

# **Geothermal Access to Federal and Tribal Lands: A Progress Report**

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# **Geothermal Access to Federal and Tribal Lands: A Progress Report**

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Key Words: geothermal resources, renewable energy policy, access to federal lands, cultural issues

## **Abstract**

This paper traces the progress to date in resolving key barriers to geothermal energy use. It focuses primarily on two areas: improving geothermal access to federal lands and increasing understanding of the tribal aspects of geothermal energy use.

## **Introduction**

Since the workshops convened by the National Renewable Energy Laboratory (NREL) on facility siting issues on federal lands in the fall of 2000, and the report on them (Farhar 2001), steady progress has been made on opening access to geothermal development on federal lands. Workshop participants agreed unanimously that actions could be taken immediately to improve the processes of geothermal siting on federal lands. The three highest-priority recommendations from the workshop were:

- Congress or the White House should enunciate a National Renewable Energy Policy stating that it is a priority, consistent with other laws, to develop and expand the use of geothermal and other renewable energy resources on federal lands.
- The U.S. Department of Energy (DOE) should establish, in cooperation with other federal agencies, a National Geothermal Coordinating Committee (NGTCC) to include a broad representation of federal and state agencies, the geothermal industry, and public interest groups involved in geothermal issues.
- Federal agencies should expand their efforts to understand the social and cultural impacts of geothermal siting.

The workshop's findings were circulated on Capitol Hill during the deliberations of the National Energy Policy Group (NEPG), headed by Vice President Dick Cheney.

## **National Energy Plan Recommendations**

In May 2001, the NEPG released the National Energy Plan, recommending to the President that the Secretaries of the Interior and Energy work together to re-evaluate access limitations to federal lands in order to increase renewable energy production, such as biomass, wind, geothermal, and solar (NEPG 2001). The NEPG also recommended to the President that the Secretary of the Interior determine ways to reduce the delays in geothermal lease processing as part of the permitting review process.

## **National Conference on Opportunities to Expand Renewable Energy on Public Lands**

Responding to the first recommendation, Interior Secretary Gale Norton joined with David Garman (Assistant Secretary for Energy Efficiency and Renewable Energy, representing Energy Secretary Spencer Abraham) and officials from the Department of Agriculture, Department of Defense, the Environmental Protection Agency, the Council on Environmental Quality, and the Federal Energy Regulatory Commission to convene a national conference, held in Washington, D.C. on November 28, 2001. The goal of the conference, called the "renewables summit," was to increase renewable energy production on public lands by gathering ideas and producing tangible solutions.

Secretary Norton said that the Department of Interior (DOI) seeks to streamline compliance with the National Environmental Protection Act (NEPA) through on-line tools and to work effectively with the historic preservation community. The Bureau of Land Management (BLM) is working to improve rights-of-way access and more timely processing of proposed leases. President Bush wants to reduce delays of geothermal leasing to eliminate the backlog in 2003. Testifying for geothermal energy were Jonathan Weisgall, MidAmerican Energy Holdings Company and Geothermal Energy Association; John Miller, Calpine Corporation; Ross Ain, Caithness Energy; and Jane Long, University of Nevada-Reno.

### **BLM Action Plan**

As a result of the NEP recommendations and the renewables summit, BLM developed a National Energy Policy Implementation Plan with 45 specific action items on all aspects of energy. Among these are three action items that relate specifically to geothermal energy (BLM 2001).

- *Action 19* states: “BLM will identify methods to expedite the processing of pending geothermal leases.”
- *Action 20* states: “BLM will revise the Categorical Exclusion list to include geothermal resources and examine opportunities that could be added to the geothermal list.”
- *Action 21* states: “BLM will contract for a geothermal literature search and an identification of constraints to access.” The BLM study will focus on the location and extent of geothermal resources and identify and analyze impediments to leasing and development. BLM will then consider modifications as appropriate to increase access to geothermal resources.

### **Access to Federal Lands**

BLM is responsible for rapidly increasing the access of geothermal energy to federal lands. To support these responsibilities, BLM needs to systematically identify sites that have geothermal resources appropriate for both electricity generation and direct-use applications. By identifying these sites, BLM can consider expediting leasing and permitting processes by modifying land-use planning documents, including environmental assessments, to include impacts of geothermal development. Such modifications would accelerate approval of permits for geothermal projects.

Working with the BLM Geothermal Program Office in Washington, and with support from the DOE GeoPowering the West (GPW) Program, NREL conducted an analysis to identify these sites. The analysis was included in another analysis at NREL supported by BLM’s land-use planning office to identify the BLM planning units with the best near-term potential for renewables development, including solar, wind, and biomass, and geothermal resources (BLM 2002).

### ***Methods for Identifying Best Geothermal Sites for Near-Term Development***

BLM has had statutory authority for leasing geothermal mineral rights under the Geothermal Steam Act of 1970 (P.L. 91-581; 30 U.S.C. §§ 1001-1027, December 24, 1970, as amended 1977, 1988, and 1993). Therefore, BLM has extensive experience with geothermal resources and environmental impact assessments. In addition, BLM’s sister agency within the DOI, the U.S. Geological Survey (USGS), completed a nationwide assessment of geothermal resources in the United States several years ago. The data were collected in 1978 and published by Muffler in 1979 as Circular 790.

Geothermal activity has decreased markedly over the past 17 years. In 1985, more than two million acres were leased for geothermal activity in the United States, with 1.2 million acres leased in

Nevada alone. (Nationally, there were 29 power plants on-line and more than 680 leases.) At that time, it took only two to three months to issue a permit. BLM had a \$3.2 million budget with 464 work months dedicated to the geothermal program. During the 1990s, when energy economics declined, industry decreased its activity in geothermal leading to a decrease in geothermal program emphasis within BLM and USGS. As of June 3, 2002, there were 317 leases and 296 pending lease applications, and geothermal lease applications may take years to process.

Because of this decline in emphasis, no current resource data provide detailed information on geothermal resources in the United States. The best data currently available are David Blackwell's compilation at Southern Methodist University (SMU) ([http://www.smu.edu/geothermal/geothermal\\_resources](http://www.smu.edu/geothermal/geothermal_resources)). The map is a composite of heat flow, thermal gradient, sediment thickness, and hot springs. Based on these variables, this map demonstrates broad areas of geothermal resources and rates these resources as "excellent" or "good." The SMU data are based on the 1978 USGS data and other information collected since then. The SMU data show general areas suitable for possible geothermal development; specific areas need to be identified by local-area studies. The SMU data were deemed inadequate for identifying the BLM planning units with the highest near-term geothermal potential because they are too geographically broad. For example, the SMU data classify virtually the entire state of Nevada as having an excellent geothermal resource potential, allowing no differentiation among areas within the state.

With BLM's guidance, NREL decided to contact—and in four cases, to personally visit—the BLM staff responsible for the geothermal programs in six BLM state offices: California, Idaho, New Mexico, Nevada, Oregon, and Utah. These states are known for their comparatively high level of geothermal resources and activity. Site visits were completed in California, Nevada, New Mexico, and Oregon between February 15 and April 5, 2002.

Using a delphi technique, NREL asked the lead geothermal staff from each of the BLM state offices to identify the best geothermal sites for near-term geothermal development within each of their states. The BLM geothermal staff have the best experience in determining sites because they are responsible for identifying and classifying the known geothermal resource areas (or KGRAs) and for managing the geothermal leasing program within their states. The staff also provided, in digital form, the most recent data on the classification of the KGRAs and on BLM leasing activity within the six states.

The sites they identified were termed the "top-pick" sites for each state, and resulted in 9 top picks for California, 3 for New Mexico, 10 for Nevada, 7 for Oregon, and 3 for Utah. Most, but not all, of the top-pick sites were KGRAs (see Table 1).

Each of the top-pick sites was plotted on the BLM land ownership maps with BLM planning-unit boundaries (see Figure 1). These locations were then compared with the BLM lease data, the KGRA data, and the SMU data to check their validity. The top-pick locations correlated well with the technical geographic information system (GIS) data sets.

On March 17, 2002, staff from NREL and the Idaho National Energy and Environmental Laboratory (INEEL) met to review the method and results of the analysis. They determined that the analysis met technical criteria (the overlap was quite high between the top picks and available GIS data on

**Table 1. Geothermal Sites Identified as top picks for Near-term Geothermal Development by State, BLM Planning Unit, and BLM Field Office**

*(Two sites in Nevada are listed twice because they cross planning unit and/or field office boundaries.)*

| State                 | Top-pick Site   | BLM Planning Unit | BLM Field Office  |
|-----------------------|---|-------------------|-------------------|
| California<br>(N = 9) | Glass Mountain  | Alturas           | Alturas           |
|                       | Mono Long Valley  | Bishop            | Bishop            |
|                       | Salton Sea, East Mesa   | El Centro         | California Desert |
|                       | Coso, Randsburg   | Ridgecrest        |                   |
|                       | Truckhaven  | El Centro         |                   |
|                       | Lake City-Surprise  | Surprise          | Surprise          |
|                       | Geysers   | Ukiah             | Ukiah             |
| Nevada<br>(N = 10)    | Beowawe, Fish Lake  | Battle Mountain   | Battle Mountain   |
|                       | Steamboat, Soda Lake, Stillwater, Salt Wells, Dixie Valley          | Carson City       | Carson City       |
|                       | Beowawe   | Elko              | Elko              |
|                       | Brady, San Emidio, Rye Patch, Dixie Valley                          | Winnemucca        | Winnemucca        |
| New Mexico<br>(N = 3) | Lightning Dock, Radium Springs, Tortugas Mountain                   | Las Cruces        | Las Cruces        |
| Oregon<br>(N = 7)     | Klamath Falls   | Klamath Falls     | Lakeview          |
|                       | Crump, Lakeview, Summer Lake  | Lakeview          |                   |
|                       | Newberry  | Deschutes         | Prineville        |
|                       | Malheur, Vale   | Malheur           | Vale              |
| Utah<br>(N = 3)       | Cove Fort-Sulphurdale, Thermo Hot Springs II, Roosevelt Hot Springs | Cedar City        | Cedar City        |
|                       | Cove Fort-Sulphurdale   | Fillmore          | Fillmore          |

geothermal resources, KGRAs, and lease activity), it was straightforward and sensible given the limited time available, and that the top-pick sites identified by the BLM state office staff would likely fall within no more than 20 BLM planning units in the western United States. Therefore, it was not necessary to apply other screening criteria to reduce the BLM planning units with the geothermal sites having the best potential for near-term development.

***BLM Planning Units with Highest Potential for Near-Term Geothermal Development***

NREL identified high-potential geothermal power production sites through visits to BLM state offices. The assessment focused on BLM’s knowledge of, and experience with, geothermal resources in six western states. BLM experts identified 31 top-pick sites in 17 BLM planning units in five states as having high potential for near-term development (see Figure 1).

Also, suitable for geothermal development are direct-use areas. The areas identified in Table 1 as suitable for power plant development are also suitable for direct uses. Certain states may also have areas especially suitable for direct-use applications, including Idaho, New Mexico, and Utah.

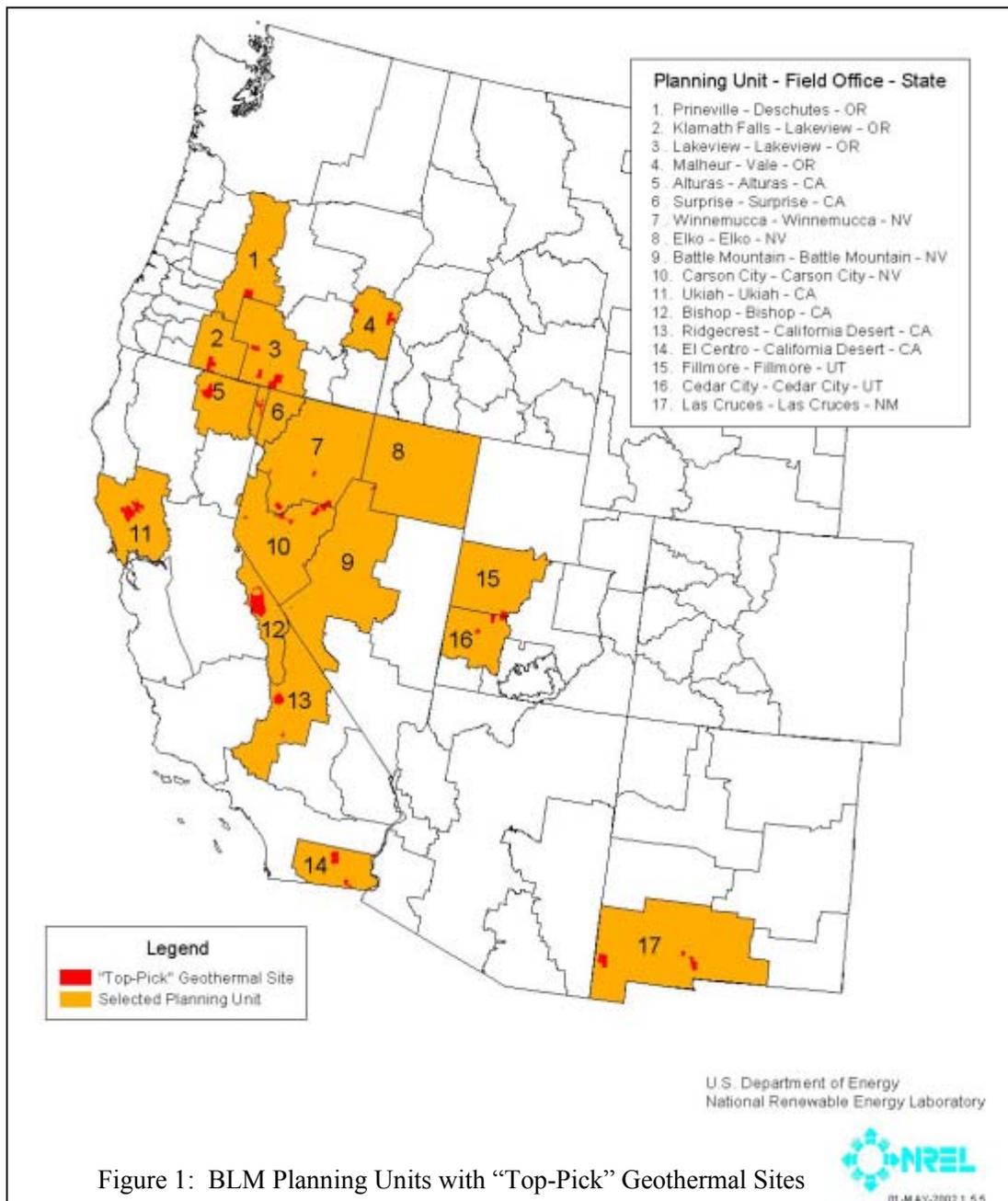


Figure 1: BLM Planning Units with "Top-Pick" Geothermal Sites

Although the BLM Idaho State Office did not define a top-pick site in Idaho, in April 2002, a geothermal developer announced plans to build a geothermal binary electric generation plant at Raft River. Rights have been obtained for private lands in the vicinity and the company is in the process of working with the BLM to lease federal land there. Raft River was the site of the first binary geothermal electric plant in the United States. The 60 kW plant, a prototype funded by DOE, demonstrated the feasibility of generating electricity from lower temperature geothermal resources using a secondary (lower boiling point) working fluid. DOE also funded a larger 5 MW binary demonstration plant that was subsequently built on the Raft River site.

### **Geothermal Access to Tribal Lands and Cultural Issues**

Several key events relative to geothermal and Indian country occurred during 2001 and early 2002. The Bureau of Indian Affairs (BIA) is also responsible for actions consistent with the NEP. BIA has stated that the potential for additional energy production from Indian lands is substantial for renewable energy (BIA 2001). On December 6, 2001, BIA convened an Indian Energy Summit in Denver, Colorado, at which Interior Secretary Norton gave the keynote address. Secretary Norton cited the “vital role that Indians have in creating energy security in the United States.” The meeting resulted in recommendations that would continue the tradition of tribal consultation in developing energy to create jobs and help the environment. BIA may continue its planning activities with a series of regional meetings in coordination with DOE and NREL. The Council of Energy Resource Tribes (CERT) is a key representative of tribal interests in this planning effort. In addition, to provide a single contact point for assistance for tribes, the BIA is planning to establish Federal Indian Energy and Mineral Offices (FIEMOs) consolidating BIA, BLM, Minerals Management Service, and Office of Surface Minerals functions.

The Inter-tribal Energy Network (ITEN), with representatives from tribal organizations (including CERT), national laboratories, and the federal government, held a strategic planning session in Denver on December 4-5, 2001. This meeting was important to the tribes because of the then-upcoming DOE solicitation.

DOE's Tribal Energy Program promotes tribal energy self-sufficiency and fosters employment and economic development on Tribal Lands. In February 2002, DOE issued a solicitation for applications from federally recognized tribes or Alaskan Native corporations for renewable energy projects, including geothermal, on tribal lands. Proposals were due on May 6. Both feasibility studies and project implementation proposals were eligible. Subject to funding availability, total DOE funding available under this solicitation was approximately \$2.5 million. DOE anticipated selecting 10-15 feasibility study applications and 3-5 development project applications. A minimum cost share of 20% was required for development projects. In its FY 2003 budget request, the administration has requested \$8.3 million for the Indian Renewable Energy Resources Program, indicating increased emphasis on this area.

CERT organized a National Conference to Define Sustainability from a Tribal Perspective in Denver, Colorado, on March 20-21, 2002. The conference goal was to develop a long-term national strategy for developing sustainability on Indian lands. Important conference themes include energy (with an emphasis on renewable energy), economy, environment, housing, and legal issues. Tribal cultures and identities were discussed as they related to these themes. Approximately 200 tribal leaders, invited by CERT, participated. DOE GPW/NREL co-sponsored a geothermal track at the conference, titled “Inventing the Future for Tribes in the Geothermal Industry,” which included presentations and a facilitated discussion. Presentations, which were videotaped, included views of the geothermal industry on tribal geothermal development (Karl Gawell), the BLM role in Indian development of geothermal energy (Paul Dunlevy), geothermal and aquaculture in Idaho (Leo Ray), geothermal and greenhouses in New Mexico (Jim Witcher), and current developments in geothermal energy in Indian country (Alan Mandell, Pyramid Lake Paiutes, and Benny Shendo, Jr., Jemez Pueblo).

The facilitated discussion helped identify key geothermal issues from a tribal perspective. Discussion centered on two types of issues: (1) developing geothermal projects on tribal lands, and (2) developing geothermal projects on federal lands near tribal lands.

- Although the tribal representatives were interested in the \$2.5 million in DOE funding for renewable energy projects, they believed that this amount divided among the 15-20 projects likely to be funded may not allow for tribes to move energy projects forward.
- Tribes employ insufficient tribal staff to take on energy development projects, which require at least one full-time professional as well as consultants.
- Tribes face intra-tribal cultural issues that they consider personal “family” issues. These revolve around beliefs that water should be allowed to flow the way it wants to, that steam should be allowed to behave in a natural way, and that money is not an all-important value.
- Tribal harmony is a core value and, from a tribal perspective, decisions about geothermal energy must be made to preserve tribes’ harmonious relationships rather than maximizing profits.
- Although tribes want to receive information about geothermal energy, they do not want the larger society to push them to site geothermal projects. The message is: “Don’t be too pushy,” they said. In effect, they say, “Don’t call us, we’ll call you.”

Regarding geothermal siting on federal lands *near* tribal lands, workshop participants strongly recommended that the federal government should share geothermal royalties with tribes.

### **Other Activities**

- GPW has supported preliminary work on convening a *National Geothermal Collaborative* to serve as a forum for stakeholders interested in and affected by geothermal development to explore issues and seek solutions. RESOLVE, Inc., a non-profit mediation organization, has interviewed stakeholders in geothermal, policy, environmental, and tribal communities, and recommended that a steering committee of 6 to 8 members be convened in the summer of 2002.
- *State Working Groups on Geothermal Energy* with broad stakeholder representation have become active during the past year in Idaho and New Mexico. The first Oregon-Washington Geothermal Working Group on Geothermal Energy was held in Portland on June 20, 2002.
- DOE has developed a \$3.6 million program to develop renewable energy, including geothermal energy, in the State of Nevada and the Southwest. An additional \$2.9 million will focus on thermal energy storage.
- *GPW communications activities* have focused on conferences (e.g., Geothermal Energy Opportunities for New Mexico), geothermal fact sheets and maps by state, hosting geothermal exhibits at key meetings, Website development (<http://www.eren.doe.gov/geopoweringthewest>), and publications (e.g., *GRC Bulletin Insert* and *Geothermal Today*).
- The *GRC short course*, “An Introduction to Geothermal Energy,” attended by BLM and tribes, was held in Reno, Nevada, on April 18-19, 2002.

### **Next Steps**

To support the DOI’s efforts, DOE formed a task force for siting geothermal on federal lands. BLM is pursuing its geothermal action items on a fast track. DOE is reaching out to U.S. Forest Service staff to open discussions concerning their role in geothermal permitting. Production tax credits for geothermal energy remain an important topic of energy policy discussion on Capitol Hill.

DOE's GPW Program continues to pursue significant activities in resource assessment, outreach, and communications to foster the use of geothermal energy in the western states. Under GPW auspices, late in 2002 a workshop will be held at NREL on the socio-economic and environmental aspects of geothermal facility siting on federal lands.

With respect to geothermal energy's future with the tribes, the Nevada Indian Commission is holding a Nevada Tribal Renewable Energy Summit in fall 2002. The BIA is planning regional meetings on renewable energy use by tribes as part of its strategic planning work for the NEP. DOE has also requested future funding for implementing renewable energy on tribal lands.

### **Conclusions**

Considerable progress has been made in national policy supporting the development of geothermal energy. The problems, key players, and actions have been identified. Planning has begun. The next phase involves implementation. Easing permitting processes is now part of the Department of Interior's priority actions, and the U.S. Department of Agriculture and the Council on Environmental Quality have been made aware of the problems. Drilling and exploration are receiving increased emphasis in DOE's program. The future prospects for geothermal energy appear encouraging, based on an overview of the past year's progress. However, time and appropriations are still needed for agencies to complete planned actions to improve geothermal access to federal and tribal lands.

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