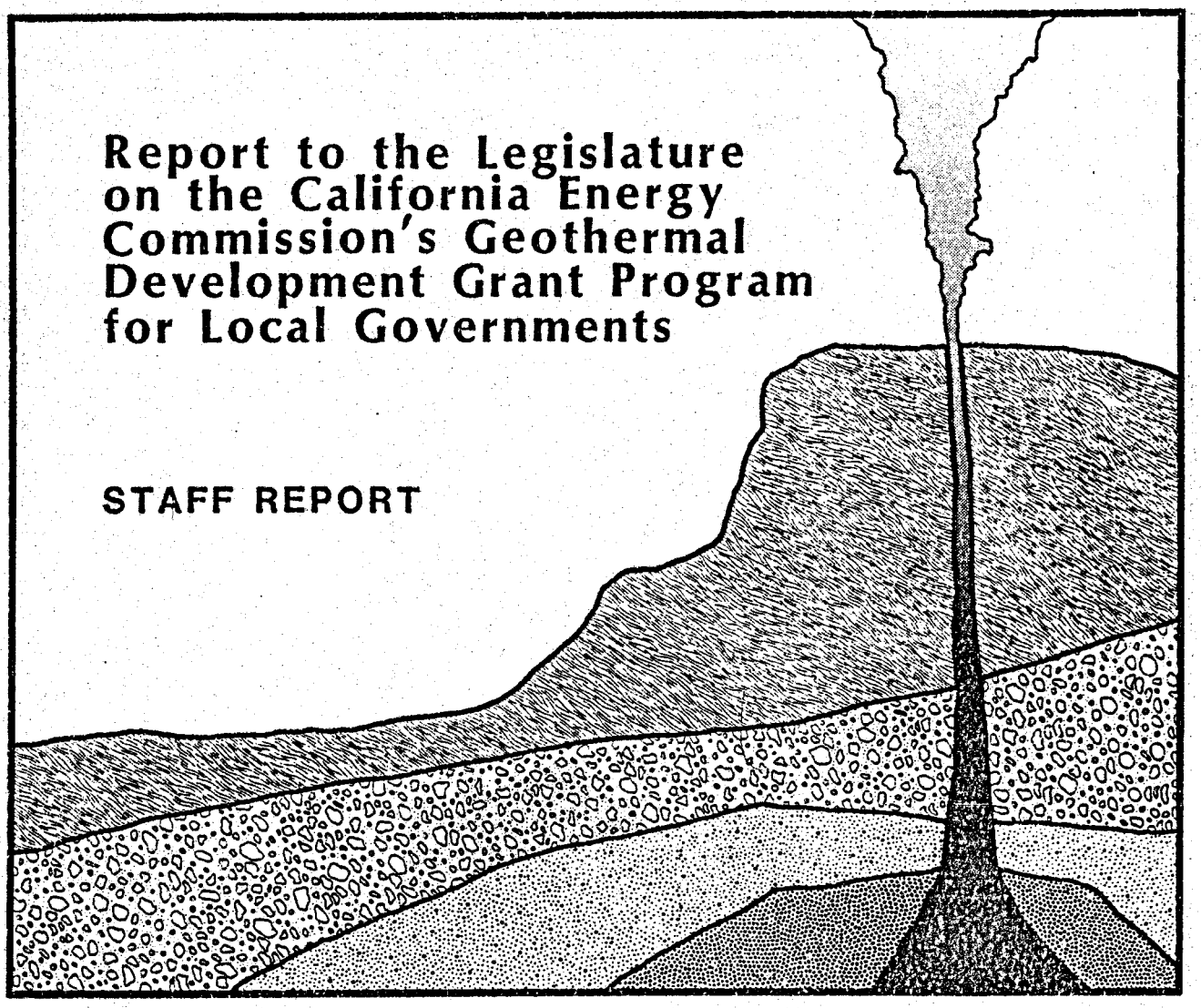
Report to the Legislature on the California Energy Commission's Geothermal Development Grant Program for Local Governments



STAFF REPORT

APRIL 1983

CALIFORNIA ENERGY COMMISSION

P500-83-008

DISCLAIMER

P--500-83-003

DE84 900573

Report to the Legislature

on
the California Energy Commission's
Geothermal Development Grant Program
for Local Governments

Geothermal Program
Office of Small Power Producers
Development Division
California Energy Commission

April 1983

ABSTRACT

This report documents the California Energy Commission's administration of its Geothermal Development Grant Program for Local Governments. The Energy Commission established this program as a result of the passage of Assembly Bill 1905 (Bosco) in 1980. This legislation established the mechanism to distribute the state's share of revenues received from the leasing of federal mineral reserves for geothermal development. The federal government deposits these revenues in the Geothermal Resources Development Account (GRDA) created by AB 1905. The state allocates funds from the GRDA to the California Parklands and Renewable Resources Investment Fund, the counties of origin where the federal leases are located, and the Energy Commission. The legislation further directs the Energy Commission to disburse its share as grants to local governments to assist with the planning and development of geothermal resources. Activities which are eligible for funding under the Energy Commission's grant program include resource development projects, planning and feasibility studies, and activities to mitigate the impacts of existing geothermal development.

PREFACE

This is the first report to the state Legislature on the status of the California Energy Commission's Geothermal Development Grant Program for Local Governments established by Assembly Bill 1905 in 1980.

This report was prepared by the staff of the California Energy Commission under the direction of Ronald W. Kukulka, Chief, Development Division; Leon G. Vann, Jr., Deputy Division Chief; Michael E. Shapiro, Manager, Office of Small Power Producers; and Ralph E. Chandler, Geothermal Program Manager. Principal authors were Andrew T. Coughanour and Michael A. Smith, with technical assistance from Frederick A. Tornatore, David M. Hill, Nancy A. Libonati, and Michael S. Heintz.

The authors would like to express gratitude to the Geothermal Resources Council and the California Department of Conservation for lending their expertise and support and wish to acknowledge the invaluable contribution of the local government officials and representatives of the geothermal industry who participated in developing this grant program.

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INTRODUCTION

California's citizens, government institutions, utilities, farmers, food processors, home builders, and industries have all experienced the adverse effects of excessive reliance on conventional fuels. To end this dependence and move California's economy forward again, reliable and cost-effective energy alternatives must be developed. One such alternative is geothermal energy.

The potential of this energy resource for California is considerable. Today, development is under way to generate electricity from the high-temperature dry steam resources at the Geysers in Sonoma and Lake counties and the high-temperature hot water resource in the Imperial Valley. Although this development establishes California as the world leader in the use of geothermal energy for electrical generation, it is but a small fraction of the estimated 15,000 MW potential from the state's high-temperature resources. Further, geothermal power plants, particularly the dry steam facilities, are among the least expensive to construct and can provide one of the lowest-cost sources of electricity. To accelerate development of the resources, however, certain institutional and environmental constraints will have to be overcome. A partnership between industry and government can reduce impediments to development and result in substantial energy production, economic development, and environmental benefits to the state.

California also has vast low- to moderate-temperature geothermal resources distributed throughout 46 of its 58 counties. Although not suitable for large-scale electrical generation, these resources can provide low-cost, reliable energy for residential, industrial, and commercial space and water heating and small-scale electrical generation. The estimated energy potential of these resources is equivalent to the annual consumption of nearly 3.5 billion barrels of oil. Despite this potential, little has been done in California to develop these resources. The primary reasons are that potential users are unfamiliar with the resource's possible application and the private financial community is reluctant to invest in what is perceived as high risk ventures. State participation with industry and local governments will help to stimulate a growing interest in developing these resources.

To facilitate the continued development of geothermal energy in California, the Energy Commission, through its Geothermal Program, is working to establish new partnerships between government and the private sector. Local governments are essential to this process. They are responsible for managing land use policy and ensuring that all resources, including energy resources, are developed in a manner consistent with the welfare and interest of local citizens. These local management decisions significantly affect the siting of large geothermal power plants and the development of geothermal direct use (nonelectric) projects. Further, as large energy consumers, local governments are in a position to take the initiative in demonstrating the viability of geothermal energy systems.

Recognizing the importance of geothermal energy to California's economy and the critical role local governments play in geothermal planning, development and mitigation, the Legislature, in 1980, passed Assembly Bill 1905.

This legislation created the Geothermal Resources Development Account (GRDA), into which all revenues the state receives from geothermal leasing and development on federal lands are deposited. The act also provides a mechanism for the equitable distribution of these funds, with 30 percent allocated to the California Parklands and Renewable Resources Investment Fund and 40 percent returned to the counties of origin where the federal leases are located. The Energy Commission disburses the remaining 30 percent as grants to local governments to assist with geothermal planning and development activities and to help mitigate the impacts of existing geothermal development.

To execute this mandate, the Energy Commission established its Geothermal Development Grant Program for Local Governments. To date, local governments have submitted 67 applications requesting over $4 million in geothermal grants. The Energy Commission has provided 22 grants totaling $1.23 million to local governments statewide for a wide variety of projects. Local governments' overwhelming response to the Commission's grant program pointed out the substantial potential for geothermal planning, development, and mitigation by communities throughout the state.

This document is intended as a status report of the Commission's local government grant program. It also provides a brief overview of the state's vast geothermal resources and the status of their development.

CALIFORNIA'S GEOTHERMAL RESOURCES

Geothermal energy is found throughout California in two forms--dry steam and hot water--comprising the largest geothermal potential of any state. These resources represent significant alternatives to conventional fuels for many different applications.

High-Temperature Resources

The primary focus of geothermal development in California has been large-scale electric power projects, which generally range in capacity from 50 to 135 megawatts (MW). This application requires high-temperature resources of at least 300°F (Figure 1). The dry steam resources found at the Geysers in Lake and Sonoma counties (Figure 2) function most compatibly with conventional turbine-generators. For this reason, large-scale electric development has been limited primarily to this region. The Geysers is one of two dry steam resources in the world. Its average resource temperature is approximately 460°F, and current generating capacity is 1,124 MW, with an additional 693 MW currently under construction. The total capacity of the dry steam is presently estimated at 2,700 MW.

The recent discovery of a possible dry steam resource at the Coso Hot Springs adjacent to the China Lake Naval Weapons Center in Inyo County (Figure 2) has raised the possibility of large-scale electric power development in that remote area. Although little is publicly known about the resource, preliminary estimates of its potential range from 600 to 4,000 MW.

By far, the most common geothermal resource is hot water. Efforts have been under way to generate electricity from the immense hot water resources underlying Southern California's Imperial Valley (Figure 2). Resource temperatures here often exceed 500°F. Unlike dry steam, however, these resources require nonconventional equipment to generate electricity. The two systems being tested and developed for use in the Imperial Valley are the flashed-steam and binary cycle. Another major impediment to development in that area has been the need to refine new techniques for handling the very saline resources located there. Despite these obstacles, the first commercial-scale facilities are under construction and are scheduled to be on line by 1984-85. The potential capacity of this resource has been estimated at 6,800 MW.

Other resource areas which show promise for large-scale electric power development include Glass Mountain (Siskiyou County), Mono-long Valley (Mono County), and Lassen, which stretches across four Northern California counties (Figure 2). Only exploratory activities have occurred in these areas thus far, and nothing definitive is yet known.

The total capacity of the state's high-temperature resources, both dry steam and hot water, has been estimated at over 15,000 MW, or the equivalent consumption of over 176 million barrels of oil annually.

FIGURE 1

MINIMUM END USE TEMPERATURE REQUIREMENTS

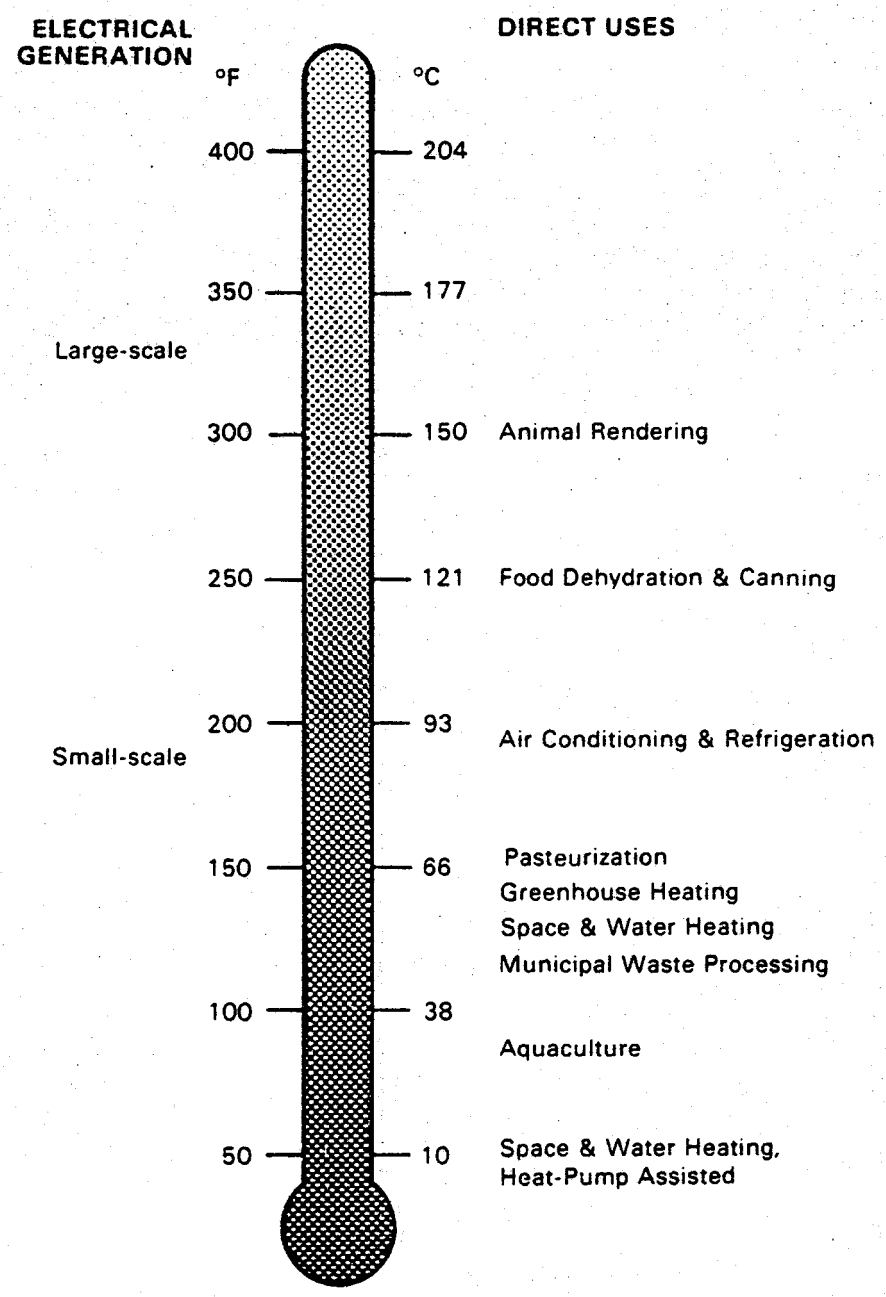
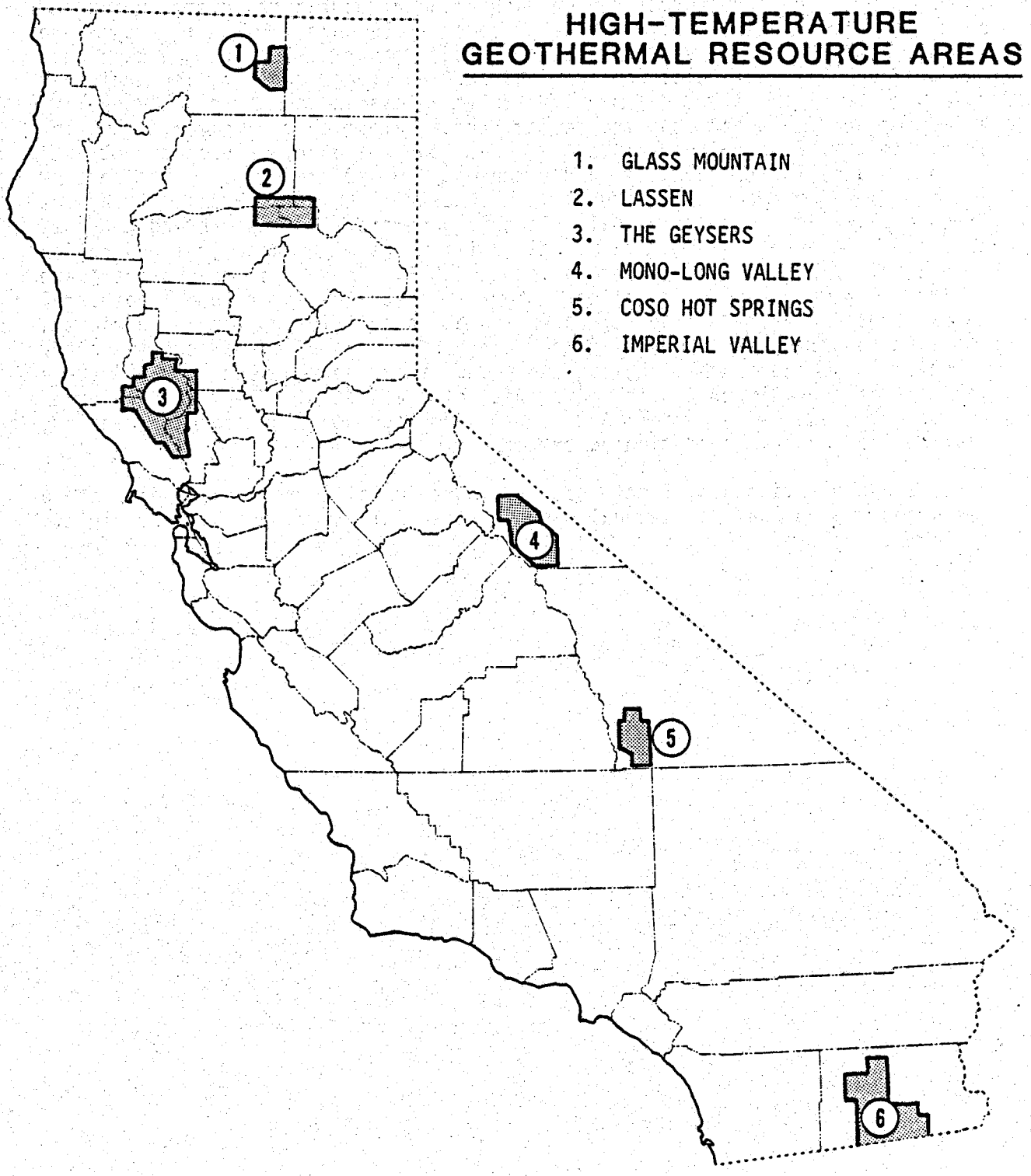


FIGURE 2

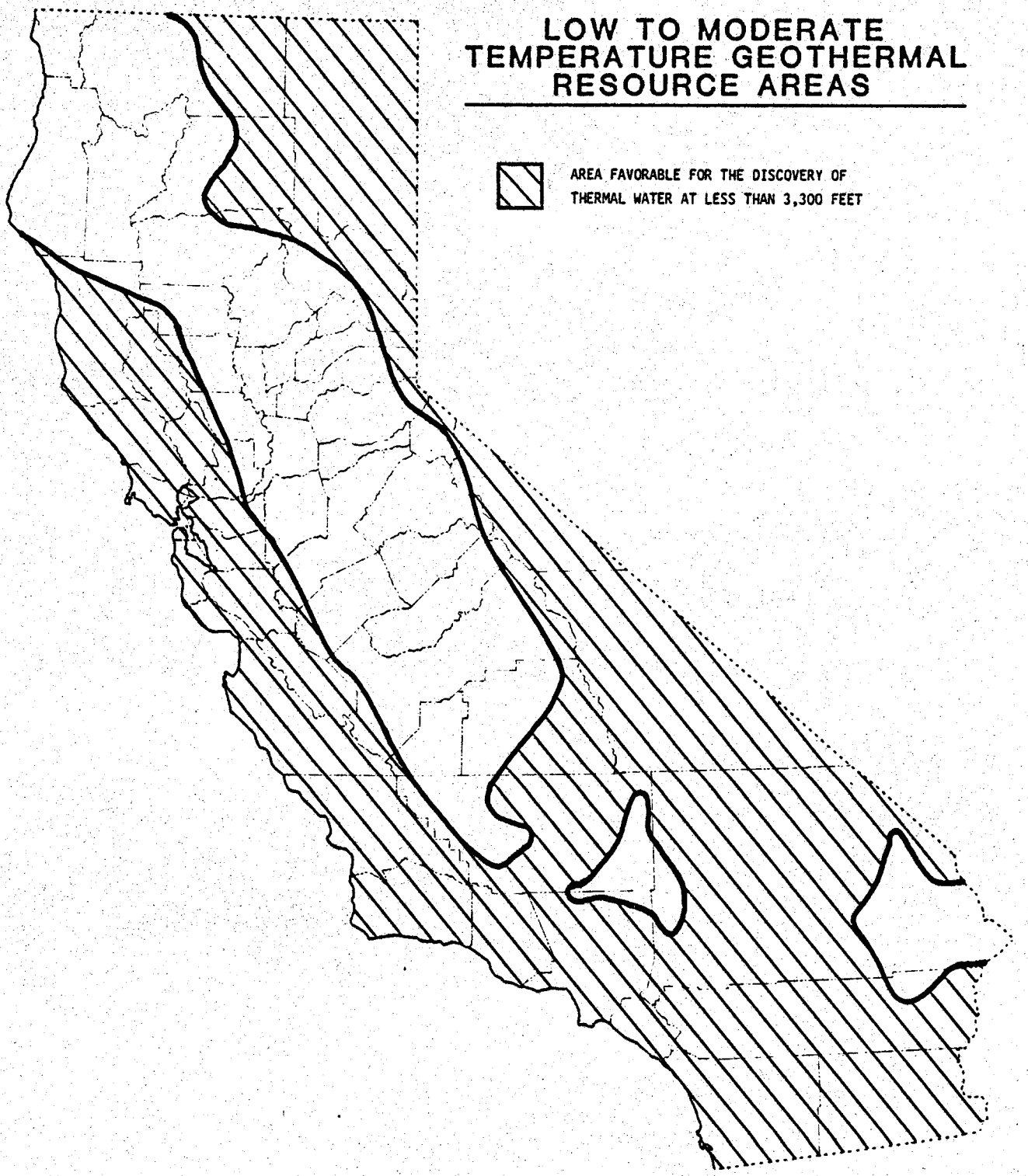

HIGH-TEMPERATURE
GEOTHERMAL RESOURCE AREAS
1. GLASS MOUNTAIN
2. LASSEN
3. THE GEYSERS
4. MONO-LONG VALLEY
5. COSO HOT SPRINGS
6. IMPERIAL VALLEY
1
2
3
4
5
6

Low- to Moderate-Temperature Resources

California also has vast low- to moderate-temperature resources, those less than 300°F. These resources have a much broader geographic distribution and can be found in 46 of California's 58 counties (Figure 3). While most are located in rural areas, some rather significant moderate-temperature resources can be found in the cities of Los Angeles, San Diego, and San Bernardino in the south and Susanville, Calistoga, and Santa Rosa in the north. Generally, these resources are not hot enough for large-scale electric power production as in the Geysers and Imperial Valley. They can, however, be used directly as a heat source for residential and commercial water and space heating (and cooling) and for many agricultural and industrial process heat applications (Figure 1). Further, small-scale electric generator systems ranging up to 10 MW in capacity are being developed which will enable the economical generation of electric power from resources as low as 200°F. These systems, however, are in the prototype development stage. Low- to moderate-temperature geothermal resources can provide energy reliably and at a cost lower than electricity, oil, and natural gas, insulating the user from the price and supply uncertainties of conventional fuels. As such, their development can provide a vehicle for economic growth in many areas of the state. The technology used to convert these resources is the same technology used in standard heating, ventilation, and air conditioning systems.

Despite these advantages, little has been done in California to develop these resources, which have an annual energy potential equivalent to nearly 3.5 billion barrels of oil.

FIGURE 3


LOW TO MODERATE
TEMPERATURE GEOTHERMAL
RESOURCE AREAS
AREA FAVORABLE FOR THE DISCOVERY OF
THERMAL WATER AT LESS THAN 3,300 FEET

THE CALIFORNIA ENERGY COMMISSION'S GEOTHERMAL PROGRAM

In 1975, the Legislature passed Assembly Bill 1575, which directed the Energy Commission to establish a program of research and development leading to the "expansion and accelerated development of alternative sources of energy, including geothermal. . ." [PRC 25601 (c)].

The early efforts of the Energy Commission's Geothermal Program focused on development of large-scale electric power plants. These activities included studies to define regulatory and environmental impediments and solutions in order to accelerate the approval of large-scale geothermal power plants at the Geysers and in the Imperial Valley. As a result, the Energy Commission has streamlined its permit procedures from 36 months to just 12 months and has certified 10 facilities at the Geysers totaling 907 MW.

The Geothermal Program also provided early support for the Heber Binary Cycle Demonstration Project in the Imperial Valley. The Geothermal Program staff was instrumental in obtaining both federal and private financial support for the project, which is now under construction. When completed in 1984-85, the Heber facility will be the world's first large-scale binary cycle power plant with far ranging ramifications in the development of moderate-temperature geothermal resources.

As a result of this government/private sector relationship, large-scale electric power development is receiving considerable private financial support. The issues this type of development faces are more institutional than technical and include the inadequacies of local regulatory procedures and project-specific and cumulative environmental impacts.

With the commercial success of large-scale electric projects, the Commission has redirected most of its Geothermal Program efforts toward promoting development of the state's low- to moderate-temperature geothermal resources. The utilities and major development companies have all but ignored these resources because the temperatures are not hot enough for large-scale electrical generation. The development that is occurring is being done by small entrepreneurs, who simply do not have adequate technical and financial capability. Consequently, these resources have gone undeveloped. The major impediments to further development include:

- Lack of reliable cost and performance data for direct use and small-scale electric generator systems,
- Lack of technical expertise within the industry,
- Lack of a market infrastructure to support this kind of development, and
- High cost and risk associated with resource exploration and confirmation.

The Geothermal Program uses many means to encourage the development of low- to moderate-temperature resources and address the institutional issues facing

large-scale geothermal power plants. Presently, the program is organized around the following activities:

- o Marketing,
- o Resource assessment,
- o Technology feasibility and demonstration, and
- o Local government assistance.

This organization allows the program to directly address each of the major issues impeding development. The activities of the program are carried out in partnership with developers and local officials in order to leverage the maximum participation of both the private sector and local governments. The following is a summary of these activities.

Marketing

The Geothermal Program staff has developed a unique approach to the promotion of California's low- to moderate-temperature resources. Its recently completed direct use market assessment (Geothermal Energy--Opportunities for California Commerce) identifies the resource areas and applications which have the best potential for successful, near-term development. These determinations were made not only from resource and engineering data, but also included pertinent economic development criteria. This analysis is providing the much needed focus for effective and efficient development of these resources.

Resource Assessment

Through the Geothermal Program, the Energy Commission is assisting in resource assessment efforts to reduce the initial risk of project development and has funded resource exploration projects in Modoc, Sonoma, and San Diego counties. Program staff is currently working with the cities of Los Angeles and Huntington Beach and is also providing assistance in the siting and completion of geothermal wells.

Technology Feasibility and Demonstration

The program staff also conducts preliminary feasibility analyses of proposed projects to provide the incentive for the applicant to further develop the project. In addition, the program is cost sharing with private industry and public agencies for the construction of direct use demonstration projects in the cities of San Bernardino, Calistoga, Susanville, and Greenville.

Local Government Assistance

The centerpiece of the Geothermal Program's local government assistance effort is the Geothermal Development Grant Program. Communities located in areas the Commission's marketing study identified as having potential resources are particularly encouraged to participate in the grant program. Through this participation a partnership is established between local government, industry, and the state to develop geothermal energy in a manner that will provide direct economic, energy, and employment benefits for the local community.

GEOTHERMAL DEVELOPMENT GRANT PROGRAM FOR LOCAL GOVERNMENTS

As the level of government closest to the citizenry, local governments can play several critical roles in the planning and development of California's geothermal resources.

Resource Development

The operation of local government facilities requires considerable energy. The recent dramatic increase in energy costs has forced local governments to spend an ever-increasing percentage of continually shrinking budgets on energy. Funds that could be better spent on police protection or economic development projects must pay for energy bills. The development of local geothermal resources for water heating and space conditioning in public facilities not only could result in considerable fiscal savings to the local entity but could also act as highly visible demonstration projects.

Planning

Local governments also have the responsibility for land use planning and other specified activities within their respective jurisdictions. These policy decisions can significantly affect the development of geothermal resources for both power plants and direct use projects. It is critical, particularly with respect to long-range energy planning, that decisions are made with sufficient knowledge and at the earliest possible time in the overall planning process. In many cases, this requires the analysis and preparation of comprehensive planning documents so that geothermal development may proceed in a manner beneficial to local residents and compatible with statewide energy policy.

Impact Mitigation

The construction and operation of geothermal power plants can cause environmental damage and require a substantial increase in the demand for certain public services. Local governments are responsible for the identification and mitigation of impacts resulting from existing development activities.

The State's Role

California's financially beleaguered local governments rarely have the technical expertise or the financial resources to pursue an adequate program of geothermal planning and development. Recognizing this serious impediment, the Legislature, in 1980, passed Assembly Bill 1905. The specific objectives of this act are:

(a) Reduction of dependence on fossil fuels and stimulation of the state's economy through development of geothermal resources.

(b) Mitigation of the adverse social, economic, and environmental impacts of geothermal development.

(c) Financial assistance to cities, counties, and districts to offset the cost of providing public services and facilities necessitated by the development of geothermal resources within their jurisdictions.

(d) Maintenance of the productivity of renewable resources through the investment of the proceeds from a depleting resource.

To attain these objectives AB 1905 created the Geothermal Resources Development Account (GRDA) into which all revenues received by the state from the leasing and development of federal mineral reserves for geothermal energy are deposited. By law, these revenues include 50 percent of all cash bonuses, rents, and royalty payments made to the U.S. Bureau of Land Management resulting from such activities. Historically, these revenues were simply deposited into the state's General Fund. With the creation of the GRDA, AB 1905 also established a mechanism for the equitable distribution of these funds. The act requires that 30 percent of these funds are to be allocated to the California Parklands and Renewable Resources Investment Fund and 40 percent are to be returned to the counties of origin where the federal mineral reserves are located. The remaining 30 percent are to be disbursed by the Energy Commission as grants to local governments to assist in the planning and development of geothermal resources as well as mitigating the impacts of existing geothermal development. Following this mandate, the Energy Commission established its Geothermal Development Grant Program for Local Governments. Further, AB 1905 provided a list of activities which would be eligible for funding under the Energy Commission's grant program (Table 1).

Through this program the Energy Commission is developing an effective partnership between state and local government that provides California's communities with the financial and technical assistance to pursue beneficial geothermal programs. This strategy promotes geothermal development as a new economic development base for a community. If communities near a geothermal resource area can demonstrate the cost effectiveness and reliability of this energy alternative and can offer conventional economic development incentives, they can attract commercial and industrial end users. Commercial and industrial development leads to increased tax revenues, indirect benefits from employees and families moving to the community, and decreased unemployment. This, in turn, will stimulate the local economy.

To develop a grant program encompassing the broad variety of activities AB 1905 allows, the Geothermal Program staff conducted seven regional workshops in April 1981. During these workshops local government officials provided constructive input on how the grant program should be structured and administered. As a result of these workshops, Geothermal Program staff developed a two-phased grant application process. This process is detailed in the revised grant application manual, Geothermal Grant Program for Local Governments, dated March 1983 (publication number P500-83-009). During the first phase a brief preapplication is submitted. Commission staff reviews the proposal and provides the local government with constructive suggestions for improving the proposal and a realistic assessment of their overall chance for eventual funding. If the likelihood of receiving grant funds appears promising, the local government then submits a more formal final grant application which begins the second phase.

Table 1

Eligible Activities

1. Resource assessment and exploration technology.

2. Local and regional planning and policy development and implementation necessary for compliance with programs required by local, state, or federal laws and regulations.

3. Identification of feasible measures that will mitigate the adverse impacts of the development of geothermal resources and the adoption of ordinances, regulations, and guidelines to implement such measures.

4. Collecting baseline data and conducting environmental monitoring.

5. Preparation or revision of geothermal resource elements, or geothermal components of energy elements, for inclusion in the local general plan, zoning and other ordinances, and related planning and environmental documents.

6. Administrative costs incurred by the local jurisdiction that are attributable to the development and production of geothermal resources.

7. Monitoring and inspecting geothermal facilities and related activities to assure compliance with applicable laws, regulations, and ordinances.

8. Identifying, researching, and implementing feasible measures that will mitigate the adverse impacts of such development or production.

9. Planning, constructing, providing, operating, and maintaining those public services and facilities that are necessitated by and result from such development or production.

10. Undertaking projects demonstrating the technical and economic feasibility of geothermal direct heat and electrical generation applications.

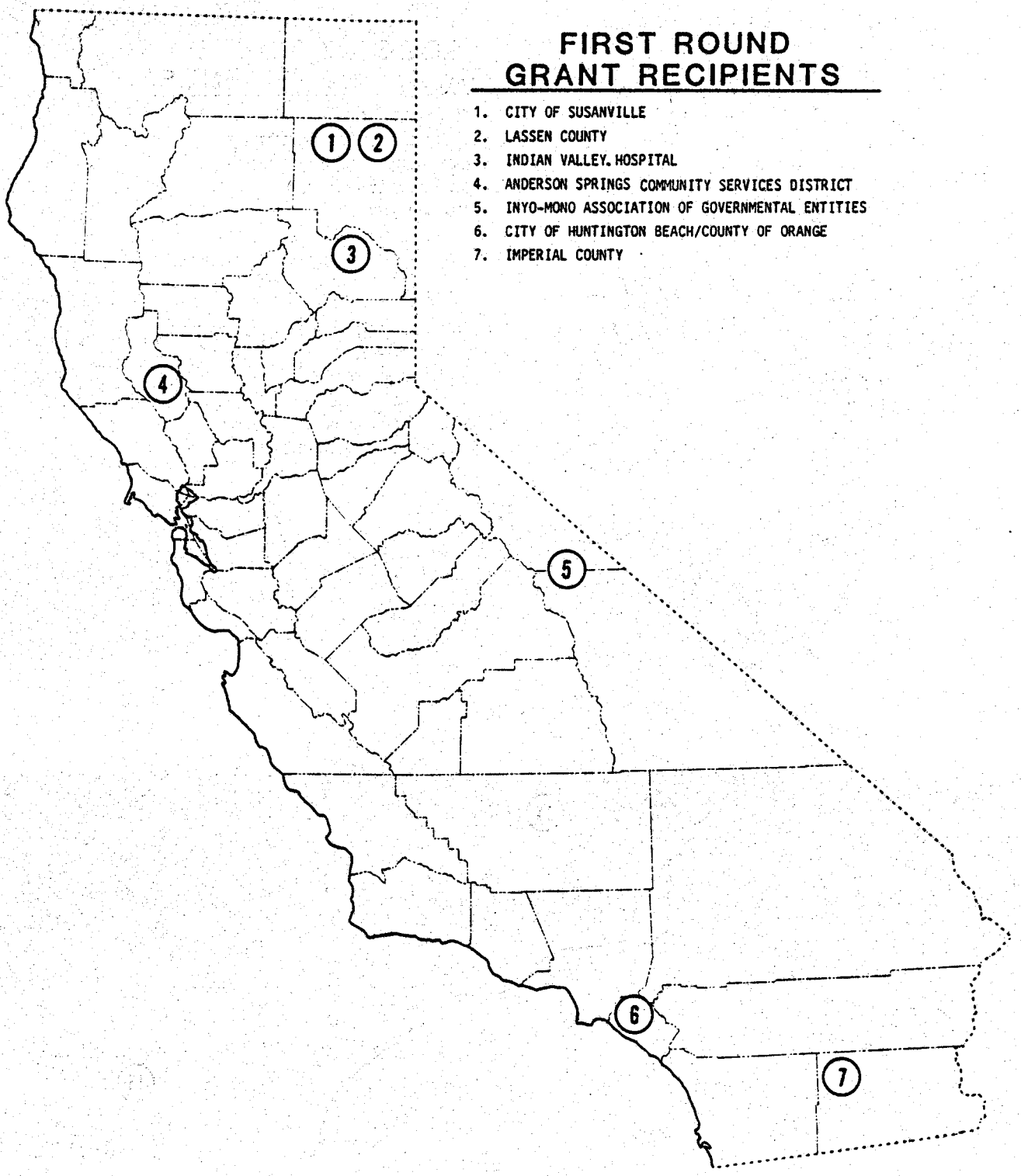
11. Undertaking projects for the enhancement, restoration, or preservation of natural resources, including, but not limited to, water development, water quality improvement, fisheries enhancement, and park and recreation facilities and areas.

A Technical Advisory Committee, made up of Energy Commission staff, a representative of the California Division of Oil and Gas, and a member of the geothermal industry, reviews and evaluates the final grant applications. Based on this evaluation, the Energy Commission decides which jurisdictions will receive grants.

To date, the Energy Commission has received 67 grant applications requesting over $4 million in funds. From these requests, 22 grants totaling $1.3 million have been provided. The location of the local governments which have received geothermal grants are shown in Figures 4 and 5 and a summary of each grant is provided in Table 2. Detailed descriptions of the projects funded are included as Appendix A.

Local governments' dramatic response to the Geothermal Development Grant Program demonstrates the value California's communities place on planning for and developing their geothermal resources. These communities recognize the potential economic benefits of reduced energy costs and increased employment which geothermal energy can provide. Further, these communities also recognize that without the technical and financial support of the Energy Commission, these activities would not have been possible.

FIGURE 4



FIRST ROUND GRANT RECIPIENTS

1. CITY OF SUSANVILLE
2. LASSEN COUNTY
3. INDIAN VALLEY. HOSPITAL
4. ANDERSON SPRINGS COMMUNITY SERVICES DISTRICT
5. INYO-MONO ASSOCIATION OF GOVERNMENTAL ENTITIES
6. CITY OF HUNTINGTON BEACH/COUNTY OF ORANGE
7. IMPERIAL COUNTY

FIGURE 5

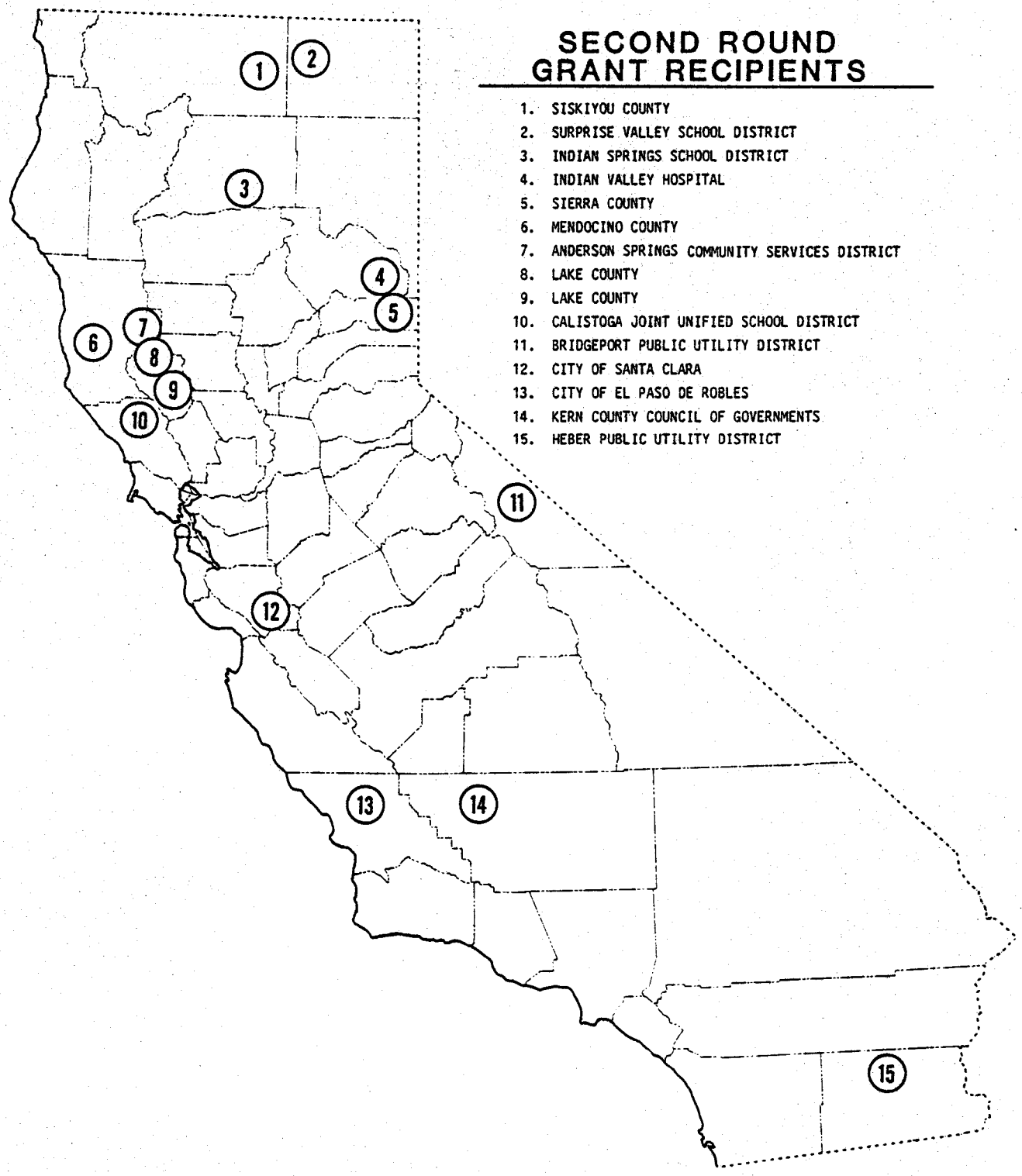

SECOND ROUND
GRANT RECIPIENTS
1. SISKIYOU COUNTY
2. SURPRISE VALLEY SCHOOL DISTRICT
3. INDIAN SPRINGS SCHOOL DISTRICT
4. INDIAN VALLEY HOSPITAL
5. SIERRA COUNTY
6. MENDOCINO COUNTY
7. ANDERSON SPRINGS COMMUNITY SERVICES DISTRICT
8. LAKE COUNTY
9. LAKE COUNTY
10. CALISTOGA JOINT UNIFIED SCHOOL DISTRICT
11. BRIDGEPORT PUBLIC UTILITY DISTRICT
12. CITY OF SANTA CLARA
13. CITY OF EL PASO DE ROBLES
14. KERN COUNTY COUNCIL OF GOVERNMENTS
15. HEBER PUBLIC UTILITY DISTRICT

TABLE 2

RECIPIENTS OF GRANT FUNDS UNDER AB 1905 (BOSCO)
GEOTHERMAL DEVELOPMENT GRANT PROGRAM

1. Siskiyou County — $ 31,124

   A planning study to assess county geothermal resources, identify potential end users, and formulate county policy regarding geothermal development.

2. Surprise Valley School District (Modoc County) — $100,000

   Geothermal resource assessment at the Fort Bidwell Indian Reservation and at Surprise Valley elementary and high schools.

3. Indian Springs School District (Shasta County) — $ 60,000

   Site-specific geothermal resource assessment, including drilling a production well at Indian Springs School in the community of Big Bend, California, for geothermal space and water heating.

4. City of Susanville (Lassen County) — $ 24,405

   Design and construction of a geothermal space-heating system for the Roop's Fort Complex (including a museum, senior center, Chamber of Commerce building, a greenhouse for use by seniors and parks department, and a sprinkler system using wastewater). This retrofit ties into the existing district heating system.

5. Lassen County — $ 95,077

   Design and construction of a geothermal space-heating system for the courthouse annex, replacing the existing electrical heating system as the primary heat source.

6. Mendocino County — $ 15,732

   A planning study to assess county geothermal resources, identify potential end users, and formulate county policy regarding geothermal development.

7. Indian Valley Hospital (Plumas County) - Phase I — $ 44,800

   Site-specific geothermal resource assessment and drilling a production well for a geothermal water and space-heating system for the Indian Valley Hospital in Greenville.

8. Indian Valley Hospital (Plumas County) - Phase II — $161,100

   Design and construction of a space- and water-heating system for the Indian Valley Hospital.

9. Sierra County — $ 25,000

   Marketing program aimed at developing a geothermal direct use industry in Sierra Valley.

10. Anderson Springs Community Services District (Lake County) - Phase I — $ 76,000

    Design a new domestic water system for the community of Anderson Springs to mitigate contamination impacts from existing geothermal development.

11. Anderson Springs Community Service District (Lake County) - Phase II — $ 76,000

    Install 5,000 feet of 6 inch diameter water transmission pipeline from the community to a diversion point on Gunning Creek.

12. Lake County — $119,025

    Placement of asphalt concrete paving on 1.67 miles of Butts Canyon Road damaged by geothermal drilling waste disposal trucks operating in the Geysers.

13. Lake County — $ 50,000

    Fund a marketing program aimed at developing a geothermal direct use industry in Lake County.

14. Calistoga Joint Unified School District (Napa County) — $ 33,170

    Drill production well using a down-hole heat exchanger and retrofit portions of the Calistoga High School for geothermal space heating.

15. Bridgeport Public Utilities District (Mono County) — $ 75,000

    Resource assessment including the drilling of a temperature gradient hole as a first step in developing the resource for a proposed district heating system and a small-scale (300 - 500 kW) electrical generation system in the community of Bridgeport.

16. Inyo/Mono Association of Governmental Entities — $ 34,000

    Planning effort including environmental and mitigation assessment and identification of direct use projects. Focus will be directed to streamlining the permitting process.

17. City of Santa Clara (Sierra County) — $ 50,500

    Resource assessment program, including geological and geophysical surveys, on the city's property near the town of Loyalton in Sierra County as well as areas in Plumas and Lassen counties.

18. City of El Paso de Robles (San Luis Obispo County) — $ 34,900

    A feasibility study for geothermal development in the Paso Robles area.

19. Kern County Council of Governments — $ 45,838

    Identification of geothermal resources within Kern County focused on the Lake Isabella and Scovern Hot Springs areas. Planning for their development and marketing will be undertaken.

20. City of Huntington Beach (Orange County) — $ 22,872

    Joint effort with the County of Orange for resource assessment, identification of potential end users, and examination of possible demonstration projects using the geothermal resources associated with local oil field production.

21. Imperial County — $ 40,722

    Field work in selected areas of the county to update and monitor potential subsidence induced by geothermal development.

22. Heber Public Utility District (Imperial County) — $ 15,000

    A study of potential social, economic, and environmental impacts on the community of Heber as a result of geothermal development of the Heber Known Geothermal Resource Area.

APPENDIX A

Summary of Grants Funded Under the Geothermal Development Grant Program for Local Governments

Grantee: City of Huntington Beach/Orange County
Location: City of Huntington Beach
Amount of Grant: $22,870
Match: $18,630

Project Description

The City of Huntington Beach and Orange County are jointly conducting this project. The grant is being used to assess the energy potential of the geothermal water located in local oil fields, to examine possible demonstration projects, and to perform preliminary economic feasibility studies for these projects. This project will also identify ways to preserve surface areas which will provide future access to geothermal resources in the highly urbanized Huntington Beach area. The project will culminate in a workshop which the city and county will fund. The results of the Huntington Beach study will be used as a model for other Orange County communities with geothermal resources, such as Brea, Fullerton, Placentia, and Yerba Linda. The project has strong support from Southern California Edison and Aminoil, USA.

The CEC is providing continual technical assistance in determining the feasibility of specific projects identified as a result of the study.

Grantee: Anderson Springs Community Services District (Phase I)
Location: Lake County
Amount of Grant: $76,000
Match: $0

Project Description

Anderson Springs is a small, rural community located in the mountainous region of southern Lake County within the Geysers-Calistoga KGRA. The community's water supply is obtained from the Anderson and Gunning creeks watershed, which is now experiencing substantial geothermal development, including access roads, well pads, steam transmission pipelines, and power plant construction. Water quality degradation from erosion in the watershed is presently occurring. Geothermal fluids, drilling muds and chemicals, and other pollutants have accidentally spilled into Anderson and Gunning creeks. Past accidents have resulted in cessation of domestic water supplies for up to three days.

This grant will allow the project proponents to develop a water system master plan and prepare design specifications for water system improvements.

Grantee: Anderson Springs Community Services District (Phase II)
Location: Lake County
Amount of Grant: $76,000
Match: $0

Project Description

Under the Phase I geothermal grant award, the Anderson Springs Community Services District developed a master plan and design specifications necessary to begin the construction project. This grant will be used to build a mile long, 6 inch diameter water conveyance pipeline. Although no matching sources are identified, the community has secured a large number of grants and loans from various sources to complete this project.

Grantee: Indian Valley Hospital (Phase I)
Location: Greenville, Plumas County
Amount of Grant: $44,800
Match: $2,128

Project Description

Indian Valley Hospital is a 26 bed, 1,000 square foot, publicly owned, rural hospital in Greenville, California (Plumas County). Electrical resistance wire beneath the flooring provides the existing heating at the hospital. Portions of this system have failed, and failure of the remainder of the system is likely.

The Geo-Heat Center at Oregon Institute of Technology performed a feasibility study that determined that conversion to geothermal space and water heating using a water-to-water heat pump was economically feasible. There is also strong evidence of a local geothermal resource. This grant provided funds for a geotechnical resource assessment leading to the drilling and completion of a geothermal production well. This well was completed in December and has produced 116°F water at 290 gallons per minute, more than sufficient for the hospital's needs.

Grantee: Indian Valley Hospital (Phase II)
Location: Greenville, Plumas County
Amount of Grant: $161,100
Match: $7,416

Project Description

Under the Phase I grant, the Indian Valley Hospital sited and successfully drilled a geothermal production well. With this well completed, work can begin on retrofitting the hospital's space and water heating system. The Indian Valley Hospital will use this grant to convert the its space and water heating system from electric resistance to geothermal heat. A hotter resource temperature than originally assumed in the Geo-Heat Center study was tapped. This will reduce retrofit construction and operating costs.

The hospital will also use these funds for the drilling of a reinjection well to safely dispose of the geothermal fluid.

Grantee: Inyo-Mono Association of Governmental Entities (IMAGE)
Location: Inyo and Mono counties
Amount of Grant: $33,994
Match: $33,169

Project Description

The Inyo-Mono region contains over 40 percent of California's known geothermal resource area (KGRA) acreage, with approximately 2,510,000 additional acres under consideration for geothermal resource development. In addition, recent and proposed U.S. Bureau of Land Management geothermal lease sales will permit potential large-scale geothermal development in both the Mono-Long Valley and Coso areas. Inyo and Mono counties currently have the only regionwide Geothermal Element (Commission funded) in their General Plans. This grant allows for the necessary planning and permit streamlining recommended in the policy formulation section of the Geothermal Element.

The imminent development of the Coso Hot Springs, Bridgeport, and Casa Diablo resource areas recognizes the urgency and timeliness of the IMAGE Comprehensive Geothermal Development Project. The project is particularly essential because of the region's extremely low tax base and consequent need for development that results in positive social and economic impacts with the mitigation of potential environmental impacts.

Grantee: Imperial County
Location: Imperial County
Amount of Grant: $40,722
Match: $53,123

Project Description

Imperial County overlies a major geothermal resource which is capable of providing 6,800 MW of electrical generating capacity. Imperial County's policy concerning development of this resource has focused on, among other items, the potential subsidence geothermal fluid extraction creates. This grant will fund a subsidence monitoring program.

Imperial County agriculture, an $800 million a year industry, depends on an extensive gravity flow irrigation system. Subsidence caused by geothermal development could damage the irrigation and drainage systems and cause irreparable harm to the county's economy. Therefore, the county's geothermal policy has emphasized subsidence detection and prevention since the early 1970s when substantial interest in geothermal development first arose. The actual potential for geothermally induced subsidence in Imperial County is unknown at the present time. Monitoring programs which the county and California Division of Oil and Gas sponsor are designed to detect subsidence before serious impacts occur. This provides funds to continue this essential monitoring program. Without regular monitoring, public fear of the subsidence impacts could pose a serious obstacle to geothermal development.

Grantee: City of Susanville
Location: Lassen County
Amount of Grant: $24,405
Match: $12,805

Project Description

The City of Susanville, Lassen County seat, is the major city in northeastern California. Susanville and the surrounding Honey Lake Valley have known geothermal resources which are already being used for heating greenhouses and public buildings in Susanville. The Roops Fort complex in the City of Susanville is the site of the Lassen County Historical Museum, the Susanville Senior Citizen Center, and the City of Susanville Parks and Recreation/Chamber of Commerce building. Because of high heating costs, the museum and senior citizen center have been closed during the winter months. The pipeline for the Susanville geothermal district heating system is approximately 350 feet from the Roop's Fort complex and is available to the project. This grant will provide for the design and installation of a lower cost geothermal space-heating system which will operate year round. In addition to space heating, a geothermally heated greenhouse will be installed on site to provide for year-round vegetable gardening for senior citizens and to allow the Parks Department to grow plants and trees.

Grantee: Lassen County
Location: Lassen County
Amount of Grant: $34,624
Match: $103,946

Project Description

The Lassen County Courthouse Annex, located in Susanville, has immediate access to the Susanville district heating system. This grant will permit the county to connect the Courthouse Annex to this system, thus eliminating the need for the present electrical resistance heating system. This retrofit is similar to other county facilities converting to geothermal use (i.e., Lassen County Jail and Veterans Memorial Building). Several other public and commercial buildings are already using the geothermal district heating system.

The Courthouse Annex is probably the most widely used building in the county. The Planning Department, Purchasing Department, Public Works, Building Department, Public Library, Road Department, and Sheriff Offices are all located in the Courthouse Annex.

Grantee: Siskiyou County
Location: Siskiyou County
Amount of Grant: $31,124
Match: $5,124

Project Description

This grant will be used to assess the availability of low- to moderate-temperature geothermal resources located within Siskiyou County. After identifying the resource, the county will determine those applications that are suitable to the resource. The county will also prepare a Geothermal Element to the General Plan to formulate the planning and development of the county's resources. The consolidation of these activities reflects a positive approach to developing geothermal energy while anticipating the probable impacts of development in the county.

Grantee: Bridgeport Public Utility District
Location: Bridgeport, Mono County
Amount of Grant: $75,000
Match: $2,285

Project Description

In 1981 the Energy Commission conducted a feasibility study for a proposed geothermal district heating system for the community of Bridgeport. The study concluded that the system would be economically feasible only if the hot water were first used to generate electricity from a 0.5 MW small-scale electric generator.

State and private agencies reports on the geothermal resource have been very favorable. The Bridgeport Public Utility District will drill an exploratory well and test the resources found for temperature and volume. The district has requested other state funds to purchase the wellhead generator as a demonstration project. Private funds have been committed to finance the rest of the Bridgeport District Heating project if the results of this proposed drilling and testing program prove favorable.

Grantee: Heber Public Utility District
Location: Heber, Imperial County
Amount of Grant: $15,000
Match: $25,700

Project Description:

The estimated potential generating capacity of the Heber Known Geothermal Resource Area is 500 MW. Two 50 MW power plants are under construction within four blocks of the unincorporated town of Heber, population 2,221. Water, sewer, drainage, and other public services are provided by the Heber Public Utilities District (district), the boundaries of which include the Heber geothermal anomaly. The development of the geothermal industry at Heber will require water, sewer, and other public services that only the district can provide. The district will use these grant funds to assist in the development and implementation of a master plan that will: (1) project the needs of the town and the geothermal industry, (2) create an awareness of the limits, conditions, and opportunities of the district's systems, (3) identify the effects, both positive and negative, associated with the projected geothermal development, (4) establish priorities on the delivery of services, and (5) identify measures to mitigate potentially adverse impacts.

Grantee: Mendocino County
Location: Mendocino County
Amount of Grant: $15,732
Match: $4,369

Project Description

The County of Mendocino will use these grant funds to formulate polices and procedures to control, direct, and facilitate geothermal development in the county. Four methods have been proposed to supplement the current lack of consistent policy within the county: (1) development of a geothermal task force to provide geothermal policy and implementation measures, (2) formulation of a geothermal supplement to discuss impacts and benefits of geothermal development, (3) initiation of a streamlined/permitting process, and (4) a provision for public awareness and outreach.

Grantee: Sierra County
Location: Eastern Sierra County
Amount of Grant: $25,000
Match: $5,000

Project Description

Sierra County will use this grant to conduct a market study to identify local geothermal resources and potential agricultural and industrial projects in Sierra Valley. The county will also develop a strategy to promote compatible geothermal development.

The study will review existing geothermal resource information and will survey industries that could use the potential resource. This information would be used to develop a county policy to encourage geothermal development.

Grantee: Calistoga Joint Unified School District
Location: Calistoga, Napa County
Amount of Grant: $33,170
Match: $1,777

Project Description

Calistoga is a rural community with a population of approximately 3,700 located 80 miles north of San Francisco in the Napa Valley. Geothermal resources in the area contains unacceptable levels of boron. A feasibility study the Energy Commission conducted for the Calistoga High School has concluded that use of a down-hole heat exchanger could provide economical geothermal heat for the facilities while alleviating the environmental problems associated with the high boron concentrations. The Calistoga Joint Unified School District will use this grant to retrofit a portion of its high school for geothermal space heating using a down-hole exchanger system. This system will provide a low-cost supply of heat while avoiding environmental problems.

Grantee: Indian Springs School District (Phase I)
Location: Big Bend, Shasta County
Amount of Grant: $60,000
Match: $7,250

Project Description

A feasibility study the Energy Commission conducted for the Indian Springs School District concluded that an existing well on school property producing 72°F water could provide economical heat for the school facilities. The system will use a water heat pump. Hotter water is anticipated at depth, perhaps as hot as the 179°F water produced by Big Bend Hot Springs located 1/2 mile from the school. A consultant report on the area shows that a postulated fault below the Big Springs passes beneath a corner of the school property. After visiting the site, personnel from both the Division of Mines and Geology and the Energy Commission recommended further study of the resource and its application. The Indian Springs School District will use this grant to conduct further resource assessment to locate hotter geothermal resources as a prelude to retrofitting the facilities.

Grantee: Kern County Council of Governments (COG)
Location: County of Kern
Amount of Grant: $45,838
Match: $5,771

Project Description

Kern County COG will undertake a study to identify geothermal resources and potential users within the rapidly growing Lake Isabella and Scovern Hot Springs areas. In addition, the study will examine the potential impacts of geothermal development in the Coso and Randsburg Known Geothermal Resource Areas. A technical advisory committee will be established to provide input into the planning process.

Grantee: Lake County
Location: Butts Canyon Road, Middleton, Lake County
Amount of Grant: $119,025
Match: $244,330

Project Description

Lake County will use these grant funds to buy asphalt to restore a 1.67 mile section of roadway damaged by geothermal waste disposal trucks operating at the Geysers. The county has absorbed all of the other costs of engineering, machinery, and labor.

Grantee: City of Santa Clara
Location: Southeastern portion of Plumas County and northeastern portion of Sierra County
Amount of Grant: $50,500
Match: $71,450

Project Description

The City of Santa Clara will assess the geothermal resources on land the city utility has purchased in Plumas and Sierra counties. After the resource areas have been identified, they will be investigated more fully, and temperature gradient wells will be drilled yielding more definitive resource data.

Grantee: City of El Paso de Robles
Location: County of San Luis Obispo
Amount of Grant: $34,900
Match: $11,910

Project Description

Paso Robles will study the feasibility of geothermal development in the city. The study will identify resources, their nature, and extent and determine the likely uses of the resources. In addition, the city will prepare an information transfer report and a plan for development in the area.

Grantee: Lake County
Location: Lake County
Amount of Grant: $50,000
Match: $40,000

Project Description

Lake County will use its grant funds to identify low-temperature resources and to catalog those located on county-owned land. To assist in the development of these resources, the county will identify potential users, prepare recommendations for overcoming institutional constraints, and provide a handbook on geothermal permitting procedures.

Grantee: Surprise Valley Joint Unified School District
Location: Fort Bidwell and Cedarville, Modoc County
Amount of Grant: $100,000
Match: $46,661

Project Description

Surprise Valley Joint Unified School District will use this grant to conduct resource assessment work at two sites: Fort Bidwell Indian Reservation and Cedarville. The development program at Fort Bidwell will determine whether or not a viable resource exists to undertake several direct use projects. The project at Cedarville School will assess the geothermal resources as a prelude to retrofitting the school's heating systems. The school district will conduct a parallel resource assessment program, using the same consultant for both sites.