U.S Department of Energy
Semi-Annual Program Report

Geothermal Outreach

Grant No.: R021599 **CFDA number:**

Grantee: Oregon Department of Energy

Project period: 10/01/04 **Through: 09/30/06**

Reporting from: 10/01/05 **Through: 03/31/06**

Date received: **Final report:**

Comments:

Geothermal Energy Outreach in the State of Oregon
Third Semi-Annual Report
April, 2006

Statement of Objectives

The Oregon Department of Energy (ODOE) provides information and services to the geothermal community and other stakeholders. By leading the GeoPowering the West (GPW) effort for Oregon, ODOE maintains working relationships with others, including but not limited to: Tribes, Oregon Department of Geology and Mineral Industries, USDOE, U.S. Forest Service, Bureau of Land Management, National Park Service, the Oregon Institute of Technology, Geothermal Resources Council, and the Geothermal Education Office. This effort will help expand direct use of geothermal energy in Oregon and may lead to overcoming barriers to geothermal power plant developments. Appendix A contains the **Strategic Plan** outlining objectives for this program.

Program activities

The following highlights the principal accomplishments during the third half-year starting October 1, 2005 through March 31, 2006:

In October 2005 the program did some preliminary investigating into the Nevada Geothermal Power leases in Warner Valley, east of Lakeview. The Oregon Chapter of the Nature Conservancy has "partnerships" with landowners in the Warner Valley for wetland protection. Some of these landowners are believed to be geothermal lessors. The nature of these relationships is very sensitive. The developer is considering wildlife surveys very early in the decision making process.

That same month the program reviewed and commented on the draft geothermal permitting guide prepared by Bob Lawrence & Associates for the USDOE.

ODOE organized the fourth Geothermal Working Group meeting on Nov. 3, 2005. This meeting was designed to bring stakeholders up to speed on developments in nearby Lake County and state legislative initiatives. Meeting presentation summaries are shown below. The highly qualified speakers brought a mix of professional experience in all aspects of geothermal energy. About 30 people attended the Workshop. A copy of the major presentations can be found on the Oregon Geothermal Working Group page of the Oregon Department of Energy web site. http://egov.oregon.gov/ENERGY/RENEW/Geothermal/OGWG.shtml

Minutes of the Fourth
Oregon Geothermal Working Group Meeting
Bend, OR
November 3, 2005

This meeting was held in McMenamin's Old St. Francis School, 700 NW Bond Street, Bend on Thursday, November 3, 2005, 9 AM to 4:00 PM. The meeting was well attended by about 30 stakeholders. The agenda is shown on the last page of these minutes.

Curtis Framel of the USDOE gave an update on the GeoPowering the West (GPW) program. His full presentation is shown on the Oregon Geothermal Working Group web page. Curtis emphasized that the GPW program is a state-focused strategy, building on state-level support for increased use of geothermal energy. Discussion also covered the uncertain nature of continued federal funds for geothermal energy programs and projects. Curtis further explained that the coordinating role of the state geothermal working groups is crucial in the next funding cycle.

Al Waibel and Alex Sifford gave the highlights of the GRC Annual Meeting that was held in Reno in September. The attendance of that meeting was high. Among other things, concern was expressed about the future USDOE Geothermal budget and attendees were encouraged to lobby their Congressional Delegations to maintain the program. Alex discussed the financing power plants sessions and made copies of two papers available to audience members. He mentioned highlights from the successful GEA Trade Show, field trips to power plants in what is now south Reno and the state GPW summit that followed the annual meeting.

Curtis continued with an overview of what the Energy Policy Act of 2005 means for the geothermal industry. Aside from the inclusion of Geothermal power in the type of resources that are eligible for the 1.9 cents per kWh production tax credits, there are other changes in the law that will encourage geothermal development. Curtis highlighted the change how royalties are split, new Clean Renewable Energy Bonds, and leasing changes by BLM.

Roger Hill from Sandia Labs explained the goals of the newly formed Utility Geothermal Working Group (UGWG). The Group has selected Guy Nelson as its Executive Director.

Roger was encouraged to have the UGWG contact the Utility Wind Interest Group to learn from its experience.

John Pease from BPA made a brief public announcement on the availability of a new renewable energy fund of about $5.5 million. This fund can be used by anyone. John is particularly encouraging projects by public/private partnerships with economic development aspects.

After the break we had two speakers discuss the Renewable Portfolio Standards (RPS) efforts in the state. Steve Munson of Vulcan Power gave a summary of his successful efforts in other states and the failed effort in Oregon during the last Legislative Session.

Troy Gagliano of the Renewable Northwest Project (RNP) explained the concerns RNP and others had as to a push for an RPS during the session, primarily because of past agreements to get SB 1149 (public purpose charge) passed and potential impacts on the work by the Energy Trust of Oregon. Both the Governor's Global Warming initiative and the Renewable Energy Action Plan will have task forces that will review the effectiveness of an RPS in reaching the stated goals in the coming months.

Carel DeWinkel gave an update on the PURPA proceedings before the Oregon Public Utility Commission (UM1129). His summary presentation is shown on the OGWG webpage. The natural gas forecast used by the utilities and contract language issues are still being reviewed in on-going procedures. A second phase of UM 1129 will start shortly. During that phase issues of contract language for systems larger than 10 MW will also be included.

After lunch, Kim Niggeman of Nevada Geothermal Power Inc. gave an excellent presentation of current efforts and next steps for her company's effort to develop the resources at Crump Geyser, just north of Adel in Lake County. While Nevada Geothermal is concentrating on prospects in that state, Kim indicated the firm is actively exploring at Crump Geyser. Her presentation can be found on the OGWG web page: http://egov.oregon.gov/ENERGY/RENEW/Geothermal/OGWG.shtml.

Clark Niewendorp of the Department of Geology and Mineral Industries (DOGAMI) described a proposed geothermal evaluation project in Christmas Valley where the US Air Force is scheduled to shut down its radar site and where the Oregon National Guard may develop the site for its training usage. His presentation contained several great images of Christmas Valley and can be found at on the OGWG web page.

Finally, Jim Hansen of AHZ, LLC outlined his company's plan to develop a geothermal electricity generating plant in the Newberry Volcano crater. Jim made it clear that he is aware of the risks and difficulties to develop such a site. He told the audience that sensitive sites in other parts of the world have been successfully developed with minimal visual and other environmental impacts.

The meeting ended with a discussion of the need to have the next workshop focus on direct heat applications and that this meeting should reach out to other audiences beyond the Klamath Falls area. A workshop in Harney or Malheur County will be considered.

The planned field trip for the next morning to the Newberry Volcano was cancelled because of winter weather.

The Program arranged three meetings with local officials for Nov. 28 & 29. Carel presented renewable energy talks to both the **Ontario Chamber of Commerce and SE Regional Alliance** on Nov. 28.

The Nov 29 meeting focused on **food dehydration**, specifically onions. Meeting minutes are in Attachment C. The GeoHeat Center excellent overview presentation can be found on the ODOE website.

Based on that meeting, the Program heard and contributed to the Geo-Heat Center's subsequent findings relating to **onion dehydration** potential in eastern Oregon on March 15. Preliminary economics look promising, and ODOE loan program staff will assist the Geo-Heat Center financial forecasting. Several other challenges face the onion growers, including confirming the highest ranked geothermal resource sites, plant infrastructure costs e.g. gas and power lines, and the market for onion flakes. The Geo-Heat Center provided hard copies of its presentation but no digital version. More on that program can be found in a companion quarterly report to USDOE.

Nationally, the program took part in the **GPW Webcast** on Dec. 7th that spelled out forthcoming funding requirements. Both state funding and project funding requirements are changing for 2006. A future state funding option may include an updated statewide assessment by the Oregon Department of Geology & Mineral Industries.

The Program contributed to **Pacific Northwest section of the GRC** meeting on March 7th. Congressional staff attended the meeting covering the USDOE FY07 budget; federal leasing changes. Production Tax Credit goals were also discussed but the main conversations revolved around both the budget and leasing issues. A meeting summary is below.

Minutes of the Geothermal Resources Council
Pacific Northwest Section Luncheon Meeting
Portland OR
March 7, 2006

Issues
1.) The Administration is proposing to cease funding DOE activities;
2.) Recent legislation detrimentally altered the ability to lease public lands; and
3.) Production Tax Credits inadequately short and inequitable.

Twenty-four attendees heard several speakers address the issues above. Susan Petty of Black Mountain Technology provided detailed background on the USDOE budget history

and events leading to the Executive branch recommendations to cease funding geothermal activities. Holding over unspent funds for years apparently contributed to a perceived lack of need for funding. Other factors contributed as well according to Susan. Regardless, audience members suggested that both Senators and Representatives would be weighing in with changes to the budget, and that Congress will contribute to a decision restoring some level of funding. Two staff members for Portland area Congressmen agreed with that assessment.

Federal geothermal leasing changes were part of the Energy Policy Act of 2005. The room heard Joe LaFleur, Dave McClain and Susan Petty state that the new law essentially eliminates non-competitive leasing of federal lands for geothermal development, and substitutes competitive bidding. Most attendees believe this new competitive bidding requirement is a mistake with detrimental consequences for the growth of the U.S. geothermal industry. The audience was urged to contact the GRC, GEA and industry members to mobilize their resources to rectify this mistake by changing the law.

Little discussion took place on the subject of extending the production tax credit; all attendees agreed it was an important item and to bring to their legislator's attention.

Related Items

The Governor's Renewable Energy Action Plan: The Renewable Energy Action Plan (REAP) was approved by the Governor in 2005. The Plan sets specific long and short-term goals and outlines geothermal action items. It includes a 10 % renewable electricity generation goal by new renewables by the year 2015. Geothermal generation could become an important part of that. The Plan also includes a goal to review the desirability of a Renewable Portfolio Standard (RPS) and compare its effectiveness with other incentives such as a production-based payment. Various OGWG members will be active participants in implementing this Plan. This plan is the basis for the next OGWG meeting on April 5, 2006.

The South Central Oregon Economic Development District is marketing geothermal energy to industries using a DVD highlighting existing firms and applications. The presentation is titled "Klamath County Geothermal Projects". Borrowing a phrase from a local engineer, Klamath and Lake Counties can offer geothermal from "cradle to grave": a maternity ward in the local hospital, schools, college, greenhouses, fish farms, and a funeral home all use geothermal energy. The latest new firm to use geothermal energy in Klamath Falls is a brewpub. The agency promotes the Oregon Institute of Technology (OIT) as an economic development tool. It will used at the next OGWG meeting in May 2006.

Local Sustainable Energy Groups: The OGWG is working with the Business Alliance for Sustainable Energy (BASE), which gave a presentation on Central Oregon renewable energy activities at one of our working group meetings. The BASE mission is to accelerate sustainable energy practices. BASE is a joint venture of 3E Strategies and the Central Oregon Intergovernmental Council. Past efforts include an October 2003 renewable energy event at the Central Oregon Fairgrounds. (The Pacific Northwest Section of the GRC held an introductory course preceding the same event.) BASE has contributed to the Governors Renewable Energy

Plan and promotes the idea of business clusters awakening in central Oregon and statewide. The renewable energy industry is hard to characterize by SIC code, but 3E Strategies estimates it to be a $185 billion industry in western US and British Columbia. Several members of the OGWG participated in BASE SUMMIT 2006: *Positioning Oregon as an International Leader in the Clean Energy Industry*. The March 20-21 event in Bend included a presentation by Dave McClain, representing the geothermal industry, who gave a good summary of the status of the geothermal industry in the state.

The new GeoPowering the West Projects Funding Program: ODOE, in cooperation with the Oregon Institute of Technology's Geo-Heat Center, prepared several proposals for technical assistance under the new GeoPowering the West Projects Funding Program. We received approval for the Herald and News Building's application. The building will have a new design of a chiller for space cooling using a low-to-intermediate temperature geothermal resource.

Oregon Institute of Technology's Geo-Heat Center: The OIT Geo-Heat Center first began measuring geothermal wells near its campus in 1962. Klamath Falls hosted the first United Nations Conference on Geothermal Direct Uses in 1974. The Geo-Heat Center has 30,000 references in its library, its website currently gets 9000 hits and 1300 users per day. Example projects the Geo-Heat Center is currently working on include solving pump problems at a Utah greenhouse and a community well in Colorado. OIT is considering using a 196°F resource at a new "net-zero energy" dorm. The concept is to use a down-hole working fluid heat exchanger to eliminate pumping. OIT plans to continue the interactions with local economic development officials about geothermal direct use opportunities and to promote awareness in the engineering community. Onion dehydration opportunities and potential in Eastern Oregon is the latest work the Geo-Heat Center is doing for the OGWG.

OGWG PARTICIPANTS

Over 90 interested parties on the OGWG mailing list, shown in Appendix B. We sent multiple mailings to interested parties and presented the first draft of the Oregon Geothermal Action Plan to these participants for input.

Appendix A

Oregon Geothermal Energy Development Strategic Plan

Proposed Activities
September 2004 to October 2006

MISSION STATEMENT

The Oregon Geothermal Working Group promotes the use of Oregon's geothermal resources for power generation and direct use applications.

STRATEGIC OBJECTIVES

Strategic Objective 1:	**Organize an Oregon Geothermal Working Group and Implement a Strategic Plan.**
Strategic Objective 2:	**Educate the stakeholders and increase public awareness of Oregon's geothermal energy resources, rules, laws, benefits and cost-effective applications.**
Strategic Objective 3:	**Promote the establishment of laws, legislation, and policies that encourage the development of geothermal energy for direct use and power generation.**
Strategic Objective 4:	**Increase technical knowledge and understanding of Oregon's geothermal resources and their uses.**
Strategic Objective 5:	**Promote financial assistance for geothermal energy projects.**
Strategic Objective 6:	**Promote innovative and broader use of non-generating applications geothermal energy.**
Strategic Objective 7:	**Promote opportunities for geothermal electric power development.**

Strategic Objective 1: **Organize an Oregon Geothermal Working Group and Implement a Strategic Plan.**

Action Plan:

a. By November 2004, organize a Oregon Geothermal Working Group to review, adopt, and implement the Oregon Geothermal Energy Development Strategic Plan. The Oregon Department of Energy will facilitate and support this group.
b. Through September 2006, conduct regular working group meetings to review progress of the Strategic Plan. This will include disseminating information to Oregon geothermal energy stakeholders through the Oregon Geothermal Working Group email list and ODOE website.

Strategic Objective 2: **Educate the stakeholders and increase public awareness of Oregon's geothermal energy resources, rules, laws, benefits and cost-effective applications.**

Action Plan:

a. Through September 2006, sponsor and/or coordinate educational activities (e.g., workshops, symposiums, etc.) to promote the uses of geothermal energy (e.g., space and water heating, aquaculture, industrial applications, power generation) to various groups.
b. Through September 2006, network with resource centers i.e., OIT GeoHeat Center, Geothermal Education Office, NREL in developing educational programs for interested parties, potential users and community leaders in the use of geothermal energy.

Strategic Objective 3: **Promote the establishment of laws, legislation, and policies that encourage the development of geothermal energy for direct use, power generation and cascading applications.**

Action Plan:

a. Through September 2006, educate appropriate legislative committees and others influencing energy policies.
b. By January 2006, identify organizations to promote the drafting of legislation, which may include renewable portfolio standards, set asides, system benefit charge, and tax credits.
b. Through September 2006, provide technical support to those involved in drafting legislation.
d. Through September 2006, work with the Oregon Public Utilities Commission to promulgate rules promoting utility purchase of geothermal power.
e. Through September 2006, explore for possible links with new farm bill to support direct use applications in agriculture.
f. Through September 2006, encourage the Oregon Congressional delegation to support legislation to promote development of geothermal resources for direct use and power generation.

Strategic Objective 4: **Increase technical knowledge and understanding of Oregon's geothermal resources and their uses.**

Action Plan:

a. Through September 2006, promote efforts to improve and update existing geothermal resource databases and maps. Information will be collected from the OIT Geo-Heat

Center, the Dept. of Geology & Mineral Industries and the Geothermal Resources Council. Such information will be distributed as part of Strategic Objective 2.

Strategic Objective 5: Promote financial assistance for geothermal energy projects.

Action Plan:

a. Through September 2006, compile and disseminate information on available government financial incentives. These include federal incentives (production tax credits), state incentives (loans and tax credits), and Energy Trust of Oregon incentives.

Strategic Objective 6: Promote non-generating applications of geothermal energy.

Action Plan:

a. By June 2005, identify and characterize geothermal resources in Oregon suitable for non-generating applications, and make such information regarding the same publicly available.
b. By December 2005, develop a repository of technical, financial, regulatory and other relevant information on non-generating uses of geothermal energy.
c. Coordinate with the Oregon Economic Development officials and others in conducting studies that document the rural economic impacts of developing geothermal energy resources for direct use.

Strategic Objective 7: Promote opportunities for geothermal electric power development.

Action Plan:

a. By June 2005, identify and characterize resources in Oregon suitable for geothermal electric development, and make information regarding the same publicly available.
b. By June 2005, make information pertinent to geothermal power plant siting, acquisition of financing, etc. publicly available.
c. By December 2005, determine from rural electric utilities (including aggregators such as Pacific Northwest Generating Company) their near-term interest in pursuing geothermal development in Oregon
d. Through September 2006, work with other stakeholders to resolve existing transmission constraints that could impede development of geothermal electric generation.

Appendix B Oregon Geothermal Working Group List

Last Name	First Name	Company	Phone	Email	Address	City	State	Zip
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APPENDIX C

Onion Dehydration with Geothermal Energy
Nov. 29, 2005 Meeting Minutes

Dr. John Lund: Vegetable dehydration with geothermal energy.
His presentation provided details about two existing onion flake plants in Nevada. John also indicated a gas-fired plant operates in Sacramento California.

Dr. John Lund: Geothermal resources in Malheur County.
John informed the audience that the Snake River and Klamath Falls areas were the subject of food processing investigations using geothermal energy beginning in 1978, (and the report is still available at the Geo-Heat Center). He reiterated data from a early 1980s geothermal well drilled on the Ore-Ida plan property to over 3060 meters (10,000 feet) depth and temperatures of 168° C (330° F), with no heat media (water or steam). Geothermal resources have been identified in Malheur county, see http://geoheat.oit.edu/oregon.htm#malheur

Mr. Reid Saito**,** Idaho Eastern Oregon Onion Growers Association.
The IEOOGA has about 200 members. Growers produce more high-quality storage onions than any region in America, planting approximately 21,000 acres every year. This combination of climate and soil creates favorable growing conditions for third- and forth-generation farmers who harvest more than 24,000 carlots (40,000 lbs. per carlot) annually. The two organizations - Idaho (President is Ron Mio) and Eastern Oregon - work closely together. Our growers plant yellow, red, and white varieties of sweet Spanish seed. Onions are grown under strict federal grade standards. The Spanish bulb onions grown here have a higher water content than the de-hydration onions grown for the onion flake market. Cull onions are either fed to livestock or landfilled. Rotation crops tend to be sugar beets, potatoes and sweet corn seeds but the growers are always interested in other crops.

Mr. Lynn Jensen, Other potential crops for dehydration,
Audience members discussed past experience with growing the de-hydration onions here in Oregon. A local farmer and breeder named Ron Engel has a history with dehydration onions. It should be viewed as an alternative crop, much like beets or potatoes. Types, costs, and crop practices need to be part of the investigation.

The group discussed the feasibility study objectives above and agreed to the following:
(1) Sufficient interest and land is available to investigate growing dehydration onions;
(2) Lynn Jensen will do preliminary work on the market for dehydrated products, and
(3) the GeoHeat Center will focus on a break-even model to evaluate the economic feasibility assuming different costs and market assumptions.