U.S. Department of Housing and Urban Development (modular integrated utilities systems)
- Argonne National Laboratory
- Geothermal Resources Council

d. Environmental Regulation of Geothermal Development. Another area designated for in-depth analysis in the "Packet of Background Material" is environmental regulation of geothermal development. The following outline was developed to guide the information search in the environmental area:

- Summarize basic authorities of local, state and federal governments to regulate environmental quality.
- Describe federal statutes, regulations and major court decisions which affect environmental regulation of geothermal development. The consequences for local and state regulation of federal environmental requirements would be highlighted. Anticipated regulations incorporating geothermal resources under existing environmental statutes would be discussed, in particular, based on contacts with federal administrative agencies.
- Detail state legislative concerns in the regulation of environmental effects from geothermal development. The characteristics of geothermal resources, state regulatory authority and federal environmental requirements would be interrelated.
- Outline state legislative alternatives in the regulation of geothermal development. Policy alternatives would be related to typical or generic regulatory concerns, with pros and cons listed for the various alternatives. (Designation of a lead agency, creation of an interdepartmental coordinating council and funding the collection of environmental background data might be three policies for improving a state's regulatory mechanism.)

In addition, a review of the latest EPA policy documents on geothermal regulation was made to determine specific areas for analysis.

- e. Project Summary. A project summary was developed to outline the project's goals and method of operation. Its major use is to introduce the project to legislative and executive officials and other interested persons.

(See Appendix D.) Major sections include

- Introduction
- Project Goal
- Reference Materials
- State Presentations and Technical Assistance
- Assistance from Experts
- State Selection and Involvement
- Project Management and Structure

3. State Profiles

Work was begun on "State Profiles" by developing a profile of activity for an individual state in terms of environmental statutes, regulations, procedures and major court decisions pertaining to geothermal development. Areas to be addressed will be:

- a. A summary of regulatory objectives and state mechanisms established to achieve those objectives.
- b. A discussion of the problem areas in regulation of geothermal development. The location and nature of geothermal resources, probable development options and the existing regulatory mechanisms would be interrelated.
- c. An outline of state legislative alternatives in the regulation of geothermal development. Policy alternatives would be related to specific regulatory concerns in that state, with a discussion of their pros and cons.

Also, as a result of the discussions held with executive officials in connection with the review of state statutes and regulations affecting geothermal development, initial steps were taken in outlining problem areas that the project should address in individual states. This information will be used in developing specific state workplans for project involvement.

C. CONTACTS

To achieve the project goal of comprehensive policy reviews of state actions that affect geothermal development, careful attention must be paid to coordinating all activities that interface with policy development at the state level and, in particular, that in any way call for contact with state legislatures. Project staff devoted a considerable amount of time during the quarter to making contacts with key individuals and organizations to apprise them of the NCSL project and to work toward close coordination of efforts in contacts with state policymakers.

Meetings were held with

1. U.S. DOE/DGE - Washington headquarters and regional staff
2. U.S. DOE/DGE Advisory Committee on Geothermal Energy
3. Idaho National Engineering Laboratory
4. Operations Research contractors and state teams: New Mexico Energy Institute, Applied Physics Laboratory, Oregon Institute of Technology and Science Applications, Inc.
5. University of Southern California Geothermal Energy and the Law Project
6. Geothermal Resources Council
7. California State Advisory Committee on Geothermal Energy
8. American Bar Association's Subcommittee on Geothermal Energy
9. WAPORA, Inc.
10. University of Pennsylvania Energy Center
11. University of California Los Alamos Scientific Laboratory
12. Indiana University School of Law
13. United Indian Planners Association

Particular efforts were made to work closely with the management team of the DOE/DGE Rocky Mountain Basin and Range Region. Project staff participated in a workshop and planning meeting of regional personnel and provided input into development of the regional Work Breakdown Structure concerning legal and institutional matters.

IV PROBLEMS ENCOUNTERED

One potential problem area has been identified: the effect the project's late start will have on achieving first year objectives. The project proposal, which calls for working with six primary target states, was designed around the assumption that the project would begin in October, 1977. The intended startup time allowed for a three-month preparatory period during which background materials were to be compiled and initial contacts made prior to the beginning of the legislative sessions. This approach would have allowed the project to begin actual work in the states during the crucial time when legislatures are in session (January to April).

What exact effect the project's late start will have on its objectives during the first year cannot fully be determined until the project states are selected and workplans developed. However, it is obvious that not being able to begin working with a state at the beginning of the legislative session will delay significantly the policy reviews that are contemplated. .

V. PLANS FOR FUTURE REPORTING PERIODS

The upcoming months of project activity will center around six tasks:

- A. Selecting project states
- B. Developing workplans for individual states
- C. Developing project reference materials: "Packet of Background Material", "Geothermal Pamphlet", and "State Profiles"
- D. Holding the first meeting of project Advisory Committee
- E. Selecting project evaluator
- F. Beginning work in project states

VI. ASSESSMENT OF PROSPECTS FOR FUTURE PROGRESS

In assessing the project's current status in terms of prospects for future progress, two accomplishments indicate the chances of meeting project goals are excellent. First, project staff have received very positive responses from the contacts made with various persons and groups involved in geothermal development, including private developers, research consultants and U.S. DOE/DGE contractors. It is felt that significant advances have been made in assuring the cooperation of these individuals and organizations whose support and work will be vital to the project's success.

Second, and most importantly, the positive responses that have been received from state legislative and executive officials indicate that the key persons in the states recognize the value of the NCSL project and support its goals. Obtaining the commitment of key parties in the legislative process will help considerably when the project reaches its final stages of attempting to implement recommendations for action.

APPENDIX A

**National
Conference
of State
Legislatures**

Headquarters
Office
(303) 623-6600

1405
Curtis
Street
23rd Floor
Denver,
Colorado
80202

President
Fred E. Anderson
President of the Senate
Colorado
Executive Director
Earl S. Mackey

March 27, 1978

Dear

This letter is a follow-up to our telephone conversation concerning
_____ 's participation in NCSL's Geothermal Policy Project.

As I indicated to you, we are in the initial stages of selecting project states; and, as a first step, we are ascertaining whether the key legislators and staff who would be involved in the project are interested in undertaking the type of policy review that will be carried out in the next year or so.

I appreciate your preliminary indication of interest and am enclosing a project summary to give you more information on the project's goals and method of operation. If you wish _____ to be seriously considered as a project state, I would appreciate you letting me know at your earliest convenience.

In closing, I want to indicate that final selection of project states will be based on several criteria in addition to legislative interest. These include significant potential for development of geothermal resources, an established mechanism that allows for the type of policy review envisioned by the project and an indication that there are significant problems to be addressed.

If you have any questions, please do not hesitate to contact us. Thank you again for your interest, and I look forward to hearing from you soon.

Sincerely,

Rutherford C. Harris
Director
Geothermal Policy Project

RCH:gp
Enc.

SENATE
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COMMITTEES
ENERGY, CHMN.
COMMUNITY AFFAIRS
FINANCE
JUDICIARY
LABOR & INDUSTRIAL RELATIONS

April 11, 1978

Mr. Rutherford C. Harris
National Conference of State Legislatures
1405 Curtis Street, 23rd Floor
Denver, Colorado 80202

Dear Rullie:

Enclosed please find a copy of Senate Concurrent Resolution No. 87 which passed the Senate on March 16; passage in the House has been delayed due to the protracted debate on the Right to Work bill and the Easter break; however, Representative Darling and I are personally committed to the project and I see the project as a vehicle to spur the implementation of the recommendations of the Committee on Committees.

The recommendations as you know would provide the legislature with a better mechanism for policy review and an increased legislative staff. The Geothermal Policy Project is a complement to the report of the Committee on Committees for together they pave the way for future legislative requirements to be established and reviewed before a crisis situation develops. Further, Delaware has been selected by the Department of Energy to participate in an important pilot program to probe the dimension of Geothermal Energy potential. I, therefore, urge that Delaware's legislature be included in NCSL's Geothermal Policy Project.

Sincerely,

A handwritten signature in dark ink, appearing to be 'H. McDowell'.

Harris B. McDowell, III

HEMcD:mjf
Enc

SPONSOR Senator McDowell & Rep.
Darling

DELAWARE STATE SENATE

129TH GENERAL ASSEMBLY

SENATE CONCURRENT RESOLUTION NO 87

MAR 16 1978

RELATING TO THE NATIONAL CONFERENCE OF STATE LEGISLATURE'S GEOTHERMAL POLICY PROJECT.

1 WHEREAS, the earth itself is a gigantic storehouse of heat and energy that we
2 have scarcely begun to tap; and

3 WHEREAS, the United State Department of Energy is now preparing to undertake
4 an extensive search for geothermal energy in certain states; and

5 WHEREAS, Delaware is known to have high-enthalpy masses of water in the deeper part
6 of its sedimentary basins and that the successful development of this vast source of
7 heat will provide clean, cheap and virtually perpetual energy; and

8 WHEREAS, geothermal energy can be developed economically in relatively small
9 plants; and

10 WHEREAS, the environmental incentive to pursue the geothermal option can no
11 longer be ignored namely because of the shortage of relatively clean sources of
12 energy...freedom from air pollution caused by fossil fuels and the absence of the
13 changes of radioactivity caused by atomic power; and

14 WHEREAS, the National Conference of State Legislature's Geothermal Policy
15 Project is designed to help states identify and develop geothermal regulatory policies
16 which may be required by future development; and

17 WHEREAS, this attempt to anticipate future legislative requirements represents a
18 a welcome departure from the more normal procedure whereby we are forced to legislate
19 from a crisis situation; and

20 WHEREAS, Delaware does not have any geothermal policies or regulations and the
21 scope of such regulatory concerns are so vast that we should not forego this oppor-
22 tunity to participate in such a project.

23 NOW, THEREFORE:

24 BE IT RESOLVED by the members of the Senate of the 129th General Assembly of
25 the State of Delaware, the House of Representatives concurring therein, that the
26 National Conference of State Legislatures is hereby requested to consider Delaware
27 as one of the twenty (20) states that will receive the assistance of the Geothermal
28 Policy Project in the development of a comprehensive policy with respect to geothermal
29 resources.

1 BE IT FURTHER RESOLVED that upon the passage of this Resolution that the Secretary
2 of the Senate is hereby instructed to forward a suitably prepared copy to the National
3 Conference of State Legislatures, 1405 Curtis Street, 23rd Floor, Denver, Colorado
4 80202, Attention: Rullie Harris.

2 of 2

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SEICHI HIRAI
CLERK

The Senate
The Eighth Legislature
of the
State of Hawaii
HONOLULU, HAWAII

April 21, 1978

Mr. Rutherford C. Harris
Director
Geothermal Policy Project
National Conference of State Legislatures
1405 Curtis St. 23rd Floor
Denver, Colorado 80202

Dear Mr. Harris,

Thank you for your phone call and follow up letter regarding the NCSL's Geothermal Policy Project. Forgive me for the delay in responding to your letter as we have just finished up a most significant Session as far as energy is considered. Enclosed is a copy of the energy results, which includes some \$10,200,000 of new funds for energy R&D.

In as much as we have a great deal of geothermal energy potential in Hawaii, we would be very interested in being considered as a project state for your program. The recent action by our Legislature supports the fact that we have a strong legislative interest. The Department of Land and Natural Resources just completed action on the rules and regulations controlling geothermal development. We also acted on two bills to move geothermal development forward...one pertaining to the statutes in relationship to the rules and regs... and the other, establishing the role of the public utility commission in rate setting approval and other aspects in geothermal energy.

In about a year, we hope to have our first well head generator in operations, plus a "step out well" drilled on the first major reservoir...and we will be on our way.

I believe I sent a copy of our Senate "Comprehensive Energy Report" to NCSL which we published last November...but if not, let us know and we will forward a copy to you.

Sincerely yours,

T. C. Yim
Senator T.C. Yim

encl.

c.c. Hideto Kono, Energy Resources Coordinator
Dr. Paul Yuen, Acting Director, Hawaii Natural Energy Institute
Dr. Charles Helsley, Director, Hawaii Institute of Geophysics
(with encl. of NCSL material)

President John Ushijima, Hawaii State Senate

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Montana Legislative Council

State Capitol

Helena, 59601

(406) 449-3064

May 5, 1978

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CODE COMMISSIONER

ROBERT PERSON
DIRECTOR, RESEARCH

Rutherford C. Harris, Director
Geothermal Energy Project
NCSL
1405 Curtis Street, 23rd Floor
Denver, Colorado 80202

Dear Mr. Harris:

I apologize for such a tardy response to your March 29 letter. When I received it I contacted a number of people to help formulate a meaningful response. I will comment on the categories in your letter in turn.

1. Legislative interest. From your background paper I judge you will gauge this factor largely by the response of lay legislators. The Montana legislature has in the past indicated interest in all forms of renewable and non-fossil energy sources of which geothermal is one.
2. Potential. As I am sure you know, Montana has geothermal potential as do many western states.
3. Established mechanism. The Montana Legislature has a means for appointing committees to work on issues of statewide significance arising between sessions. There is also a mechanism for in-session assignment of work to committees. In addition there are permanent groups, notably the Environmental Quality Council, which have the capacity to undertake some additional task on their own volition. The only problem associated with this is the availability of staff resources. They are far from unlimited in any agency here.
4. Significant problems. I was most hard put to derive specific comments from those to whom I spoke as to what significant problems could be addressed that have not so far been covered. Water quality concerns seem to be most often mentioned.

Rutherford C. Harris
May 5, 1978
Page 2

I have enclosed some statutes and information on ongoing geothermal research in Montana that might be of interest to you and shed some light on the above comments.

Eileen Shore of the EQC staff told me she might stop by to see you and John Reuss when she was in Denver. If so, you know that the EQC staff is interested in this project and may have some time to devote to it.

Sincerely,

Robert B. Person
Research Director

RBP:eg

Encl.

HOME ADDRESS
NANCIE FADELEY
260 SUNSET DRIVE
EUGENE, OREGON 97403
LANE COUNTY

COMMITTEES
CHAIRMAN:
ENVIRONMENT AND ENERGY
MEMBER:
INTERGOVERNMENTAL AFFAIRS
STATE GOVERNMENT OPERATIONS
JOINT COMMITTEE ON LAND USE

HOUSE OF REPRESENTATIVES
SALEM, OREGON
97310

April 14, 1978

Rutherford C. Harris, Director
Geothermal Policy Project
1405 Curtis Street - 23rd Floor
Denver, Colorado 80202

Dear Mr. Harris:

So good to know about your geothermal policy project. As Ed told you, we have more than a little interest in geothermal since the relatively recent volcanic activity in our state puts us at the top of the list for geothermal potential. This letter is written to indicate my hope that Oregon will be one of the states included in your project.

Enclosed is a copy of our geothermal law which was developed during a study I chaired in the 1973-75 interim. The OPEC crisis came at a time that offered a double whammy to us - gasoline shortages, plus months of drought when we with our close-to-complete dependence on hydro power for electricity got a headstart on other states in recognizing the limitations of our present energy sources.

As you can see, our geothermal law (developed in the 1973-75 interim and adopted by the 1975 legislative session) is based upon the legal scholarship which indicates that the courts will find geothermal neither water nor mineral but sui generis. The most important thing the 1975 legislation did was clean up the bottleneck that had developed between the state engineer (water) and the Department of Geology and Mineral Industries. The bottlenecks which exist in this state now are Federal bottlenecks.

So far, I feel that our geothermal law is probably a good one - I wish that we could give our Energy Siting Council control over the shallow wells, but so far that's been politically impossible. Although we've not struck steam yet in this state, we've a long history of using geothermal hot water - for space heating and industrial processes. And

Rutherford C. Harris, Director
Geothermal Policy Project
Denver, Colorado

Page Two
April 14, 1978

that use is picking up. The City of Klamath Falls is forming a geothermal district for heating downtown businesses. Work is in line to not only use geothermal to heat Timberline - that grand old ski lodge on Mt. Hood - but to also keep the parking lot clear. There are also plans (not yet approved) to pipe hot water from Mt. Hood to heat homes in Portland. We have brand new legislation offering tax credits for alternate energy devices. Most of the applications for credit so far have been for solar devices - but six have been for geothermal.

Enclosed is a brochure for a ballot measure which would have provided funding for small geothermal projects. The measure got caught up in a private vs. public power fight and failed - but we'll probably try again with a similar proposal.

Sincerely,

Nancie Fadeley

NF:MB

Enc. Ballot Measure brochure
Copy Ore. Geothermal Law

cc: Rob McDougal - NCSL

UTAH STATE SENATE

MORONI L. JENSEN

PRESIDENT

CORRESPONDENCE
319 STATE CAPITOL
SALT LAKE CITY, UTAH 84114

RESIDENCE
2940 FILMORE STREET
SALT LAKE CITY, UTAH 84106

May 2, 1978

Mr. Rutherford C. Harris, Director
Geothermal Policy Project
National Conference of State Legislatures
1405 Curtis Street, 23rd Floor
Denver, Colorado 80202

Dear Mr. Harris:

It has come to our attention that Utah is being considered for participation in NCSL's Geothermal Policy Project. We have reviewed the material from your office outlining the project and have discussed the matter with Mr. Leon Sorenson, Legislative Research Director, with whom we understand you have met.

As you know, Utah is in a critical stage in its policy formulation on geothermal development. The Utah statutes are not clear and do not provide a sound basis for the development of this valuable resource. We feel that your project will give us valuable assistance in the development of a proper state policy and in formulation of an adequate statutory basis for geothermal development.

We understand that the only commitment required by Utah is for a staff liaison between the project staff and the legislative committee. We firmly support Utah's application for this project and hope that you will give our needs favorable consideration.

Sincerely,

Moroni L. Jensen
President of the Senate

Glade M. Sowards
Speaker of the House

MLJ/GMS:rtg

STATE GEOTHERMAL LAWS AND REGULATIONS

by

Douglas M. Sacarto
Kenneth A. Wonstolen
Gay Polich

National Conference of State Legislatures
1405 Curtis Street, 23rd Floor
Denver, Colorado 80202
Earl S. Mackey, Executive Director

STATE GEOTHERMAL LAWS AND REGULATIONS

Douglas M. Sacarto
Kenneth A. Wonstolen
Gay Polich

Introduction

Laws providing for the regulation of geothermal development have been established in each of the fifteen gulf and western states. The states have characterized the resource, identified available lands and the methods for leasing, and provided for statewide regulation of field development and production activities. California and New Mexico enacted geothermal statutes in 1967, and other states followed in the '70s, often patterning their legislation after earlier state geothermal statutes or the federal Geothermal Steam Act of 1970.(Appendix 1)

In most states, administrative agencies have promulgated leasing and development regulations to implement the enacted legislation. Major concerns of state leasing regulations are 1) characteristics of the resource, 2) access for exploration, 3) the manner of granting a lease, 4) rentals and production royalties, 5) lease terms and adjustments, and 6) efficient geothermal operations.

Statewide development regulations have been established to control the geothermal industry's methods of drilling, resource production and waste disposal. Development activities are monitored to restrict environmental degradation and help ensure that geothermal resources are not wasted.

State laws and regulations bear on every phase of geothermal development, from initial exploration and financing to final utilization and waste disposal. Exploration and private appropriation of the resource are affected by state permitting requirements and statutory definitions of geothermal resources; state lease provisions determine the security of a leasehold and influence its profitability; and statewide development regulations impinge on the economic value of resource discoveries. State securities

regulations, taxation policies and utility regulations also have important consequences for geothermal developers.¹

In many cases, established laws and regulations are unresponsive to the needs of geothermal development. Current policies largely derive from state water laws or petroleum statutes, and past experience with these resources often has been misleading when applied to geothermal development. Established policies as a result frequently present obstacles rather than encouragement to the geothermal industry.

Neglected policy areas also may impede development. Currently, state geothermal regulations are tailored principally to the production of electricity. Policymakers have given comparatively little attention to the legal and institutional foundations required for direct use of geothermal resources in agricultural production, industrial processing and heating and cooling of buildings. Geothermal heating districts have been authorized in Oregon, providing contracting and bonding authority and the power of eminent domain.² Similar policies, at a minimum, need to be adopted in other states for geothermal heating to realize its full potential. On the legislative agenda, remedies for such policy vacuums should rank equally with removal of poorly drafted or misconceived regulations.

OWNERSHIP AND DEFINITION

Geothermal resources form an ambiguous entity, resembling water, minerals and gas physically and in aspects of their development and use. As a result, considerable disagreement--including litigation--has arisen over the essential nature of the resource and assignment of ownership rights.³

Most legislatures and the U.S. Congress have avoided any statutory assignment of ownership rights. Exceptions are Hawaii (mineral); Oregon (surface); Idaho, Montana

and Washington (sui generis); and Wyoming (groundwater).⁴ According to the designations of Idaho, Montana, Washington and Wyoming, geothermal energy is a public resource. Colorado has declared that geothermal resources are not mineral, but stopped short of identifying the proper resource category. The Colorado statute reads: "Reference to minerals in any conveyance shall be presumed not to include geothermal resources unless specific reference is made to such resources in the conveyance."⁵

Two Definitions

While a majority of states have skirted the ownership question, all states have attempted to list the identifying characteristics of geothermal resources. Two accounts of the resource--which appear as "definitions" in the California Geothermal Resources Act of 1967 and the federal Geothermal Steam Act of 1970--have served as models for most other states.⁶

Definition 1: California Geothermal Resources Act

"Geothermal resources" shall mean the natural heat of the earth, the energy, in whatever form, below the surface of the earth present in, resulting from, or created by, or which may be extracted from, such natural heat, and all minerals in solution or other products obtained from naturally heated fluids, brines, associated gases, and steam, in whatever form, found below the surface of the earth, but excluding oil, hydrocarbon gas or other hydrocarbon substances.

Definition 2: Federal Geothermal Steam Act

"Geothermal steam and associated geothermal resources" means (i) all products of geothermal processes, embracing indigenous steam, hot water and hot brines; (ii) steam and other gases, hot water and hot brines resulting from water, gas, or other fluids artificially introduced into geothermal formations; (iii) heat or other associated energy found in geothermal formations; and (iv) any byproduct derived from them.

"Byproduct" means any minerals (exclusive of oil, hydrocarbon gas, and helium) which are found in solution or in association with geothermal steam and which have a value of less than 75 per centum of the value of the geothermal steam or are not, because of quantity, quality, or technical difficulties in extraction and production, of sufficient value to warrant extraction and production by themselves.

The resource definitions of Hawaii, Idaho, Montana and New Mexico (and recently Maryland) follow the California language. Utah and Wyoming use the California definition in their administrative regulations, although no physical description of the resource is given in their statutes. The federal model was followed by Arizona, Colorado, Louisiana and Texas, while Alaska and Oregon incorporated both the California and federal definitions. (Appendix 1)

Departures from the Federal Model

When adopting the federal language, Arizona, Louisiana, Oregon and Texas made substantial modifications. Louisiana and Texas sought to bring the elements of geopressed reservoirs (heat, fluid pressure, dissolved natural gas) clearly within their definitions. Louisiana stipulated that geothermal resources include:

- (a) All products of geothermal processes, embracing indigenous steam, hot water, hot brines and geopressed waters excepting, however, water produced incidental to oil or gas exploration or production;
- (b) Steam and other gases, hot water and hot brines resulting from water, gas or other fluids artificially introduced into geothermal and/or geopressed water formations;
- (c) Heat, natural gas dissolved in formation water or which was dissolved in formation water and is produced at the geothermal and/or geopressed well bore, or other associated energy found in geothermal and/or geopressed water formations;
- (d) Any byproduct derived therefrom.

Oil and gas continue to be excluded as byproducts.⁷

With the same purpose, Texas provided that geothermal energy and associated resources include "all products of geothermal processes, embracing indigenous steam, hot water and hot brines, and geopressed waters." The language of the federal definition is maintained thereafter until "byproduct" is defined. The Texas statute reads: "The term 'byproduct' means any element found in a geothermal formation which when brought to the surface is not used in geothermal heat or pressure inducing energy generation."⁸

Arizona eliminated the "byproduct" section when adopting the federal model and simply included as part of the geothermal resource any "mineral or minerals, exclusive of fossil fuels and helium gas, which may be present in solution or in association with geothermal steam, water or brines." Artificially-induced energy also was made part of the resource under the third clause of the Arizona geothermal definition:

"Geothermal resources means--(3) Heat or other associated energy found in geothermal formations, including any artificial stimulation or induction thereof."⁹

The Oregon statute adds minimum temperature and well-depth thresholds to the distinguishing features of geothermal resources. Fluids from wells less than 2,000 feet deep with bottom-hole temperatures less than 250°F. must be developed under state water law.¹⁰ Low-temperature fluids from shallow wells are not considered a geothermal resource.

Departures from the California Model

Of the eight states--California, Hawaii, Idaho, Maryland, Montana, New Mexico, Utah and Wyoming--which follow the California definition, Maryland has made the most substantial departures in its recently enacted geothermal statute.¹¹ The state defines geothermal resources as:

the natural heat of the earth higher than 120 degrees Fahrenheit or 49 degrees Centigrade, or the energy, in whatever form, below the surface of the earth present in, resulting from or created by, or which may be extracted from, this natural heat, the natural or artificial medium containing that heat, and all minerals in solution or other products obtained from naturally heated fluids, brines, associated gases, and steam, in whatever form, found below the surface of the earth, but excluding oil, hydrocarbon gas, and other hydrocarbon substances. (Emphasis added.)

Maryland limits geothermal resources to temperatures exceeding 120°F., and it considers produced fluids--other than hydrocarbons--as part of the geothermal resource.

The fluids may be naturally present or artificially introduced, as would be the case when developing hot dry rock reservoirs. In the other seven states, fluids produced from geothermal reservoirs are not part of the resource, and rights to them must be obtained through separate water appropriation procedures.

Two Other Definitions

Of all the states which have enacted geothermal legislation, only Nevada and Washington have not made use of the California or federal resource characterizations. Nevada defines geothermal resources as "heat or other associated geothermal energy found beneath the surface of the earth."¹²

Washington characterizes geothermal resources in terms of their use. Geothermal resources are restricted to:

only that natural heat energy of the earth from which it is technologically practical to produce electricity commercially and the medium by which such heat energy is extracted from the earth, including liquids or gases, as well as any minerals contained in any natural or injected fluids, brines and associated gases, but excluding oil, hydrocarbon gas and other hydrocarbon substances.

Any other use of naturally heated fluids--whether "byproduct water resources" from geothermal electric generation, or the production of wells not suitable for electric generation--must be authorized through the state's water appropriation procedures.¹³ Such fluids are considered water resources by virtue of their use.

Problems for Developers

No consensus has been reached on what geothermal resources are and who owns them, as is evident from the relevant state statutes. This uncertainty hampers geothermal development. Under these circumstances, all potential ownership rights need to be secured by developers to protect their investments.¹⁴ This can require a great deal of time and talent (if even possible), which diminishes the resource's

economic value. Without that protection, however, the threat of litigation may preclude any major development expenditures.

The hybrid character of geothermal resources also leads to overlapping regulatory jurisdictions. In most states, for example, developers are subject both to water allocation procedures and separate geothermal development regulations. Multiple permitting requirements of this kind cause delays, create uncertainty and generally impede development.

For geothermal development to proceed expeditiously, ownership rights must be settled in each state. The relationship of geothermal to other resources, particularly water, also needs to be clear. Appropriation of the resource hinges on these two issues, which makes them central concerns in the formulation of state geothermal policies..

STATE LEASING

The fifteen gulf and western states have all authorized geothermal leasing for state lands. Two-tiered, non-competitive/competitive systems have been established by most states and by the federal government. Exceptions are Arizona, Hawaii, Montana and Washington, which require competitive bidding for all geothermal leases.

A two-tiered leasing procedure allows non-competitive access for areas with low or unknown geothermal potential, but requires competitive bidding for particularly valuable or known geothermal resource areas (KGRAs). Factors which may be bid for competitive leases include cash bonuses, annual rentals, production royalties, profit shares and work commitments. In most cases, both competitive and non-competitive leases impose annual rentals and production royalties.¹⁵

Two types of non-competitive access are granted for geothermal resources. Alaska, California and Wyoming issue exclusive short-term exploration permits for non-KGRA lands. The permittee is allowed to convert areas under permit to development leases upon discovery of geothermal resources or reclassification of the area for other reasons as KGRA. (Fig.1)

The other states with two-tiered leasing simply issue non-competitive leases for non-KGRA lands unless they are being offered for the first time. Competitive bidding or a public drawing generally is required for newly offered lands. (Fig. 2)

The second tier of the leasing system is engaged when lands not leased or under permit are determined to have significant geothermal value (KGRA). Developers may obtain leases for those lands only through competitive bidding, the terms of which vary among the states.

With two-tiered access, the states have sought to encourage exploration of unknown lands while retaining the income benefits from ownership is known geothermal areas. This approach permits the entry of small firms into the geothermal industry and provides an incentive generally for exploration. On the other hand, non-competitive leases, and exploration permits with preferential conversion rights, can give developers control of geothermal resources upon state lands for very little cost. Then when a discovery is made, the value of ownership accrues totally to the developers and nearby property holders. Accumulation of geothermal properties is encouraged in this way.

To reduce revenue losses and to discourage accumulation of land for speculation, the states have relied on fixed royalties, acreage limitations, limited lease terms and lease adjustments. (Fig. 3)

Acreage Limitations

Restriction on the size of individual leases and on total lease holdings permitted for any one party are required for orderly resource development. Minimum area limitations prevent excessive fragmentation, and maximums inhibit monopolization of the resource.¹⁶ To be effective, however, acreage bounds must recognize the exigencies of resource development.

The states generally have set quite small lease sizes for geothermal resources. Four states hold individual leases to a maximum of 640 acres; another four use this as a minimum and set 2,560 acres as the maximum lease size. The larger of these two figures is itself small. A field capable of supplying 200 megawatts of electric power generally will span a number of 2,560-acre leases. A developer would need 20-30 such leases to cover a 1,000-megawatt reservoir.

Lease sizes that are too small diminish the value of geothermal development by reducing the expected financial return on investments for exploration and development. Discoveries are more likely to be lost in part to competing developers who hold nearby leases.

The time and financing necessary to procure adequate leaseholdings also increases with undersized leases. Before discovering a 200 megawatt reservoir 150,000 to 500,000 acres on the average will first have been examined and approximately 80,000 to 240,000 acres leased.¹⁷ Even if each lease is 2,560 acres, 30-90 leases will be required. Such large numbers of leases are difficult to obtain in a timely manner and in the desired locations.

Alaska, California, Hawaii and Idaho also impose limits on total state leaseholdings. Idaho disallows interest in more than 50 township-and-ranges. Thirty-six sections of 640 acres--or 23,040 acres--constitute a township-and-range. The Idaho limit therefore prevents checkerboard speculation, rather than

large acreage holdings. Hawaii prohibits the accumulation of more than 80,000 acres of non-producing leases; no acreage limit is imposed on productive holdings.

The total acreage limits set by Idaho and Hawaii should not impede geothermal development. Those of Alaska and California are more restrictive, however. Both states forbid state holdings in excess of 25,600 acres. The federal government similarly limits federal lessees to 20,480 acres/state.¹⁸ These limitations confine developers to at most two or three sites of 7,500 to 10,000 acres, an area just large enough for a 200-300 megawatt reservoir. And since productive acreage is not exempt, the limits set by Alaska, California and the federal government may force successful developers out of states in which they have producing leases.

Rentals and Royalties

State leases generally provide for production royalties (10-15%) and minimal rentals (\$1-\$2/acre). Annual rentals are a small charge for the opportunity to undertake intensive use of public lands. They help primarily to defray regulatory costs. Royalties on production, along with cash bonuses for competitive leases, act to hold a portion of the public resource value in the public treasury.

Royalties, in contrast to cash bonuses, involve no risk for the geothermal developer and are not a barrier to small development firms. Royalties simply become part of production costs. With increased production costs, however, marginal resources become unproducable. This is a prime weakness of royalty charges. Their deleterious effects may be reduced by employing only low rates, except that low royalties fail to retain public ownership value for lucrative geothermal reservoirs.¹⁹

Profit sharing is an alternative to royalties which avoids suppressing the development of marginal resources. Profit shares to the lessor are calculated as

a percentage of net profit, rather than gross income. California has employed profit-shares bidding to lease state geothermal development rights at The Geysers. Winning bids received were 28% and 47.77% of net profits.²⁰

Lease Terms and Adjustments

One method of limiting land speculation and losses due to unreasonable lease arrangements is to restrict the effective life of a lease and to allow for adjustment of its various provisions. Primary lease terms of 5, 10 and 20 years have been selected by different states, allowing for renewal if producible geothermal resources are discovered during that period. Renegotiation of the lease typically is allowed after 20 years.

An important characteristic of geothermal resource development is the need for on-site use. This involves large capital investments in powerplant facilities and transmission lines or industrial facilities which require 20 to 40 years for amortization. In addition, field development generally will proceed in increments of 55-110 megawatts, so that new facilities are added late in the lease term.

The prospect of lease termination or adverse adjustments within 5, 10 or even 20 years consequently figures quite differently in geothermal development than in the development of other energy resources. Uncertain tenure due to short lease terms and frequent renegotiation compounds the risks already inherent to geothermal development. Care should be taken, therefore, that these techniques of resource control are not improperly applied.

DEVELOPMENT REGULATIONS

In each of the fifteen states, public agencies have been given the authority to regulate drilling and production of geothermal resources. These agencies are

to ensure that geothermal resources are not wasted and that development operations do not needlessly degrade the land, water or other natural resource values of the state. For this purpose, most of the states have promulgated special regulations.

Common features of these regulations are required permits for each well drilled, converted, capped or abandoned; required drilling reports and well logs; and restrictions on the methods of handling drilling materials and well effluents. In addition, state air and water pollution control regulations apply to geothermal development. As a compliance surety, performance bonds must be filed (e.g., \$5,000 per well; \$25,000 per development), with the exact amount differing among the states. Hawaii, Idaho, and Oregon also require geothermal operations to be insured against liability.

Reservoir Management

The migratory nature of geothermal fluids creates special regulatory problems. Geothermal fluids circulate in the containing aquifer and will flow toward areas of reduced pressure. One well therefore may drain large sections of an entire reservoir, which encourages competing producers to increase present production. The cumulative result may be overproduction and the reduction of ultimate reservoir productivity. In addition, to increase the rate of production, operators must drill more wells than necessary for efficient development. Such excessive drilling creates more widespread environmental damage and increases development costs. As a result, fewer geothermal reservoirs will be developed and costs to the public, both direct and indirect, will increase.²¹

These problems also are encountered in the development of petroleum and water resources. In response, states have employed well-spacing restrictions, direct

production restrictions and provisions for the unit operation of reservoirs.

Geothermal regulatory agencies also have been granted at least one of these powers. Statewide well-spacing requirements predominate, with fewer states adopting production restrictions and mandatory unitization. (Fig. 4) To the extent, though, that water rights are required for geothermal development, state water allocation procedures also would appear to control geothermal production.

Well spacing. A spacing plan for wells sets the minimum distance allowed between a well and other wells, property lines and established roads or buildings. Well spacing limits the total number of wells that may be drilled into a reservoir and therefore the maximum rate of withdrawal. Buffer zones are created along property lines, as well, and these help protect competing interests--or correlative rights--in the reservoir.²²

Production restrictions. Direct restrictions on the rate of fluid withdrawal from a reservoir may be used to protect correlative rights and ensure the most efficient recovery of the resource. For this purpose, the regulatory agency first determines the maximum efficient withdrawal rate for a reservoir and then prorates production by area to the development interests. Production may be allocated to wells in the reservoir, rather than to the areal holdings themselves, and in this case a coordinate well-spacing program is needed to block excessive drilling.

Production allowances also may be set according to appropriative rights. This is the principle of "first in time, first in right." Wyoming has defined geothermal resources as groundwater, and Nevada has submitted geothermal development directly to its water appropriation procedures.²³ Both states therefore

rely on prior rights in the allocation of geothermal production. Production restrictions in the other states follow the principle of correlative rights, although as already noted, water appropriation procedures indirectly control geothermal production wherever water rights are necessary for development.

Unitization. Unitization is an agreement between ownership interests to cooperatively develop a shared reservoir, with benefits allocated according to the principle of correlative rights.²⁴ The regulatory value of unitization is that it removes the competitive drive to overproduce the reservoir. With unitization each interest in the reservoir benefits from improved efficiency. As a result, proper well spacing and production rates are actively pursued, rather than enforced by the state.

Unitization reduces the regulatory burden, since producers voluntarily seek to eliminate waste. Unit operation also gives geothermal developers a larger and more assured resource supply and, therefore, a stronger bargaining stance with industrial or utility consumers.

Voluntary unitization agreements may not always be possible. Unit operation may be blocked by blind stubbornness or parties in a position without unitization to exploit the resource to the detriment of other resource interests. To manage such instances, some states have granted their regulatory agencies the power to mandate unitization. A minimum percentage of development interests may need to agree before the state will mandate unit operation (Arizona: 63%), but this proviso generally is not made.

Environmental Protection

Irresponsible geothermal operations can pose clear dangers to public health and local environments through air and water pollution, noise, subsidence or

solid waste mismanagement.²⁵ Each of the states has regulatory authority and established agencies to eliminate such actions. Geothermal operators must obtain permits to site and drill wells. Methods for well drilling, casing and cementing are prescribed to protect underground aquifers and prevent blowouts. Production and disposal techniques must be approved, and permits are required to plug and abandon a well. Developers also must file surety bonds to insure compliance with regulatory standards at each stage of development. (Appendix 1)

Like other electric generation facilities, geothermal powerplants and transmission lines are sited under state regulation.²⁶ Geothermal production as a whole is subject to state solid waste, air and water pollution control standards. Few states have set specific emission standards for the geothermal industry, however, because development activity has not been sufficiently great.

AREAS FOR NEW INITIATIVE

The importance of state policies for the geothermal industry extends beyond regulations for field development and leasing. State tax policies, direct appropriations, securities regulations, bond authority, construction programs and utility regulatory policies can be applied either to stimulate or impede geothermal development.

The states have not given a great deal of attention to these policy areas, although in some cases important initiatives have been taken. Income tax deductions or property tax exemptions are granted in several states for residential geothermal energy facilities. Some states provide substantial funding for research and development of geothermal and other emerging energy sources.

Arizona now assesses geothermal properties on the basis of gross proceeds. The state also extends geothermal developers a percentage depletion deduction and allows current expensing of exploration and development expenditures.

California, Hawaii and Oregon have sought to enhance geothermal development through areas of utility regulation.

These various policy initiatives are listed in Appendix 2 under the heading of financial incentives. They represent preliminary steps in areas that can help substantially in bringing geothermal development to its full potential.

FIGURES

<u>State</u>	<u>Manner Awarded</u>	<u>Term</u>	<u>Annual Rental</u>
Alaska	By application	3 years, possible 2-year extension	variable: \$1/acre minimum
California	By application	3 years, possible 2-year extension	\$1/acre
Wyoming	a) Public drawing* b) By application	3 years, possible 2-year extension	\$1/acre

*When lands are newly offered for exploration, a period is set of at least thirty days and applications received during that period are awarded permits by public drawing.

Fig. 1. Exclusive state geothermal exploration permits with lease conversion privilege after discovery

State	Non-KGRA Lands		KGRA Lands (Competitive Leasing)	
	Newly Offered	Subsequent Leasing	Bidding Factor	Designation Criteria
Alaska	---	---	(A)	(A)
Arizona	Competitive	Competitive	Cash Bonus	All lands awarded competitively
California	---	---	Cash Bonus or other	Producing Well
Colorado	(A)	(A)	(A)	(A)
Hawaii	Competitive (B)	Competitive (B)	(A)	All lands awarded competitively (B)
Idaho	Public Drawing (30-day filing)	By Application	(A)	Producing Well
Louisiana	(C)	(C)	(C)	(C)
Montana	Competitive	Competitive	Cash Bonus	All lands awarded competitively
Nevada	(C)	(C)	(C)	(C)
New Mexico	Competitive (3- day filing)	By Application	Cash Bonus	Determined by Commissioner of Lands
Oregon	Public Drawing (30-day filing)	By Application	Cash Bonus (D)	Geology and/or producing well
Texas	(C)	(C)	(C)	(C)
Utah	Cash Bonus (E) (15-day filing)	By Application	(E)	(E)
Washington	Competitive	Competitive	Cash Bonus (F)	All lands awarded competitively
Wyoming	---	---	(A)	(A)

(A) Specified by state land commissioners

(B) Mineral reserve lands may be leased non-competitively to occupier (or assignee) with two-thirds vote by Board of Land and Natural Resources.

(C) Regulations not finalized

(D) If no bids received, Division of State Lands may reclassify for non-competitive leasing

(E) Lands are offered non-competitively by order of application, except when they are newly offered. Newly offered lands are leased by cash bonus bidding.

(F) Unlike Montana, if a tract receives no bid, it is withdrawn.

Fig. 2. Leasing methods for state lands

State	Primary Term	Renewal	Renegotiation of Rentals and Royalties	Annual Rental	Royalties		Acreage Limits
Alaska	10 years	one 5-year term if drilling; for duration of commercial production, up to 40 years	20-year intervals beginning 35 years after commercial production; and at end of first 40-year lease period	variable; \$1/acre minimum	primary: byproduct: minimum:	10-15% 2-10% \$2/acre/year	minimum lease: 640 acres maximum lease: 2,560 acres (5,750 for submerged lands) maximum state holdings: 25,600 acres
Arizona*	10 years	2 years if drilling; for duration of commercial production	.....	not less than \$1/acre	primary: byproduct: shut-in:	at least 12.5% at least 12.5% 4 times annual rental per year	maximum lease: 2,560 acres (4 sections) confined to 6 miles square
California	20 years	so long as geothermal resources are produced or capable of being produced in commercial quantities, up to 99 years	10-year intervals, beginning 20 years after lease date	\$1/acre	primary: byproduct: minimum:	10% between 2% and 10% \$2/acre/year	minimum lease: 640 acres maximum lease: 2,560 acres maximum state holdings: 25,600 acres (includes acreage under exploration permit)
Colorado	10 years	for duration of commercial production; lacking production, at discretion of state land board	minimum royalty: 5-year intervals	\$1/acre	primary: byproduct:	10% 5%	.....
Hawaii	10 years	so long as geothermal resources or byproducts are produced in commercial quantities, up to 65 years; 5 years with diligent drilling without production, or with shut-in wells without market	15 year intervals, beginning 35 years after the lease date	state: as bid or set in lease surface occupant: as agreed or set by Board of Land and Natural Resources	primary: byproduct:	10 + 20% 5-10%	minimum lease: 100 acres maximum lease: 5,000 acres, or 2,560 if length of tract is more than six times the width maximum state holding: 80,000 undeveloped acres
Idaho*	10 years	for duration of commercial production or drilling operations to at least 1000 feet, up to 40 years beyond primary term	.....	first 5 years: \$1/acre second 5 years: \$2/acre thereafter: \$3/acre	primary: byproduct:	10% 5%	minimum lease: 40 acres maximum lease: 640 acres maximum state holdings: interest in 50 township-and-ranges
Louisiana	at most 10 years	for duration of commercial production or development operations	.....	at least \$1/acre or 1/2 cash bonus, whichever is greater	primary: byproduct:	at least 10% at least 5%	maximum lease: 5000 acres
Montana	10 years	for duration of commercial production or drilling	10-year intervals, beginning 20 years after lease date	at least \$1/acre	primary: byproduct: shut-in: minimum:	at least 10% between 2% and 5% set in lease \$2/acre/year	maximum lease: 640 acres
Nevada	.....	.....	.....	\$1/acre	primary: byproduct:	12.5% 5.0%	.....
New Mexico	5 years	so long as geothermal resources are produced or capable of being produced in commercial quantities	10-year intervals, beginning 20 years after lease date	\$1/acre	primary: byproduct: recreation or therapeutic: powerplant: minimum:	10% between 2% and 10% between 2% and 10% 8% (net revenue) \$2/acre/year	minimum lease: 640 acres maximum lease: 2,560 acres maximum state holdings: 25,600 acres
Oregon	10 years	10 years, if royalties in any year of preceding term equalled or exceeded annual rental due under lease; 5 years, if no production but discovery has been made or is deemed imminent; maximum of 50 years from lease date	.....	years 1-3: \$1/acre year 4: \$3/acre years 5-10: \$5/acre years renewed: \$5/acre	primary: byproduct:	10% 1%, demineralized water 5%, other (rentals paid each year deducted from royalties due)	minimum lease: 40 acres
Texas	(no lease terms established)			(no lease terms established)			
Utah	10 years	for duration of commercial production; or 1-year terms, in absence of production, upon payment of \$5/acre advance royalty	3-year intervals	\$1/acre	primary: byproduct:	10% 10% (net proceeds)	minimum lease: 40 acres maximum lease: 640 to 2,560 acres, at discretion of director of state lands
Washington	5 years	so long as drilling with diligence; or upon commercial discovery, up to 20 years	.....	at least \$1/acre; at least \$5/acre upon commercial production	primary: byproduct: minimum:	10% at least 4% (net proceeds) \$5/acre/year	minimum lease: 40 acres maximum lease: 640 acres
Wyoming	10 years	so long as geothermal resources produced or capable of being produced in commercial quantities	10-year intervals	\$2/acre	primary: byproduct:	10% 5%	minimum lease: 640 acres maximum lease: 2,560 acres

* Regulations under review

Fig. 3. State geothermal lease provisions

[The page contains extremely faint, illegible text, likely bleed-through from the reverse side. The text is organized into several columns and rows, with some lines appearing as bold or italicized headings. Due to the low contrast, specific words and phrases cannot be transcribed accurately.]

<u>State</u>	<u>Well-Spacing</u>		<u>Enforced Unitization</u>	<u>Production Restrictions</u>
	<u>Area</u>	<u>Pooling</u>		
Alaska	OG	OG	OG	OG
Arizona	GR	GR	GR, OG	GR
California	GR, OG	OG	OG	GR (only for state leases)
Colorado	GR, OG	GR, OG	GR, OG	GR, OG
Hawaii	GR	--	GR	--
Idaho	GR	GR	GR	--
Louisiana	OG	OG	OG	OG
Montana	OG	OG	--	OG
Nevada	GR	GR	GR, OG	GR(water)
New Mexico	GR, OG	GR, OG	--	GR, OG
Oregon	GR	GR	GR, OG	GR
Texas	GR, OG	OG	--	OG
Utah	GR, OG	GR, OG	GR	GR, OG
Washington	GR	GR	GR, OG	--
Wyoming	GR, OG	OG	--	GR (water), OG

GR = Geothermal Resources

OG = Oil and Gas

Fig. 4. Statewide regulatory powers

Footnotes

1. Sacarto, Douglas M., State Policies for Geothermal Development (Denver: National Conference of State Legislatures, 1976).
2. Oregon Revised Statutes, Section 523.010 et seq.
3. United States v. Union Oil Co., 369 F. Supp. 1289 (N.D. Cal. 1973) rev'd 549 F. 2d 1271 (9th Cir. 1977) cert. den ____ U.S. ____.
Geothermal Kinetics, Inc. v. Union Oil Co., No. 75314 (Supreme Ct., Sonoma Cty, Cal., 1976)
Pariani v. California, No. 657-291 (Superior Ct., San Francisco Cty., Cal., 1977)
4. Hawaii Revised Statutes, Sec. 182-1;
Idaho Code, Sec 42-4002;
Montana Revised Code, Sec. 81-2602;
Washington Revised Code, Title 79-76-4;
Wyoming Statutes, Sec. 41-121.
5. Colorado Revised Statutes, Sec. 100-10-103 (6c).
6. California Public Resources Code, Sec. 6903.
Federal Geothermal Steam Act, P.L. 91-581, Sec. 2.
7. Louisiana Revised Statutes, Sec. 30:801.
8. Texas Natural Resources Code, Sec. 141.003.
9. Arizona Revised Statutes, Sec. 27-651 (5, 10).
10. Oregon Revised Statutes, Sec. 522.025.
11. Annotated Code of Maryland, Sec. 8-8A-09 (Maryland Geothermal Resources Act, S.B. 1154 (1978)).
12. Nevada Revised Statutes, Sec. 534A.010.
13. Washington Revised Code, Title 79-76-3.
14. Gerald J. Kitchen, "Geothermal Leasing Practices", 13 Land and Water Law Review 25, 39-45 (1977).
15. FTC Bureaus of Trade and Economics, Report to the Federal Trade Commission on Federal Land Policy (1975), pp. 221-303.
16. Christopher D. Stone and Jack McNamara, Geothermal Energy and the Law, Vol I. (Los Angeles: University of Southern California Law Center, 1975), pp. 183-187.

Footnotes

17. Sacarto, State Policies for Geothermal Development, pp. 21-23.
18. Federal Geothermal Steam Act, P.L. 91-581, Sec. 7.
19. FTC, Federal Land Policy, pp. 263-278.
20. California Division of State Lands, "Geothermal Resources Program: A Dynamic Approach to Alternative Energy Development" (1977).
21. Stephen L. McDonald, Petroleum Conservation in the United States (Baltimore: Johns Hopkins Press, 1971).
22. Ibid., pp. 45, 150.
23. Nevada Revised Statutes, Sec. 534A.040.
Wyoming Statutes, Sec. 41-121.
24. McDonald, Petroleum Conservation in the United States, p. 199.
Federal geothermal development regulations (30 CFR 271.12) give a standard agreement for unit operations.
25. U.S. Environmental Protection Agency, Western Energy Resources and the Environment: Geothermal Energy (1977).
U.S. Fish and Wildlife Service, Geothermal Handbook (1976).
26. California Energy Resources Conservation and Development Commission, "Geothermal NOI/AFC Regulations (77-SIT-1(1a))" DRAFT (1978).

APPENDIX I

State Laws and Regulations Regarding Geothermal Resources

ALASKA

Statutes: Geothermal Resources Act (1971) AK Stat. 38.05.181
Leasing: Div. of Lands - Regulations & Statutes Pertaining to Coal and Other Leasable Minerals (1974) 11 A.A.C. 84.700...
Drilling: Div. of Oil & Gas - 11 A.A.C. 94.730... (1974)

ARIZONA

Statutes: Geothermal Resources (1972); amend. HB 2257 (1977) A.R.S. 27-651...
Leasing: Land Dept. - Geothermal Resources (1972) T.12C.5.A.21 (under revision)
Drilling: Oil & Gas Conservation Comm. - General Rules & Regulations Governing the Conservation of Geothermal Resources (1972) T.27C.4.A.4

CALIFORNIA

Statutes: leasing - Geothermal Resources Act (1967) Pub. Res. Code 6902...
production - Laws for the Conservation of Geothermal Resources (1967, as amend.) Pub. Res. Code 3700...
siting - Energy Resources Development; Conservation Act (1974) Pub. Res. Code 25000...
Leasing: State Lands Comm. - Leases & Prospecting Permits for Geothermal Resources (1970) C.A.C. 2250...
Drilling: Div. of Oil & Gas - Statewide Geothermal Regulations (1976) C.A.C. 1900...
Siting: Energy Comm. - Provisions Applicable to Geothermal Notices & Applications (1978) DRAFT

COLORADO

Statutes: Geothermal Resources Act (1974) C.R.S. 34-70-101...
Leasing: Board of Land Commissioner - Special Rules & Regulations Relating to Geothermal Resources Leases (1972) SLB #248-1
Drilling: Oil & Gas Conservation Comm. - Rules & Regulations for the Development & Production of Geothermal Resources (1976) G101...

HAWAII

Statutes: Government Mineral Rights (1974); amend. HB 3033 (1978) H.R.S. 182-1...
Leasing: Dept. of Land & Natural Resources - Regulations on Leasing & Drilling Geothermal Resources (1978) Reg. No. 8
Drilling: Reg. No. 8

IDAHO

Statutes: leasing - Geothermal Resources Leasing Act (1975) ID Code 47-1601...
production - Geothermal Resources Act (1974, as amend.) ID Code 42-4001...
Leasing: Board of Land Commissioner - Rules & Regulations Governing the Issuance of Geothermal Resources leases (1974) (under revision)
Drilling: Water Resource Board - Drilling for Geothermal Resources (1978)

LOUISIANA

Statutes: Geothermal Energy Resources (1976) L.R.S. 30:800...; Geothermal & Geopressure Energy Research & Development Act (1975) L.R.S. 30:681
Leasing: Mineral Board - none (oil & gas model likely)
Drilling: Office of Conservation - pending

Appendix I

MONTANA

Statutes: leasing - Lease of Geothermal Resources (1974) R.C.M. 81-2601...
siting - Major Facilities Siting Act (1975, as amend) R.C.M. 70-801...
filing bottom-hole temperatures - Act to Facilitate the Discovery of
Geothermal Energy Sources (1975) R.C.M. 60-127, 144, 148
Leasing: Dept. of State Lands - Geothermal Rules & Regulations (1975) M.A.C. 26-2.6(2)
Drilling: Dept. of Natural Resources & Conservation - Geothermal Investigation
Reports (1975) M.A.C. 36-2.8(14)

NEVADA

Statutes: leasing - An Act Relating to State Lands (1975) N.R.S. 322.030...
production - An Act Relating to Geothermal Resources (1975) N.R.S. 534A.010...
Leasing: Div. of Lands - pending
Drilling: Div. of Water Resources - Regulations Pertaining to Exploration Drilling
(1978)

NEW MEXICO

Statutes: Geothermal Resources Act (1967) N.M.S.A. 7-15-1...
Geothermal Resources Conservation Act (1975) (Chap. 272)
Leasing: State Land Office - Rules & Regulations Relating to Geothermal Resources
Leases (1971)
Drilling: Oil Conservation Div. - Rules & Regulations for Geothermal Resources (1974)

OREGON

Statutes: Geothermal Resources (1975) O.R.S. 522.005...
Geothermal Heating Districts (1975) O.R.S. 523.010...
Leasing: Div. of State Lands - Geothermal Lease Regulations (1975) 75-010...
Drilling: Dept. of Geology & Mineral Industries - Rules, Regulations & Laws
Relating to Exploration & Development of Geothermal Resources (1977) 632-20-005...

TEXAS

Statutes: Geothermal Resources Act (1975) V.A.C.S. Art. 5421s
Leasing: Railroad Comm./Div. of Oil & Gas - none (oil & gas model likely)
Drilling: Railroad Comm./Div. of Oil & Gas - Rules Having General Application
to Oil, Gas, & Geothermal Resource Operations (1976) 051.02.02.000
School Land Board - Rules & Regulations Governing Drilling & Producing
on Permanent Free School Lands (1974) (general)

UTAH

Statutes: Water & Irrigation Laws (1973) U.C.A. 73-1-120
Leasing: Div. of Lands - Rules & Regulations Governing Issuance of Mineral
Leases (1973); Geothermal Steam Lease Agreement (1973)
Drilling: Div. of Water Rights - Rules & Regulations for Wells Used for the
Discovery & Production of Geothermal Energy (1978)

WASHINGTON

Statutes: Geothermal Resources Act (1974) T.79 R.C.W.
Leasing: Dept. of Natural Resources - Geothermal Leasing Policy (1978) DRAFT
Drilling: Dept. of Natural Resources - none

WYOMING

Statutes: Underground Water (1973) WY Stat. 41-121
Leasing: Board of Land Commissioner - Rules & Regulations Governing the Issuance
of Geothermal Resource Permits & Leases (1975)
Drilling: Oil & Gas Conservation Comm. - Rules & Regulations (1975) (general)

APPENDIX 2

State Financial Incentives Applicable to Geothermal Resources

Arizona	H.B. 2257 (1977)	Provides for property tax valuation on gross yield, in lieu of ad valorem assessment, for geothermal production facilities. Extends percentage depletion deduction to geothermal production. Allows deduction (or capitalization) for current exploration and development expenses.
California	S.B. 77 (1976)	Empowers PUC to order public utilities to transmit electricity generated by private producers from non-conventional sources.
	A.B. 4032 (1976)	Higher rate of return allowed for utility investments in renewable energy facilities.
Colorado	H.B. 1519 (1977)	Commercial or residential investments for solar, wind and geothermal energy systems deductible for state income tax.
Hawaii	S.B. 2467 (1976)	Property tax exemption for building improvements to use geothermal energy.
	S.B. 995 (1977)	Exempts nonfossil power generation and transmission facilities from PUC regulation when energy used by producer or sold directly to public utility. Authorizes PUC to require public utilities to purchase surplus power from such facilities.
	S.B. 1581/H.B. 3039 (1978)	Major funding provided for geothermal resource assessment; research and development of non-electric uses; and the rift zone laboratory.
	H.B. 2165 (1978)	Makes rates paid by public utilities to geothermal developers for geothermal steam, or electricity from geothermal steam, subject to PUC regulation.

Hawaii	H.B. 3033 (1978)	Determines the applicability of excise taxes on geothermal gross proceeds. Provides for royalties in lieu of a severance tax. Clarifies utility access.
Idaho	H.B. 468 (1976)	Income tax deduction for investments in residential geothermal energy facilities.
Montana	S.B. 86 (1975)	Applies state coal tax fund to renewable energy projects.
	S.B. 167 (1977)	Tax credit for nonfossil energy systems (may apply to geothermal).
	H.B. 292 (1977)	Tax deduction for residential nonfossil energy generating systems (may apply to geothermal).
Nevada	S.B. 326 (1977)	State energy conservation standards for buildings must allow design and construction latitude to the extent that solar, geothermal, or other nondepletable energy sources are used.
	A.B. 277 (1977)	Property tax credit up to \$2,000 for residential geothermal facilities for heating and cooling.
New Mexico	S.B. 185 (1975)	Created permanent fund for energy research and development and appropriated funds.
	H.B. 395 (1975)	Life-cycle cost analysis of nonfossil energy systems required for new state buildings or major renovations.
	H.B. 2 (1978)	\$200,000 appropriation for establishing geothermal space heating demonstration projects. 100% matching funds required.
	H.B. 199 (1978)	\$2 million appropriation for energy research and development.

Oregon	S.B. 339 (1977)	Income tax credit up to \$1,000 for residential geothermal space heating.
	S.B. 477 (1977)	Loan program for veterans--up to \$3,000 for residential geothermal energy facilities.
	S.B. 572 (1977)	Energy Conservation and Production Fund financed by state bond issues established to assist utility companies and individuals in development of non-nuclear energy resources. Emphasis on geothermal and other resources not currently in widespread use. Oregon Department of Energy authorized to develop alternate energy projects, fix rates and sell energy.
	SJR 32 (1977)	Authorizes issuance of bonds for Energy Conservation and Production Fund (must be approved by voters).
	H.B. 3185 (1975)	Authorizes geothermal heating districts with contracting and bonding authority and power of eminent domain.
	H.B. 2159 (1977)	Authorizes waiver of state bonding requirements for well drilling if operation has bond with federal government.
Texas	HSR 24 (1977)	Requests all state agencies and universities to encourage feasibility studies and demonstration projects for alternate energy use in state buildings.
Utah	SJR 37 (1977)	Interim committee to develop legislation pursuant to Utah energy policy (SCR 1, 1977) for support of solar, geothermal, wind and hydroelectric energy development.

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GEOTHERMAL POLICY PROJECT

Introduction

Geothermal resources derive from the earth's natural internal heat. When transported to the surface, this heat energy may be economically applied for a variety of uses, including electric generation, heating and cooling of buildings, commercial heat-processing and in agricultural cropdrying, greenhouses and soil heating.

To develop available geothermal resources, commercial investments must expand greatly beyond their present level. Rapid development is impeded, however, by numerous legal and institutional difficulties. The geothermal industry is hobbled by unsuitable provisions in state and federal leases, obstructive applications of state water laws and ambiguous or discriminatory tax statutes. In some states, laws to regulate the development and use of available geothermal resources have not been enacted.

The scope for state policy review therefore is great. Important policy areas that need to be addressed include ownership and appropriation of the resource, field development and pollution control, financing, taxation, power of eminent domain and utility franchise authorizations. Proper use of the resource requires that these policies be suited to the character of geothermal development. The NCSL Geothermal Policy Project is designed to help states achieve this objective.

Project Goal

The project's goal is to stimulate and assist the review of state policies that affect the development of geothermal resources. Successful completion of the project should help establish state statutes and regulations that are consistent with efficient development of geothermal resources.

Reference Materials

Information provided to project states will include

- "Packet of Background Materials" — a comprehensive gathering of information on the nature of geothermal resources and the various development opportunities available including important state legislation and research studies;
- "Geothermal Pamphlet" — an introduction to the nature of geothermal resources, their beneficial uses and the role of state policies;
- "State Profile" — a concise description of a state's potential benefits from geothermal development and leading policy concerns, including an outline of the location and character of the state's geothermal resources and its potential applications;
- "Summary of State Actions" — a summary of state study results and legislative actions taken during the year.

State Presentations and Technical Assistance

As part of the policy review process, the project will provide individual assistance at the request of the state. In the form of workshops or through more informal contacts, project staff will assist in such areas as analyzing policy alternatives, describing legislative action taken in other states, and identifying important studies, expert witnesses and concerned parties available for assistance.

Assistance From Experts

To insure that the policy reviews conducted are thorough and complete, the project is designed so that the states receive the expertise of all parties concerned with geothermal development. Participating in the multifaceted effort will be

- State legislators;
- State legislative staff;
- State and local officials;
- Geothermal developers, investors, utilities and other concerned private groups;
- Consultants from public and private research institutions; and
- Representatives of the Division of Geothermal Resources, U.S. Department of Energy.

State Selection and Involvement

States will be selected to participate in the project on the basis of several criteria. The most important will be an indication of interest by key legislators and staff in participating in the project, a significant potential for development of geothermal resources and an established mechanism within the state legislature that allows for the type of policy review envisioned by the project.

Initial contact will be made with committee chairmen and key legislative staff who would appropriately be involved in project activities. If substantial interest in the project is expressed, the concurrence of legislative leadership for the state's participation in the project will be sought. Upon selection, a work plan will be designed to outline project activities and determine the exact type of geothermal policy review that will be undertaken. This work plan will take into consideration the unique characteristics of the state including the specific operation and timing of its legislative processes. The level of involvement and the type of commitment on the state's part will depend on several factors, including geothermal policy reviews already completed or under way, legislative time tables and staffing available for assistance.

Project Management and Structure

The Geothermal Policy Project is headquartered in the Denver office of the National Conference of State Legislatures. Project staff consists of a Project Director, Associate Director, Research Associate and Administrative Assistant. In addition to this central staff, the project will receive assistance and overall direction from an Advisory Committee made up of key legislators from project states. Also, the project will secure a group of technical consultants to assist in its efforts. These consultants will represent the expertise of utility suppliers, geothermal developers, federal officials, and others with experience in development of geothermal resources.

National Conference of State Legislatures

The National Conference of State Legislatures, the official representative of the nation's 7,600 state legislators and their staffs, works to help lawmakers meet the challenges of the complex federal system. Headquartered in Denver, Colorado, with an office of state-federal relations in Washington, D.C., the NCSL is a non-partisan organization funded by the states and governed by a 43-member Executive Committee.

To assist states with energy policy questions, the Conference has undertaken special study projects and published several reports. State Policies for Geothermal Development, Analysis of State Solar Energy Options, and Turning Toward the Sun were produced in response to the strong interest of states in alternative energy sources. The NCSL Energy Policy Project publishes a bi-weekly newsletter titled Energy Report to the States and annually issues Energy: The States' Response, a compilation and review of all energy legislation enacted by the states that year.

Because energy issues are among the most important facing state legislatures, NCSL is expanding its energy-related activities. The Geothermal Policy Project is an important part of this effort.

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