

## **NOTICE CONCERNING COPYRIGHT RESTRICTIONS**

This document may contain copyrighted materials. These materials have been made available for use in research, teaching, and private study, but may not be used for any commercial purpose. Users may not otherwise copy, reproduce, retransmit, distribute, publish, commercially exploit or otherwise transfer any material.

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted material.

Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specific conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

This institution reserves the right to refuse to accept a copying order if, in its judgment, fulfillment of the order would involve violation of copyright law.

## STATE COMMERCIALIZATION PLANNING PROJECTS FOR THE RMB&amp;R REGION

Richard T. Meyer and Barbara A. Coe

Western Energy Planners, Ltd.  
Denver, Colorado 80222

## ABSTRACT

The States of the Rocky Mountain Basin and Range Region and the United States Department of Energy participate jointly in a program to promote and accelerate the commercialization of geothermal energy. Ten State Teams, under the guidance of Western Energy Planners, Ltd., perform activities in planning, evaluating, marketing and implementing geothermal projects for both electric and direct thermal applications. Specific tools used to achieve commercialization consist of Energy and Economic Analyses, Area Development Plans, Site Specific Development Analyses, Time Phase Project Plans, Institutional Analyses, Technical Assistance and Outreach. The State Teams have achieved numerous and significant accomplishments, with major impacts on DOE programming, planning and budgeting, private sector developments, community actions and state and federal legislative initiatives.

## INTRODUCTION

The Rocky Mountain Basin and Range Regional Hydrothermal Commercialization Project was initiated in 1977 to stimulate geothermal commercialization throughout the Region. State and local participation are viewed as essential elements in the geothermal commercialization program in order to ensure that the program elements are implementable, that they reflect state and local, as well as national, goals and that they are as effective as possible. Indeed, realistic planning and policy development requires the concurrence of state and local governments.

To obtain state and local participation, the U.S. Department of Energy provides support for state geothermal programs through cooperative agreements with selected state agencies. The cooperative agreements provide for projects in planning, analysis, and marketing of the geothermal energy and technical assistance for its use to prospective users and developers. The several state commercialization programs are closely related to state-coupled resource assessment programs; the latter provide inventories and preliminary data about the geothermal resource areas in each state. Coordination of the programs helps

assure that they are all directed toward the single goal of getting geothermal energy on line. Once the DOE-assisted state commercialization programs are well-established, state and local governments will have the expertise available to continue programs on their own to provide both technical information and funding assistance to prospective developers and users.

During CY 1979, the Idaho Operations Office of the Department of Energy (DOE-ID) contracted with ten Rocky Mountain Basin and Range states to conduct state geothermal commercialization programs. The states - Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, South Dakota, Utah and Wyoming - provided a portion of the funding to cost-share with the Department of Energy. This report describes the activities and findings of the state teams participating in the RMB&R Regional Hydrothermal Commercialization Program.

## OBJECTIVES

Several major objectives are identified as means to effect the goal of increased geothermal commercialization through the state commercialization projects. They include:

- Match geothermal sites with potential markets to identify and rank "targets of opportunity" where state commercialization efforts will be concentrated.
- Identify and describe the actions needed by both private and public participants for geothermal commercialization.
- Stimulate interest and cooperative action among participants in geothermal commercialization.
- Stimulate development of geothermal resources by providing technical information including permit requirements and financial, economic, engineering and resource information.
- Help stimulate economic development through identification of geothermal energy potential for industrial use and coordination with state economic development agencies.
- Identify the constraints to geothermal commercialization and recommend ways to alleviate them.

## TECHNICAL APPROACH

The technical approach of the State Commercial-

ization Projects is to use existing information and data from available sources whenever possible. Interviews and discussions with a variety of state and local participants also contribute data, direction and ideas. Both quantitative and qualitative analyses are performed as necessary. Within these parameters and the objectives indicated above, a number of specific tasks were defined and performed. Although the specific tasks vary in scope and detail, all the states incorporated the following tasks into their contracts with DOE:

- Prospect Identification

Data in geothermal resource areas and sites are documented in order to identify the potential geothermal energy supplies between now and the year 2020. These data include a classification of the resources as either electrical power generation or direct thermal application, and whether the resource is proven, potential or inferred, based on definitions for those terms that were established in previous studies (Meyer and Davidson, 1978).

- Energy and Economic Analyses

Energy consumption and economic data are collected and analyzed to provide a basis for calculating current and future energy demand. This in turn is used to estimate the market demand for geothermal energy. Energy consumption is described or estimated by type of use and by commercial, residential and industrial sectors. Industrial users are described by four-digit standard industrial classification (SIC) codes.

- Area Development Plans (ADPs)

This task provides an assessment of the possible geothermal supply and demand over time. It covers a broad area, either a county or several counties in most cases and includes all the resource sites and all prospective energy users within that area. It is a source of energy and economic data for the New Mexico Energy Institute analyses as well. The Area Development Plans generate the targets for the Site Specific Development Analyses.

- Site Specific Development Analyses (SSDAs)

Site Specific Development Analyses are an important tool for marketing geothermal energy. They identify specific applications of the energy for business, industry, government and residential sectors. Analyses are prepared for major geothermal resource prospects and uses or users. They include examination of technological, economic, and environmental aspects of geothermal use. Communication with the prospective users and/or developers is established and maintained to assure realism and implementability.

- Time-Phased Commercialization Project Plans (TPPPs)

Detailed project management plans showing

specific activities and deadlines are prepared for a limited number of sites that are in advanced stages of development or commercialization. They reveal actions by both private and government sectors needed to achieve commercial operation, and they stimulate cooperative interactions to accomplish the project milestones. Step-by-step procedures are described and shown on a time-line chart. Direct communication between the geothermal developer and the governmental entities is required and produced during the process.

- Institutional Analyses and Handbooks

The local, state and federal regulatory systems and practices for geothermal activity are documented and analyzed to understand the effects upon the rate of commercialization. A regulatory handbook to guide geothermal development participants is prepared for each state.

- State and Regional Aggregations of Development Plans

The geothermal prospects included in all three types of plans are aggregated to obtain estimates of the amount of geothermal energy that can be developed and used between now and the year 2020.

- Identification of Constraints and Recommended Actions

Technological, environmental, economic and institutional constraints that might delay or preclude the development of geothermal energy are examined. Possible solutions are evaluated, leading to recommendations for actions to be taken by local, state and federal governments and by the private sector.

- Outreach

Outreach programs are conducted by each state to promote the use of geothermal energy by industry, utilities, business, agriculture, government and communities. A technical assistance program provides prospective geothermal users and/or developers with information about laws and regulatory processes, economic and engineering feasibility, and the geothermal resource.

#### BENEFITS

The benefits to be gained from the geothermal commercialization project are numerous. The ultimate goal is the replacement of imported oil. Conserving natural gas and other fossil fuels can either directly or indirectly effect that goal. The value of the conventional energy saved, less the total project costs to put geothermal energy on line, gives a conservative estimate of benefits. However, when funds are spent within this country rather than being exported, they have a multiplier effect that should be considered. Taxes paid are an additional benefit.

For national planning, programming and budgeting purposes, the information generated by the

State Commercialization Projects is essential. The projects provide realistic assessments of how much geothermal energy can and is likely to be produced within what time frame and by what consuming sectors. From this information, public and private expenditures, congruent with the amount of energy, can be allocated to stimulate geothermal production and utilization.

Indirect benefits include local values such as lower fuel bills for users and economic development stimulated by the lower cost of energy. Furthermore, the assurance that a supply of energy will be available at a comparatively stable price can help both the private and public sectors to better plan for their future

#### POLICY AND PROGRAM IMPACTS OF STATE TEAM ACTIVITIES

##### DOE Planning:

- Shift of programming emphasis to include direct thermal applications.
- Continuation and expansion of State Commercialization Planning Projects.
- Use of State Teams to augment planning by United Indian Planners Association and Four Corners Regional Commission (Rural Development Program).
- Update of Mitre Corporation Project Two compilation and analysis of site specific scenarios; expansion to include direct thermal applications.

##### DOE Funding:

- Four DOE PONs in South Dakota from actions stimulated by Applied Physics Laboratory.
- Formulation of new funding programs.
- Prospective use of State Teams to screen project proposals from in-state parties.
- Emphasis on need for more industrial process heat PON awards.
- Special study of applicability of geothermal energy to phosphate industries in Idaho.

##### Congressional Legislation:

- Energy Tax Act of 1978 - NMEI/WEPL Public/Private Actions Analysis.
- National Conference of State Legislatures Geothermal Study by Nevada State Legislature.
- Geothermal Omnibus Legislation - EG&G/WEPL Evaluation of Small Business Requirements.
  - State Team communications to congressional delegations.
  - Pacific Northwest Regions' Workshop
  - Testimony of Governor Evans (Idaho) by D. McClain.
- Windfall Profits Tax Amendments - State Team communications to Senate Finance Committee.

##### State Legislation:

- Enacted legislation in Idaho, New Mexico, Montana and Nevada.
- Pending/proposed legislation in Utah, South Dakota, Wyoming and Idaho.
- EG&G/WEPL evaluation of state taxation impacts.
- Study of geothermal legislation with Nevada State Legislature assisted by National Conference of State Legislatures.

##### Private Sector Actions:

- Integration of Phillips Petroleum permitting timetable with state agency agendas for Roosevelt Hot Springs, Utah.
- Applications by Crescent Valley, Nevada, ranchers for FCRC funds and GLGP.
- Well drilled by Penny Hot Springs, Colorado.

##### Community Sector Actions:

- Decision by City Council of Idaho Springs, Colorado, to seek funding for feasibility study for district heating.
- Successful proposal by Pagosa Springs, Colorado, for DOE PON for district heating system.
- Request by City of Thermopolis, Wyoming, for site specific development analysis.
- City of Winnebec has applied for FCRC and GLGP funds for alcohol production.

##### State Government Actions:

- Integration/coordination of resource assessment and commercialization planning projects in certain states (Montana, North Dakota, New Mexico, Colorado and Arizona).
- Funding by Idaho Legislature for engineering design of geothermal system for Capitol Mall.
- Decision by North Dakota Governor's Office to participate in DOE commercialization planning project.
- Decision by Colorado Department of Corrections to pursue the geothermal option at Canon City.

##### Other Federal Agencies:

- BLM/USFS lands prioritization.
- UDAG funding opportunities for eligible communities.

#### SELECTED SIGNIFICANT PRODUCTS OF SPECIFIC STATE TEAM TASKS

##### Energy and Economic Data Collection:

- Prime source of data for NMEI Market Penetration Analyses.
- Statistics for press releases by Governors and State Energy Office.
- Input for State Hydrothermal Commercialization Baseline Documents.
- Information for testimonies to state legislative committees.
- Specialized state geothermal resource maps by Idaho and New Mexico.

##### Area Development Plans:

- Focus for planning and development activity in Dona Ana County by New Mexico Energy and Minerals Department.
- Stimulation of public and private development actions in San Luis Valley, Colorado.
- Determination of broad applicability of geothermal energy for commercial and industrial uses in greater Phoenix area.
- Identification of five valleys in Montana for expanded resource assessment projects.

##### Site Specific Development Analyses:

- Decision by Big Horn Basin Barley Growers Association to evaluate a gasohol plant for Cody, Wyoming.

Meyer et al.

- Economic feasibility analysis for retrofit of Idaho Capitol Mall buildings.
- Preliminary economic analysis for Lemmon, South Dakota.
- Decision by Idaho Springs, Colorado, City Council to obtain a detailed economic analysis for district heating system.

Time Phased Project Plans:

- Coordination of permitting regulatory actions by Phillips Petroleum and State of Utah.
- Comprehensive management plan for City of Boise geothermal project.
- Acceleration of permit applications by Pagosa Springs, Colorado.

Institutional Analyses and Handbooks:

- Enacted or proposed legislation in all states.
- Idaho Geothermal Handbook.
- Decision by South Dakota Governor's Subcabinet Group to disapprove proposed bills unfavorable to geothermal energy.
- State Institutional Handbooks.

Outreach and Technical Assistance:

- Professional public relations campaign in Arizona - origin of "Mother Earth" and "GEO-rge THERMAL" caricatures.
- Aid to Jemez Springs, New Mexico, well leak problem.
- Award of DOE Region VIII Appropriate Technology Grant to Timberline Academy, Colorado.
- Award of DOE Region VI Appropriate Technology Grant to Tom McCant, Animas, New Mexico.
- City of Caliente, Nevada, has received Appropriate Technology Grant for hospital.

Special Projects:

- Prioritization of BLM/FS lands for 1980 leasing and environment assessment schedules.
- Determination of prospective community applicants for UDAG funds.

Reporting:

- Weekly and Monthly Highlights to DOE.
- Topical Reports.
- Institutional Handbooks.
- Hydrothermal Commercialization Baseline Documents.
- Summary Report for First Year Southwest Regional Geothermal Operations Research Program.
- Semi-Annual Progress Reports (by States).

REFERENCES

- Birkby, J., Brown, K., Chapman, M., 1979, Montana Geothermal Commercialization Planning Semi-Annual Progress Report, U.S. Department of Energy, Idaho Operations Office.
- Coe, Barbara A., 1979, Colorado Geothermal Commercialization Planning Semi-Annual Progress Report, U.S. Department of Energy, Idaho Operations Office.
- Green, S., Wagstaff, L. W., 1979, Utah Geothermal Commercialization Planning Semi-Annual Progress Report, U.S. Department of Energy, Idaho Operations Office.

Chehab, M., Goldstone, L., Hahman, Sr., R., Mancini, F., Weibel, B., White, D., 1979, Arizona Geothermal Commercialization Planning Semi-Annual Progress Report, U.S. Department of Energy, Idaho Operations Office.

Clark, N., Jackson, K., Sasek, R., 1979, Nevada Geothermal Commercialization Planning Semi-Annual Progress Report, U.S. Department of Energy, Idaho Operations Office.

James, R. W., 1979, Wyoming Geothermal Commercialization Planning Semi-Annual Progress Report, U.S. Department of Energy, Idaho Operations Office.

Eastlake, W. B., McClain, D. W., 1979, Idaho Geothermal Commercialization Planning Semi-Annual Progress Report, U.S. Department of Energy, Idaho Operations Office.

Meyer, R. T., Davidson, R., 1978, Summary Report Southwest Regional Geothermal Operations Research Program, U.S. Department of Energy, Idaho Operations Office.

Rodruquez, P., Scudella, G., Fedor, D., 1979, New Mexico Geothermal Commercialization Planning Semi-Annual Progress Report, U.S. Department of Energy, Idaho Operations Office.