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## Geothermal Basics - Employment

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### 9.1. What types of jobs are created by the geothermal sector, and how long will they last?

According to an employment study, an overwhelming majority of geothermal jobs (86%) are full time, permanent positions. Geothermal provides quality wages to people living in depressed economic communities and provides a stable source of employment.

Geothermal provides long-term income for people with a diversity of job skills. People directly employed by the sector include welders, mechanics, pipe fitters, plumbers, machinists, electricians, carpenters, construction and drilling equipment operators and excavators, surveyors, architects and designers, geologists, hydrologists, electrical, mechanical, and structural engineers, HVAC technicians, food processing specialists, aquaculture and horticulture specialists, resort managers, spa developers, researchers, and government employees. (1)

### 9.2. How many people currently work in the U.S. geothermal industry?

In answering this question, most organizations focus upon the total number of direct and indirect jobs created by their industry. For geothermal, direct jobs relate to the construction and maintenance of geothermal power plants, while indirect jobs provide goods and services to the industries directly involved in power plant construction or operation and maintenance. The number of indirect jobs within a particular sector is largely theoretical, and changes according to the preferred method of analysis. So while indirect impacts should certainly be considered—any investment in a particular sector of the economy will impact other sectors—it is also important to distinguish between these two types of employment impacts.

According to an employment survey conducted by Geothermal Energy Association (GEA), the total number of jobs supported by the existing geothermal industry in 2004 was 11,460. This includes direct, indirect, and induced employment. (2) Power plant or direct employment was estimated to be 4,583 full-time positions. This corresponds to 1.7 permanent jobs per megawatt of capacity installed. As the report notes, "Employment in the industry is probably at a historic low since power plant construction has been minimal between 1993 and 2004 as state and federal policies underwent significant changes. Also, because federal research support is at a historically low level, associated research employment is low."

Based upon our 2004 analysis, GEA estimates that the geothermal industry directly employed about 25,000 people in 2008. This is roughly 9,000 direct jobs in operating, construction and manufacturing and an additional 16,000 indirect and supporting jobs. (3)

### 9.3. How many jobs will be supported by the geothermal industry in the future?

Many new projects are under development and will likely come on line within the next few years, which will significantly expand geothermal employment. According to a report by the Western Governors Association (WGA), development of near-term geothermal potential of 5,600 MW of geothermal energy would result in the creation of almost 100,000 jobs. The chart below summarizes that estimate of geothermal employment potential.

**Table 2: Summary of Western States' Near-Term Geothermal Potential and Resulting Employment and Economic Contribution**

	New Power Capacity (MWs)	Direct and Indirect and Induced Employment	30 Year Economic Output (nominal) +
		<b>(Power Plant Jobs/Construction &amp; Manufacturing Employment)**</b>	
California	2,400	10,200 ft jobs/38,400 person*yrs	\$36 billion
Nevada	1,500	6,375 ft jobs/24,000 person*yrs	\$22.5 billion
Oregon	380	1,615 ft jobs/6,080 person*yrs	\$5.7 billion
Washington	50	212 ft jobs/800 person*yrs	\$749 million
Alaska	25	106 ft jobs/400 person*yrs	\$375 million
Arizona	20	85 ft jobs/320 person*yrs	\$300 million
Colorado	20	85 ft jobs/320 person*yrs	\$300 million
Hawaii	70	298 ft jobs/1,120 person*yrs	\$1 billion
Idaho	860	3,655 ft jobs/13,760 person*yrs	\$12.9 billion
New Mexico	80	340 ft jobs/1,280 person*yrs	\$1.2 billion
Utah	230	978 ft jobs/3,680 person*yrs	\$3.4 billion
Wyoming ,	Potential Exists;	Not Studied	Not Studied
Montana ,	Resource not		
Texas , Kansas ,	studied in WGA		
Nebraska , South	Report		
Dakota , North			
Dakota			
<b>Total Western States</b>	<b>5,635 MW</b>	<b>23,949 fulltime jobs/90,160 person*years of construction and manufacturing employment</b>	<b>84,410,046,000.00</b>

(additional to current)

**Almost 85 billion dollars to the U.S. economy over 30 years**

\*\* Power plant jobs are the direct, indirect and induced full-time jobs (ft jobs) created by reaching the full power production capacity indicated. Construction and manufacturing jobs are the direct, indirect and induced jobs necessary to build and supply the power plants at the full power

capacity indicated. Construction and manufacturing jobs are expressed as full-time positions for one year (person\*years), however these jobs will be spread out over several years depending upon the development time frame for new projects. Direct employment results in 1.7 full time positions and 6.4 person\*years per megawatt. Induced and indirect impacts were calculated assuming a 2.5% multiplier; for a total direct, indirect, and induced employment impact of 4.25 full time positions and 16 person\*years per megawatt.

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