COMMITTEE REPORT

Final California Energy Commission Report on the Geothermal Program Update Process

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Final California Energy Commission Report on the Geothermal Program Update Process

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This Research, Development, and Demonstration Committee report summarizes the process and results of the planning effort that culminated in the Energy Commission's Geothermal Program releasing the January 1999 funding opportunity. It is organized into the following four sections:

1. Overview of the Geothermal Program Update Process
2. Developing Staff Recommendations through Stakeholder Involvement
3. Overview of Stakeholder Comments on Staff Recommendations at the December 1998 Workshop
4. Committee Decisions to Guide Future Funding Opportunities

Overview of the Geothermal Program Update Process

At the direction of the Commission's Research, Development, and Demonstration Committee (RD&D Committee), Geothermal Program staff began in July of 1998 to update the Geothermal Program. This update process involved industry, government, academia, and public interest groups (referred to as "stakeholders") in identifying uses of the Geothermal Resources Development Account (GRDA) funds that are most likely to promote the development of California's geothermal resources. Geothermal stakeholders became involved in this process through an Internet discussion group and at a staff workshop on August 25 where participants defined the most important problems facing the geothermal industry. Using criteria suggested by the stakeholders and later prioritized by the RD&D Committee, the staff analyzed the advantages and disadvantages of using the GRDA to address these problems and developed program recommendations.

This stakeholder-driven planning effort culminated in a RD&D Committee informational workshop on December 3, 1998. The RD&D Committee subsequently considered this input in developing policies to guide future funding opportunities. The Committee's short-term policies directed the development of the January 1999 Program Opportunity Notice and its associated application manual.

Reasons and Goals for Updating the Geothermal Program

The RD&D Committee initiated the Geothermal Program Update Process for three primary reasons:

1. The needs of the geothermal community have changed greatly since the Geothermal Program was established in 1980.
2. Funding provided by restructuring legislation (AB 1890) overlaps program mandates.
3. The program also has been under-subscribed during the past few years, and greater benefits might be realized by focusing on a few key problems.

The objective of this effort was to develop GRDA recommendations that:

- address the most important geothermal problems
- provide the greatest public benefit to California
- attract the highest-quality proposals and leverage GRDA funds
- minimize Geothermal Program staffing
- make the program more efficient and user-friendly

Milestones for the Geothermal Program Update Process included:

- **July 1, 1998:** Stakeholders were invited to comment on a "Discussion Outline of California Geothermal Problems and Resolution Strategies."
- **Mid-July 1998 to present:** The staff initiated a geothermal list server discussion group on the Commission's Internet web site to facilitate public input.
- **August 25, 1998:** The staff held a well-attended stakeholder workshop which resulted in refined problems and resolution strategies, suggested criteria for evaluating these problems, and administrative suggestions.
- **Mid-September to mid-November 1998**: The staff incorporated stakeholder comments and began using criteria to analyze the advantages and disadvantages of using the GRDA to address workshop-developed geothermal problems. The staff developed GRDA use and administrative recommendations and developed a list of possible legislative changes.
- **December 3, 1998:** The RD&D Committee GRDA Informational Workshop was convened in Sacramento.
- **December 1998-January 1999:** The RD&D Committee made policy decisions to direct the January 1999 Program Opportunity Notice and its associated application manual.

Developing Staff Recommendations through Stakeholder Involvement

Preparing for the August 1998 Workshop

A discussion outline with suggested geothermal problems and solution strategies was mailed to stakeholders. This outline was intended to begin discussion at a comprehensive level yet also to facilitate identifying the most critical problems facing California's geothermal community. Stakeholders were asked to identify their priority geothermal problems and solution strategies.

The Commission established an automated Internet e-mail system, the Geothermal List Server Discussion Group, to develop GRDA use recommendations. The list server became a convenient and effective means of soliciting and prioritizing geothermal problems, generating GRDA use strategies, and initiating discussion of these ideas. The Commission staff archived and consolidated suggestions and comments from the list server (and other media such as mail and telephone) to form the initial discussion problems and strategies for the August 25, 1998 meeting in Millbrae, California.

Refining Stakeholder Suggestions at the August 1998 Workshop

Geothermal Program staff and Dale Flowers, of Dale Flowers Associates, conducted the Geothermal Stakeholder Workshop at the Clarion San Francisco Airport Hotel on August 25, 1998[1]. Over sixty people attended the six hour workshop, and good progress was made in identifying the key problems facing California's geothermal community and defining strategies for addressing these problems. Participants represented the full spectrum of the geothermal community and its varied interests. Stakeholders identified 18 problems in 5 areas:

- Electric Power Generation
- Geothermal Heat Pumps
- Direct-Use Applications
- International Geothermal Activity
- Geothermal Public Education

Stakeholders also suggested criteria for evaluating the relative importance of geothermal problems and solution strategies and suggested program administrative improvements. In general, workshop participants emphasized three points:

1. The GRDA is a relatively small funding source for addressing geothermal problems, but it is important and should remain dedicated to geothermal uses.
2. Other funding sources for geothermal development are inadequate.
3. The GRDA should be used to help California's geothermal technologies become competitive.

Overview of Stakeholder Comments on Staff Recommendations at the December 1998 Workshop

The RD&D Committee convened a well-attended informational workshop at the Energy Commission on December 3, 1998 to hear stakeholder comments on targeting GRDA funding, improving program administration, and identifying possible legislative changes. The report, *Summary of Staff Recommendations on Revising the Geothermal Program,* was mailed to potential attendees and served as the focus for workshop discussion.[2]

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[1] To review results of the August 25 workshop, please refer to the 18 page report, *Draft Results of the Geothermal Stakeholder Workshop* which can be downloaded from the Commission's Geothermal Program web page <www.energy.ca.gov/development/geothermal>.

[2] To review these recommendations, refer to the 50 page report, *Staff Recommendations on Revising the Geothermal Program* and/or the 10 page report *Summary of Staff Recommendations on Revising the*

Stakeholders were encouraged to submit written comments to the docket prior to or at the workshop. Stakeholders were asked to focus their attention on these questions:

- What are the most important problems that the GRDA should address?
- What are the most beneficial funding priorities and to what degree should these priorities limit future funding decisions?
- What administrative changes should be made to the Geothermal Program?
- Should the Commission pursue GRDA statutory changes and, if so, which changes should be pursued?

The following is a summary of stakeholder written and spoken comments on these staff recommendations. These comments are presented in the context of the five interest area discussions as well as in the context of discussions of administrative and legislative issues.

Stakeholder comments in the five interest areas focused on whether or not to use the GRDA funds to solve identified and numbered geothermal problems. In the following comment summaries, the staff's funding recommendations for specific problems are presented and any generalized stakeholder comments in agreement with them are noted. Similar consenting and dissenting comments from individuals and organizations are listed in groups.

Geothermal Electric Power Generation

California is a world leader in geothermal electric power generation, but this industry is currently distressed by lower-cost gas-fired generation plants and the uncertainties of deregulation of the electricity marketplace. The costs of generating geothermal electric power begin with the risks of resource exploration and well drilling and proceed through power plant design and construction, power plant operation and maintenance, and environmental mitigation. The primary need of this industry is to lower the life-cycle costs of existing and new geothermal power production through RD&D.

Stakeholders agreed with the staff recommendation **to fund** projects that address the following Generation Problems:

- High life-cycle costs will make it difficult for California's geothermal electric power plants to compete in the deregulated market once AB 1890 Renewable Supports disappear at the end of 2001.
- The techniques for enhancing the productivity of geothermal systems are unproved and too expensive.
- Lack of funding for geothermal development planning and geothermal impact mitigation limits geothermal development and public acceptance.

Stakeholders agreed with the staff recommendation **not to fund** projects that address the following Generation Problems:

Geothermal Program." These documents can be downloaded from the Commission's Geothermal Program web page <www.energy.ca.gov/development/geothermal>.

- The market power price does not reflect the environmental and other benefits of generating electricity from geothermal energy resources.
- The lack of funding for developing and commercializing California's undeveloped and unproved high-temperature resources limits the development of California's geothermal resources.

Consenting Comments:

1. The Geothermal Energy Association fully supports all of staff's generation recommendations.
2. Mike Thompson, Senator Second District; Virginia Strom-Martin, Assemblymember, First District support using GRDA to reduce the cost of geothermal electric generation.
3. The Department of Conservation supports using GRDA for geothermal impact mitigation.

Dissenting Comments:

1. Lake County government officials; Douglas H. Bosco; Mike Thompson, Senator Second District; Virginia Strom-Martin, Assemblymember, First District; the Natural Resources Defense Council, and the County of Mono Energy Management Department believe that staff's support for geothermal development planning and geothermal impact mitigation does not sufficiently stress "environmental RD&D" to lower generation costs.
2. Delbert Cortopassi supports studies into how market power energy price does not reflect environmental benefits.

Geothermal Heat Pumps (GHPs)

The present early market stage of GHPs in California presents both a good opportunity and a risk for public funding. Well established in the East, South and Midwest, it is not entirely clear why GHPs are slow to catch on in California. It is probably due to a number of factors, including: milder temperatures in high population areas which are also served by natural gas, wide availability of natural gas in these and many other areas, and stringent and variable drilling and permitting requirements of local jurisdictions throughout the state. In addition, high initial costs and relatively long payback periods for residential systems are deterrents. As in geothermal power generation and direct-use, the future of GHPs is tied to the availability and price of natural gas in areas where it is available or scheduled. The best marketing niche for GHPs in California may be in areas lacking natural gas. Becoming competitive with natural gas is the single greatest challenge facing this industry.

The staff recommended **funding** projects that address the following GHP Problem:

- The lack of funding for RD&D to lower initial capital costs limits the California GHP market

The staff recommended **not funding** projects that address the following GHP Problems:

- The lack of funding for a stakeholder collaborative process addressing institutional barriers limits the California GHP market (Stakeholders agree with staff recommendation).
- The lack of funding for demonstration sites in key facilities limits the California GHP market.
- The lack of funding for professional training limits the California GHP market.
- The lack of funding for California GHP consumer education campaigns limits the California GHP market (Stakeholders agree with staff recommendation).
- The lack of funding for financing programs for residential applications limits the California GHP market (Stakeholders agree with staff recommendation).

Consenting Comments:

1. The Geothermal Energy Association fully supports all of staff's GHP recommendations.
2. The Davis Energy Group, EPRI, SMUD, Western Geothermal Heat Pump Training Center, WaterFurnace International, and the Truckee-Donner Public Utility District generally support staff recommendations including GRDA funds for cost-reducing GHP RD&D.

Dissenting Comments:

1. The Davis Energy Group, EPRI, Geothermal Heat Pump Consortium, Inc., SMUD, Western Geothermal Heat Pump Training Center, and the Truckee-Donner Public Utility District support using GRDA funds for GHP. demonstrations and to continue GHP training/technology transfer activities.
2. EPRI supports using GRDA funds for collaboratives and to quantify the benefits of GHP installation financing programs.
3. Lake County government officials, Douglas H. Bosco; Mike Thompson, Senator Second Senatorial District; and the County of Mono Energy Management Department believe that GRDA funding for geothermal heat pumps is not authorized under current statutes.

Geothermal Direct-Use Applications

Geothermal direct-use was the development focus of the Geothermal Program for the program's first ten years of project awards (1982-1992). These early awards supported geochemical, geophysical, and hydrological assessments; well drilling; and construction of geothermal direct-use resource distribution systems. During this period, the Commission's Geothermal Program worked with cities, counties, school districts, and special districts to develop local low- and moderate-temperature geothermal resources primarily for space and water heating.

The Geothermal Program has received few geothermal direct-use proposals in the last six years, probably due to the current wide availability and low cost of natural gas as an energy source. Because of this situation, most undeveloped direct-use resources in California are currently uneconomical to develop, and some developed direct-use systems are currently uneconomical to operate. The high cost of exploration and the relatively low

value of directly using geothermal resources limit potential development sites to areas with obvious surface manifestations such as hot springs. Few obvious direct-use resources are near population centers where they might be economically used. The direct-use of geothermal resources has potential energy, environmental, and economic benefits which are not likely to materialize under the prevailing conditions of wide availability and low price of natural gas without a well-funded research and development effort.

Staff recommended **not funding** projects that address the following Direct Use Problems:

- The lack of awareness of the direct uses of geothermal resources and potential use benefits limits the development of California's low- and moderate-temperature geothermal resources.
- The lack of funding to explore for and characterize the direct-use geothermal resources and to drill and develop direct-use demonstration and commercial projects limits the development of California's low- and moderate-temperature geothermal resources.
- The lack of professional technical support for geothermal direct use projects and the lack of current technical and other information limits the development of California's low- and moderate-temperature geothermal resources.

Consenting Comments: The Geothermal Energy Association fully supports all of staff's direct-use recommendations.

Dissenting Comments: ISOT Inc., Environmental Geothermal Services, Inc., and the Mono County Energy Management Department support using a percentage of GRDA funds for direct uses as in past program.

International Geothermal Activities

Geothermal energy development is an international industry, and many California geothermal companies conduct a good part of their business in other countries. California is in an excellent position to promote geothermal energy technology exports because it is home to the majority of the U.S. geothermal industry and is the location of the majority of U.S. geothermal projects and RD&D. As such, California is a natural destination for foreign visitors involved in geothermal development seeking business partners to develop their geothermal resources. Government programs promoting U.S. geothermal energy technology exports include the Commission's Export Program, the U.S. Agency for International Development, the U. S. Trade and Development Agency, the U.S. Department of Commerce, and the U.S. Department of Energy.

Staff recommended **not funding** projects that address the following International Geothermal Activity Problems:

- The lack of countrywide knowledge about economically useful geothermal resources for target counties and the lack of business assessments of these resources hinders California firms from identifying priority geothermal development areas.

- The lack of foreign buyer awareness of California company capabilities limits the growth of California's geothermal export market.
- The lack of financing at competitive terms limits the growth of California's geothermal export market.

Consenting Comments: Lake County government officials, Douglas H. Bosco; County of Lake Board of Supervisors; Mike Thompson, Senator Second District; and the County of Mono Energy Management Department believe that GRDA funding for international commerce is not authorized under current statutes.

Dissenting Comments: Ben Holt Co., Trans-Pacific Geothermal Corporation, ThermaSource, Inc., and Geothermex, Inc. support using GRDA to address international activities that benefit California. The Geothermal Energy Association supports limited use of GRDA for reverse trade missions.

Geothermal Energy General Education

The entire August 25, 1998 workshop group addressed this interest area. The group generally agreed that the loss of geothermal expertise and research infrastructure is tied to the economic health of the geothermal industry. However, the group generally believed that GRDA funds could not effectively address this problem and that the problem would resolve itself when the geothermal industry begins to grow. The group wanted the problem statement rewritten to focus on increasing public awareness about the benefits of geothermal power, direct-use, and Geothermal Heat Pumps.

The staff recommended **not funding** projects that address this Geothermal Energy General Education Problem:

- The lack of public awareness about the benefits of geothermal power, direct-use, and Geothermal Heat Pumps limits public support for the development of these resources

Consenting Comments: The Geothermal Energy Association opposes using GRDA for education. Lake County government officials, Douglas H. Bosco; County of Lake Board of Supervisors; Mike Thompson, Senator Second District; and the County of Mono Energy Management Department believe that GRDA funding for education is not authorized under current statutes.

Dissenting Comments:

1. The Geothermal Education Office supports using 1 percent of GRDA for public education targeted to agencies and communities where geothermal development may occur.
2. Maxwell Technologies, Inc. supports a limited use of GRDA funds to support geothermal workshops, publications, and other educational functions.

Administrative Issues

The Geothermal Program staff recommended immediate resumption of GRDA funding opportunities by offering a single limited-term project solicitation. This initial solicitation will expedite support for the best project proposals that have gone unfunded since the Geothermal Program suspended solicitations at the beginning of Fiscal Year 1998. The staff recommended conducting a review of Geothermal Program results, efficiency, and funding allocations among program issues every three years.

An important result of the GRDA Use Recommendation process was the input received on improving the administration of the GRDA program. The staff analyzed this input and recommended that the following changes be pursued (which require no new legislation) in order to promote greater efficiency and reduce administrative burden:

1. Narrow funding emphasis to address only the most significant problems facing the geothermal community.
2. Require no repayment and royalties provisions on awards.
3. Establish a policy that allows limited instances of co-funding the non-RD&D capital costs of demonstration projects necessary to advance needed science or technology.
4. Simplify the application process and shorten time between application and notification of project award or rejection.
5. Adopt appropriate administrative streamlining policies (e.g., selected terms and conditions) from the Public Interest Energy Research Program.
6. Speed up reimbursement process by reducing backup information required and instituting an audit program.
7. Pursue RD&D collaborative efforts other institutions such as the Geothermal Drilling Organization, the Geothermal Power Organization, the Geothermal Technology Organization, the Electric Power Research Institute, and the Geothermal Heat Pump consortium.
8. Every three years conduct a review of Geothermal Program results, efficiency, and funding allocations among program issues.

Consenting Comments:

1. There was full stakeholder consent for the immediate resumption of GRDA funding opportunities by offering a single limited-term project solicitation.
2. The Geothermal Energy Association supports staff's administrative recommendations including narrowing funding emphasis and periodic program reviews to consider changing market economics.
3. The Geothermal Energy Association, the City of Santa Rosa, and Lake County Special Districts support eliminating contingent awards/repayment.
4. Material Integrity Solutions, Inc. supports simplifying and shortening the application process for small companies, assuring confidentiality of ideas, and supports working with the Geothermal Power Organization to address current power plant issues.
5. Sandia National Laboratories and ThermaSource, Inc. support using GRDA for cost-shared geothermal drilling RD&D projects with industry and the U.S. Department of Energy through the Geothermal Drilling Organization.

6. Two Phase Engineering & Research supports simplifying and shortening application process for small companies and using the Geothermal Drilling Organization, Geothermal Power Organization, and Geothermal Technology Organization to address generation issues.
7. The Electric Power Research Institute (EPRI) and the Davis Energy Group support Commission collaboration with EPRI and the Geothermal Heat Pump consortium to leverage GHP funds.
8. Lake County Special Districts supports allowing co-funding of non-RD&D capital costs of demonstration projects, simplifying application process and shortening application process, and supports using PIER administrative streamlining policies.
9. The City of Santa Rosa supports narrowing the program focus.
10. Maxwell Technologies, Inc. supports recommendations for administrative improvements.

Dissenting Comments: The Natural Resources Defense Council, Senator Mike Thompson, Lake County Special Districts, Douglas H. Bosco, the County of Lake Board of Supervisors, Senator Mike Thompson, Assemblymember Virginia Strom-Martin, and the County of Mono Energy Management Department oppose narrowing of funding emphasis

Legislative Issues

The staff analysis of GRDA's enabling statute (Public Resources Code, Chapter 6, Section 3800 et. seq.) revealed provisions which are outdated, which limit participation, have prevented the Commission from funding of good projects, and which hinder the efficient administration of the Geothermal Program. The staff identified possible legislative changes to improve the program. An important aspect of the December 3 workshop was to explore the feasibility and advisability of seeking the following statutory changes:

1. Broaden funding eligibility to include universities, not-for-profit organizations, and other government entities.
2. Change the Geothermal Program's enabling statute to permit selecting and adding types of projects which qualify for GRDA funding administered by the Commission.
3. Facilitate statewide focus by eliminating the need for determining tangible benefits to local governments and the need for approval by the city, county, or unit of Native American government in which the project is located.
4. Establish a sliding scale for required matching funding according to the ratio of public to private benefits.
5. Allow awards in the form of contracts, grants, loans, or other financial agreements.
6. Allow different methods of solicitations including sealed competitive bids, competitive negotiation process, multiparty agreements, single source, or sole source.

7. Allow sole source contracts when the Commission determines that the cost to the state is reasonable.
8. Allow purchase of insurance.
9. Extend Administrative Procedures Act exemptions to this program.

Support for Legislative Changes:

1. The Western Geothermal Heat Pump Training Center supports changing legislation if needed.
2. Bob Mielke supports changing legislation to establish a sliding scale for required matching funding according to the ratio of public to private benefits.
3. ISOT Inc. supports legislative change to broaden funding eligibility to include universities, not-for-profit organizations, and other government entities.
4. The Geothermal Education Office supports changing legislation to "broaden funding eligibility to include educational efforts that support development.
5. Maxwell Technologies, Inc. supports possible legislative changes.

Opposition to Legislative Changes:

1. The Geothermal Energy Association cautions against opening legislative issues while conceptually supporting increased Commission flexibility to respond to changing market conditions and to adjust funding priorities.
2. The Lake County Air Quality Management District and Lake County Special Districts oppose legislative changes that would allow exemptions from the procedures act, having sealed bid processes, doing sole source unsolicited funding, and removing the local benefit clause
3. Lake County Special Districts oppose the broadening funding eligibility to include universities, not-for-profit organizations, and other government entities and changing the enabling statute to permit selecting and adding types of projects which qualify for GRDA funding administered by the Commission.

Committee Decisions to Guide Future Funding Opportunities

The RD&D Committee made the following decisions regarding the Geothermal Program based on stakeholder comments on staff recommendations for reopening funding opportunities and improving the program:

- The January 1999 solicitation would have an advertised budget of "up to" $7.5 million for multiple awards.
- All geothermal proposals consistent with existing statutes and regulations are eligible to apply. Geothermal Heat Pump projects are eligible to apply. International geothermal activities and geothermal energy general education activities are not eligible to apply.
- To emphasize support for projects that address key geothermal problems, projects that address these problems will be awarded up to 30 "Overriding Issues" points (of 120 points as defined in regulations). Projects eligible to receive these extra points include, but are not limited to:
    1. RD&D projects which lower the life-cycle cost of geothermal electricity generation,

2. RD&D projects which lower the cost of enhancing geothermal reservoir systems,
3. Projects which mitigate the adverse impacts of geothermal development, and
4. Projects which provide significant environmental enhancement.

- As statutes and regulations permit, adopt appropriate contractual terms and conditions developed for the Public Interest Energy Research Program.
- Contingent awards will be eliminated. Funding assistance will be made as either a grant or a loan.
- The program should institute a Department of Finance audit program to speed up payment on invoices by reducing required backup information.
- Limited instances of co-funding the non-RD&D capital costs of demonstration projects are allowed when justified by the applicant as necessary to advance needed science or technology.
- After the first solicitation is released, the staff should pursue RD&D collaborative efforts with other RD&D institutions involved in promoting the use of geothermal energy resources.
- Changes to the current statute will not be pursued by the Commission at this time.
- Staff should conduct a review of Geothermal Program results and efficiency every three years.