

## **Geothermal Basics - Economic Benefits**

Geothermal energy provides long-term answers to some of the most pressing issues in today's economy. Warning signs of climate distress and volatile fuel costs are leading people to question where their power comes from and how rising energy costs will affect their communities and businesses. Unlike coal and natural gas, geothermal incurs no hidden costs such as land degradation, high air emissions, forced extinction and destruction of animals and plants, and health impacts to humans. Since geothermal energy production is domestic, it helps offset involvement in foreign energy affairs.

A geothermal project will only provide the highest benefits to developers and customers if the economics have been thought through in advance. Like any investment, geothermal projects require an understanding of the risks, costs, and benefits. See section 7 for factors affecting the cost of a geothermal project.

6.1. How does geothermal energy benefit the U.S. economy?

6.2. Is geothermal market investment growing?

6.3. How does geothermal energy benefit local economies?

6.4. How does geothermal energy benefit developing countries?

6.1. How does geothermal energy benefit the U.S. economy?

Geothermal power is a low cost energy source that diversifies the fuel supply and benefits the transitioning power grid. It does not require purchase of fuel, and because it is a baseload resource, geothermal power is reliable, helping to stabilize prices. It is also dispatchable, or able to be ramped up or down quickly to make up for intermittency caused by wind or solar power. The average cost of geothermal plant over its lifetime is dramatically lower than that of traditional sources of power.

Geothermal energy is locally produced, reducing foreign oil imports and boosting rural economies through royalties and tax payments. A geothermal power project development will involve hundreds of individuals, employing local people full time as well as stimulating induced jobs.

### **6.2. Is geothermal market investment growing?**

A 2006 GEA estimate showed that for every dollar invested in geothermal energy, the resulting growth of output to the U.S. economy is \$2.50, or, a geothermal investment of \$400 million would result in a growth of output of \$1 billion for the entire U.S. economy. Renewable energy technology projects worldwide saw \$70.9 billion of new investments in 2006, and \$117.2 billion in 2007, according to a DOE assessment. "This is no longer just an interesting alternative, but a large scale transformation in global energy markets," DOE wrote.

Since that time, the capital represented by geothermal projects coming on line has increased substantially. With roughly 100 MW added annually in the U.S., and projects taking several years to construct, the capital investment in new U.S. geothermal projects would be in excess of \$10 billion.

The geothermal industry is supported by both public and private investments. In 2008, Google.org outspent the government at the time and was the largest private investor in geothermal, injecting \$11 million in advanced geothermal technology research and development.

Table 3 summarizes a 2006 WGA estimate that near-term geothermal development of approximately 5,600 MW would result in nearly \$85 billion dollars to the U.S. economy over 30 years. Potential also exists in Wyoming, Montana, Texas, Kansas, Nebraska, South Dakota, and North Dakota, but the resource in those states was not studied in the WGA report.

Table 3. Near-Term Geothermal Potential & Resulting Economic Contribution:

State	New Power Capacity (MW)	30-Year Economic Output (nominal)
California	2,400	\$36 billion
Nevada	1,500	\$22.5 billion
Oregon	380	\$5.7 billion
Washington	50	\$749 million
Alaska	25	\$375 million
Arizona	20	\$300 million
Colorado	20	\$300 million
Hawaii	70	\$1 billion
Idaho	860	\$12.9 billion
New Mexico	80	\$1.2 billion
Utah	230	\$3.4 billion
	Total 5,635 MW	\$84,410,046,000.00

Assuming an average capital cost of a geothermal project corresponding to \$4000/kW.U.S. Department of Energy “Geothermal Risk Mitigation”

The funding facilitated geothermal heat maps that can be accessed at Google Earth, <http://www.google.org/egs/>.

### **6.3. How does geothermal energy benefit local economies?**

Rural areas, where many of the geothermal resources that can be produced for energy consumption are located, can suffer from economic depression and high unemployment. Geothermal developers bring significant economic advantages such as jobs and tax payments. Many geothermal companies provide additional voluntary contributions to their neighbor communities.

In Imperial County, California, MidAmerican Renewables is the single largest taxpayer. Overall geothermal activities supply a full 25% of the county tax base, and over \$12 million in tax revenue. In Nevada, geothermal power plants pay sales and use tax, property tax, net proceeds of mine tax, modified business tax, bonus lease payments, royalties to the state and county, salaries and benefits to employees, and a range of local vendors for products and services.

Since enactment of the 2005 Geothermal Steam Act Amendments, 25% of revenues from geothermal leasing and production are allotted to state and local governments. In 2008, Nevada received \$7.5 million and put all of the money in a state fund that supports K-12 schools throughout the state. The same year, California received \$9.9 million and put 40% to the counties of origin; another 30% to the Renewable Resources Investment Fund; and 30% to the CEC for grants or loans to local jurisdictions or private entities.

Geothermal power plants can be a tourist draw when students, scientists, or interested individuals visit the site, thereby bringing business to the local community. Iceland's most popular tourist destination is the Blue Lagoon, a geothermal spa connected to the Svartsengi power plant in the island's southwest. As of August 2012, the Calpine Geysers Visitor Center in California had hosted more than 75,000 visitors from all 50 U.S. states and 79 countries since it opened in 2001.

**Photo: Blue Lagoon, Iceland, Draws Tourists to its Geothermal Hot Springs**



- GEA “A Handbook,” page 16
- MidAmerican Energy Holdings Company operates geothermal energy through MidAmerican Renewables (formerly CalEnergy U.S.).
- GEA “Why Support”
- GEA “Geothermal Revenue,” page 5
- GEA “A Handbook,” page 16
- MidAmerican Energy Holdings Company operates geothermal energy through MidAmerican Renewables (formerly CalEnergy U.S.).
- GEA “Why Support”
- GEA “Geothermal Revenue,” page 5

#### 6.4. How does geothermal energy benefit developing countries?

Kenya, Indonesia, and many Caribbean islands are some of the developing countries that stand to directly benefit from developing their abundant geothermal resources. Geothermal energy can provide answers to infrastructure needs while preserving the cleanliness of these regions.

Many developing countries are seeking energy and economic independence while learning from the lessons, both positive and negative, of the trade and subsidy practices employed by developed nations. Australia, China, Germany, Iceland, Italy, Japan, and the U.S. are some of the more developed countries that are facilitating geothermal development projects around the world. This support includes financing as well as technology sharing, training, and geological surveys.

Indonesia holds about 40% of the world’s known geothermal resources, but has developed very little of this. Since geothermal energy is developed locally rather than extracted and transported around the world, Indonesia could develop its geothermal resources for local use thereby freeing up its portable energy fuels—such as coal and natural gas—for higher mark-up export.

The East African Rift System is another of the world’s largest known geothermal reserves, and energy needs in Africa are a topic of international interest. Biomass production has led to unwanted deforestation, and droughts have made hydropower plants unreliable. Dependence on expensive, imported petro-products and diesel supplies has increased in recent years. The Rift System’s geothermal resources could provide an indigenous generation system with a predictable supply and price for remote locations.

GEA "International" 2010

Updated April 3, 2014 by L. Blodgett

Source: [http://geo-energy.org/geo\\_basics\\_benefits.aspx](http://geo-energy.org/geo_basics_benefits.aspx)