

GEOTHERMAL ENERGY & ECONOMIC DEVELOPMENT



Whether they are used to generate electricity or for direct-use applications, geothermal energy projects contribute to the economy of areas where they are located. Geothermal power plant operations are often a major source of tax revenue to local governments. Royalties from development are another potential source of revenue for governments and tribes who lease their land to private developers. Using the heat of geothermal resources directly in commercial greenhouses or fish farming can help support a state's agricultural industry, even in areas that have poor farm land or where energy supplies are expensive or difficult to access. Geothermal resources are often located in remote areas and developing them usually provides an opportunity to improve rural economies. The extraction of valuable minerals from geothermal resources is beginning to provide additional economic benefits.

■ Jobs

Geothermal power plants are often located in rural areas, which typically have chronic, high unemployment rates. Building a 50 megawatt (MW) geothermal power plant may create several hundred temporary (from two to three years) construction and related development jobs and between 30 and 50 permanent, highly skilled full-time jobs at the facility that pay well above minimum wage. Considering the economic multiplier effect, this should provide approximately 90 to 150 new full-time jobs in the community. Because geothermal plants have long operating lifetimes, they can become a stable, reliable part of a community's economic base.

Lake County, California (population 64,000) and Sonoma County, California (population 464,000)

Power plants in these counties (five in Lake County and 16 in Sonoma County) employ approximately 425 people full time, of which two-thirds live in Lake County and one-third live in Sonoma County. An additional 225 full-time equivalent contractor work force supports ongoing projects at the Geysers Geothermal Field.

■ Property Tax

Geothermal power plants represent large capital investments in the counties in which they are constructed. The property taxes that the power plants generate can be significant, especially since many are located in more rural areas with an otherwise declining property tax base.

Imperial County, California (population 145,000)

The 10 geothermal power plants in Imperial County have an installed capacity of 330 MW. These plants, worth approximately \$1 billion, generate approximately \$10 million annually in property tax, which represents nearly 20 percent of the total property tax revenue for the county.

Inyo County, California (population 18,000)

Geothermal plants are the second largest taxpayer in Inyo County. The plant owners pay approximately \$6 million annually in property taxes on the three power plants in the county, of which roughly two-thirds are used to fund schools.

Lake County, California and Sonoma County, California

The 21 geothermal power plants at The Geysers Geothermal Field can generate almost 1,000 MW of electricity and have been an important source of tax revenue for Lake and Sonoma counties for many years. In 2003, property tax payments to the two counties totaled more than \$11 million.

■ Royalty Payments

Royalties are based on a percentage of a developer's revenues that come from using geothermal resources on leased land. These royalties could generate significant revenue for western states where substantial geothermal resources lie under federal, state or tribal lands. By 1997, geothermal power plant operators had paid a total of nearly \$500 million to the Federal Government in royalties. In 1999 alone, Nevada received \$2 million from its share of federal royalties from approximately 235 MW of geothermal electric generating capacity that provides 5.5 percent of the state's power. Under the provisions of the federal "Geothermal Steam Act", in states where the Federal Government collects geothermal royalties, it gives back half of the total to the state in which the resource is located. States are free to determine what percentage of their share they give to the county.

Royalties in Lake and Sonoma Counties of California

In 2003, operators at The Geysers Geothermal Field paid a total of \$6.15 million in royalties to the Federal Government for using geothermal resources it owns in California. The Geysers also paid \$4.1 million in lease fees to the State of California for using geothermal steam produced on state property. In California, some geothermal royalties are specifically directed to fund the California school-teacher's retirement fund. Moreover, the state uses its share of these royalties specifically to expand the use of geothermal energy through grants and loans for resource exploration, research and development, mitigation and planning.

Inyo County, California

The power plant located on land that the Bureau of Land Management owns provides royalty payments to the state and county, while the two on Navy land pay royalties to the Navy.

■ Direct Use

Using low temperature geothermal resources (between 70°F and 300°F) generates revenue and creates jobs for some states. For example, four commercial geothermal greenhouses in rural, southern New Mexico occupy more than 50 acres and at times have employed up to 400 people. In 2002, these projects generated nearly \$23 million in sales and paid more than \$6 million in payroll. A one million square-foot greenhouse in rural Utah employs between 80 and 120 people at different times throughout the year. These jobs pay nearly twice the minimum wage. Low temperature geothermal resources also support nearly 50 aquaculture operations (production and sale of farm raised aquatic plants and animals) in 11 western states and some southeastern states.

■ Mineral Extractions

Selling valuable minerals, such as zinc, silica and manganese, that are present in geothermal fluids can make power plants more profitable and provide another base of economic activity for communities. As extraction technology develops, it also may be possible to recover silica, manganese, lithium, silver, gold, and other valuable minerals from geothermal reservoirs. Many of these minerals currently are imported, and some are critical for high-technology industries. Given these factors, it is possible that geothermal resources could become significant sources for future mineral production.

■ Other Economic Benefits

Lake County, California and Sonoma County, California

Lake County is saving millions of dollars in disposal costs by piping treated wastewater (also known as reclaimed water) from the county into geothermal wells to create steam that the power plants use to generate electricity. The Lake County project, which began in 1997, currently uses approximately 8 million gallons of reclaimed water for this purpose each day; a similar project in Sonoma County injects about 11 million gallons per day. These projects not only solved a major disposal problem but allowed for significant new growth in the counties.