
The Economic, Environmental, and Social Benefits of Geothermal Use in Utah

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Geothermal water has been used in the “Beehive State” for hundreds of years. Before the first pioneers soothed aching bones in the plentiful hot water, Native Americans considered the hot springs sacred neutral zones.

Today, geothermal energy is used in Utah to generate kilowatts, grow roses and chrysanthemums, heat a prison, house nurse sharks, and soothe muscles. Geothermal benefits Utah in many ways.

Economic benefits

Geothermal businesses contribute to Utah’s economy by creating jobs, fostering commercial growth, paying taxes and, in some cases, paying royalties as well.

The Blundell Geothermal Power Plant and numerous geothermal small businesses across the state employ more than 350 Utahans. Using a multiplier of 2.5, geothermal energy creates more than 885



The Milgro Nurseries greenhouse near Newcastle (Photo: National Renewable Energy Laboratory)

direct, indirect, and induced jobs in Utah. The Milgro Nurseries in Newcastle is the largest geothermal business in Utah, and one of the largest geothermal greenhouses in the country. With 26 acres of covered greenhouses and another 200 acres in bare land, Milgro employs from 100 to 130 people. The average pay is above minimum wage.

Milgro Nurseries grow a huge selection of plants and flowers each year including 1.3 million chrysanthemums; 1 million Dutch bulbs (tulips, daffodils, hyacinths); half a million poinsettias; 300,000 calla lilies; and 25 million chrysanthemum cuttings. Milgro is the country’s largest producer of chrysanthemums, and has its own fleet of 18 long-haul tractor trailers based in St. George. Milgro finds the cost of doing business less in Utah than in California, where the company is also located.

The smaller Bluffdale Flowers employs about 15 people. Approximately 50 different varieties of flowers, over 40 different varieties of cut roses, a mango tree, and hot peppers are grown in 250,000 square feet of greenhouses. Bluffdale Flowers plans to double its greenhouse space.

Also in Bluffdale, geothermal water from Crystal Hot Springs heats the Utah State Correctional Facility. Oquirrh 4 was first heated by geothermal water in the early 1980s. In 2003, the State of Utah Department of Corrections contracted with Johnson Controls to re-establish the

geothermal building heat and culinary water system.

Geothermal water supplies space heat and culinary hot water for 332,665 square feet, including the medium-security cell block, prison furniture shop, sewing shop, and Special Service Dormitory. Completed in January 2006, the new geothermal system will save Utah taxpayers \$280,000 this year, and \$344,000 next year. Guaranteed savings are \$193,000 a year. Inmates work at nearby Hi-Tech Fisheries which uses thermal water from the prison's geothermal well to raise tropical fish for commercial sale.

Royalties are paid by the geothermal power plants. The 26-MWe Blundell Geothermal Power Plant, the first geothermal electric plant outside of California, pays about \$190,000 in royalties per year, or about \$4 million over the 21 years the plant has been operating. Prior to being closed in 2003, the 11-MWe Cove Fort I and II Geothermal Power Plants paid about \$25,000 a year in royalties; a total of \$325,000 while they generated electricity.

Draper-based Amp Resources purchased and closed the Cove Fort Power Plants in 2003. In December 2005, PacifiCorp signed a 20-year power purchase agreement to purchase the output of a new, 42-MWe geothermal electric generating plant to be built on the site. The plant should be online by the end of 2007. Raser Technologies, Inc. acquired Amp Resources and its geothermal assets in 2006.

A new 42-MWe geothermal power plant at Cove Fort would have significant economic benefits for Utah. During manufacturing and construction, approximately 270 direct person-year jobs would be created. Once built, the plant would employ roughly 30 people. An estimated investment of \$113

million in the plant would result in an output growth of \$283 million for the U.S. economy.

Environmental benefits

Geothermal energy prevents the emissions of greenhouse gases (GHG) and air pollutants, helping to keep Utah's air clean and its sky clear.



Because geothermal plants do not burn fuel, they have an inherent environmental advantage over power plants that do. Overall, geothermal energy is one of the cleanest power sources available today. (Photo: National Renewable Energy Laboratory)

The Blundell and Cove Fort geothermal power plants have offset over 3 million tons of carbon dioxide emissions that would have been generated by similar-sized fossil fuel plants. This is equivalent to 7 million barrels of oil. In addition, the plants annually offset the emission of 410 tons of nitrogen oxides and 447 tons of sulfur dioxides.

The business which use geothermal water for aquaculture, greenhouses, swimming pools, scuba diving, and space heating and hot water also prevent the emissions of air pollutants and GHG. If these businesses used electricity to generate the heat that geothermal water naturally contains, not only would most be unable to afford to stay in business, but they would emit 65,000 tons of carbon dioxide annually—the same as

about 137,000 barrels of oil. In addition, they would emit 120 tons of nitrogen oxides and 113 tons of sulfur dioxides each year into Utah's air. (See Tables 1 and 2.)

Social benefits

Social benefits are more difficult to measure quantitatively. One key social benefit from geothermal energy's use in Utah, however, is improved quality of life through recreation. Geothermal provides many unique recreational opportunities which tens of thousands of people enjoy each year.

Bonneville SeaBase in Grantsville is "Utah's inland sea for snorkelers and scuba divers." Four of the total 80 acres are water ponds; the largest is 62 feet deep. Heated by Grantsville Warm Springs which have a chemical composition close to seawater, the ponds are home to 100 tropical marine animals, including angel, damsel, grouper, grunt, hog, puffer, nurse shark, jacks, mollies, tang, triggers, and shrimp. Some 4,000 people dive and snorkel at SeaBase each year.

Over 30,000 people visit Camperworld in Garland each year to camp, swim, scuba dive, and golf. The owners have invested about \$2 million in the 300-acre property since 2003, and plan to invest more.

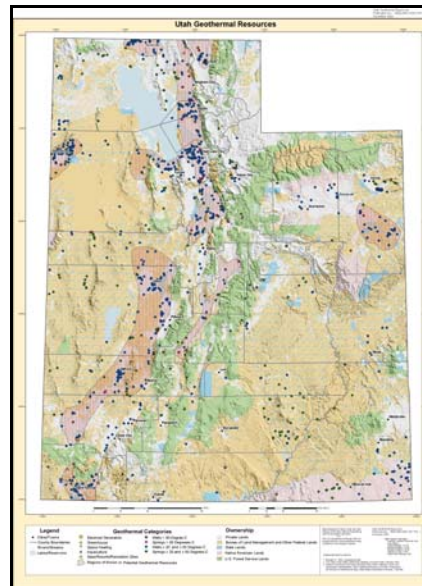
About 25,000 people annually visit Crystal Hot Springs Resort in Honeyville, which is open year-round and "no matter what." Mystic Hot Springs in Monroe has about 3,000 visitors a year. According to its owner, "Business is doing great!"

Homestead Resort and Spa in Midway is "Utah's original spa." Founded more than a century ago, the Homestead Resort is open all year. Visitors can scuba dive in the famous Homestead Crater.

Conclusion

According to a study done by the Utah Energy Office and Utah Geological Survey, Utah has about 70 sites with geothermal water hot enough to support common commercial businesses, and up to 200 sites that could use the geothermal water for direct uses.

The potential for geothermal to contribute to Utah economically, environmentally, and socially—even more than it already does—is substantial.



**Utah Geothermal Resource Map
(Idaho National Laboratory)**

Use	Name	Location County	Installed Capacity MWt	Annual Energy Use		Annual Emissions Offset (lbs)		
				Btu(t) billion	Equivalent kWh	Nitrogen oxides	Sulfur dioxide	Carbon dioxide
Greenhouses	Allan Plant Co.	Ogden Box Elder, Weber	0.66	4.9	1,436,048	2,810	2,272	1,334,119
Greenhouses	Bluffdale Flower Growers	Bluffdale Salt Lake	3.29	24.6	7,209,547	14,107	11,408	6,697,821
Scuba diving	Bonneville SeaBase	Grantsville Tooele	0.59	14.0	4,102,994	8,028	6,492	3,811,768
Space heating Swimming pool Scuba diving	Camperworld	Garland Box Elder	1.26	27.0	7,912,917	15,483	12,521	7,351,266
Greenhouses	Castlevally Greenhouses	Newcastle Iron	1.76	13.1	3,839,230	13,127	13,876	7,836,000
Swimming pool	Crystal Hot Springs	Honeyville Box Elder	1.03	21.4	6,271,719	12,272	9,924	5,826,559
Aquaculture	Crystal Springs Fisheries	Bluffdale Salt Lake	0.73	14.7	4,308,144	8,430	6,817	4,002,356
Aquaculture Space heating	Hi-Tech Fisheries	Bluffdale Salt Lake	1.68	32.6	9,554,115	18,695	15,118	8,875,974
Swimming pool Scuba diving	Homestead Resort and Spa	Midway Wasatch	1.18	26.4	7,737,074	15,139	12,243	7,187,904
Space heating	LDS Wardhouse	Newcastle Iron	0.04	0.2	58,614	200	212	119,633
Greenhouses	Milgro Nursery	Newcastle Iron	16.85	104.9	30,743,148	105,116	111,116	62,747,817
Swimming pool	Mountain Spa Resort	Midway Wasatch	1.03	4.6	1,348,127	2,638	2,133	1,252,438
Swimming pool	Mystic Hot Springs	Monroe Sevier	0.29	7.8	2,285,954	4,473	3,617	2,123,699
Swimming pool	Saratoga HOA	Lehi Utah	0.32	7.7	2,256,647	4,416	3,571	2,096,473
Space heating	Utah State Prison	Bluffdale Salt Lake	2.05	15.3	4,483,986	8,774	7,095	4,165,717
Swimming pool	Veyo Hot Springs	Veyo Washington	0.29	7.0	2,051,497	7,014	7,415	4,187,176
TOTAL			33.05	326.2	95,599,760	240,722	225,830	129,616,720

Table 1 — Annual energy use and emissions offset by direct-use applications in Utah. (Installed capacity and Annual Energy Use (Btu) from *GHC Bulletin*, December 2004, p. 7).

Name	Location County	Installed Capacity MWe	Annual Energy produced MWh	Annual Energy produced kWh	Annual Emissions Offset (lbs)			Years online	Total Carbon dioxide offset (tons)
					Nitrogen oxides	Sulfur dioxide	Carbon dioxide		
Blundell Power Plant	Milford Beaver	26	216,372	216,372,000	423,377	342,383	201,014,139	21	2,110,648
Cove Fort I and II <i>Closed 2003</i>	Cove Fort Beaver, Millard	11	91,542	91,542,000	397,353	552,535	183,479,429	13	1,192,616
TOTAL			307,914	307,914,000	820,730	894,918	384,493,568		3,303,265

Table 2 — Annual energy use and emissions offset by geothermal power plants in Utah.
(Assumes 95 percent capacity factor.)