Geothermal Energy: Putting Creative Ideas to Work

Rapid expansion of U.S. geothermal capacity is opening new job opportunities across the nation. With more than 3,000 megawatts (MW) already installed, the United States leads the world in existing geothermal capacity. The additional resources currently under development will more than triple that installed geothermal capacity for electric power. These new facilities will support thousands of jobs in manufacturing, construction, and power plant operations and maintenance.[1] Since 2009, the industry has seen an estimated 26% surge in domestic geothermal projects.[2] This substantial growth will require an educated and trained workforce to locate new geothermal resources, create new reservoirs, and build and administer the power plants.

Creating high-paying, long-term jobs is one of the most obvious economic benefits of geothermal energy development. According to Calpine Corporation—a leader in U.S. geothermal power production—construction of a typical 50-MW geothermal plant involves 160 people and 33 months of labor. The Geothermal Energy Association (GEA) estimates that in 2008 the geothermal industry accounted for roughly 25,000 jobs—with 9,000 in operations, construction, and manufacturing and an additional 16,000 in supporting positions.[3]

[1] *Geothermal Energy Association* (April 2010).

[2] Geothermal Energy Association (GEA).

[3] Jobs in the geothermal heat pump industry are not included in these figures.

Photo courtesy of J. Galbraith, GRC

New growth is occurring across the geothermal power industry, which taps the heat within the earth.

Innovation Across the Nation

Geothermal energy technologies rely on tapping the heat within the earth itself. The entire geothermal power industry is experiencing new growth as it becomes a major contributor to the nation's baseload renewable energy portfolio. Development of geothermal power plants and direct-use applications create a wide variety of jobs and stimulate economic activities in many other areas. Improving the delivery of geothermal energy involves discovering geothermal resources and adapting or updating existing technologies and research initiatives for application in today's environment.

> *"Along with a huge number of new construction jobs, geothermal power also creates many permanent positions that can never be outsourced."*
>
> **— Geothermal Energy Association**

Diverse Professional Opportunities

Improving geothermal energy delivery provides opportunities for many professionals to flex their creative problem-solving skills:

- Mechanical equipment and primary metal suppliers make casings for geothermal well shafts, drilling equipment, power plant equipment and controls, pumps, and transport or light-construction equipment (e.g., loaders, tractors, and trucks).
- General consultants and contractors search for geothermal resources and prepare simulations of resource availability and economic analysis so that developers can obtain financing.
- Drilling and well services firms use resource management, geosciences, and stabilization technology and expertise.

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Photo courtesy of Naknek Electric Association, Inc.

Trained geothermal worker operates the tugger line. Geothermal power plants are built where the resource is located, providing long-term jobs, stability, and tax revenue to benefit local economies.

- Environmental services firms manage paperwork, permitting, well testing, water testing, air sampling, and other tasks required for regulatory approvals.
- Geothermal developers—under contract to a utility, government, or other entity to develop a project—oversee all facets of development, from construction site security and safety to turnkey requirements.
- Power plant ownership and operations firms may be electric utilities or independent power producers, which require trained and certified power plant operators and maintenance staff.

Geothermal Websites

U.S. Department of Energy
Geothermal Technologies Program
www.eere.energy.gov/geothermal

International Energy Agency (IEA)
Geothermal Implementing Agreement
www.iea-gia.org

Geothermal Energy Association (GEA)
www.geo-energy.org

Geothermal Resource Council (GRC)
www.geothermal.org

American Geological Institute
www.agiweb.org

U.S. Geological Survey (USGS)
www.usgs.gov

Geothermal Education Office
geothermal.marin.org

U.S. Department of Energy's Geothermal Technologies Program

The U.S. Department of Energy's Geothermal Technologies Program (GTP) conducts research, promotes development, and builds partnerships to establish geothermal energy as a significant contributor to America's future electricity generation.

University Curriculum Development

GTP supports programs that stimulate student interest in geothermal energy as a career path. New programs for university undergraduates and graduate students are encouraging further expansion of teaching and training capabilities to equip the next generation of the U.S. geothermal workforce with both academic and practical experience. The University of Nevada-Reno (UNR), for example, conducts a program in geothermal science and technology. Several other programs in higher education have partnered with UNR, including the Oregon Institute of Technology, Southern Methodist University, Stanford University, the University of Utah, and Cornell University. The common goal is to ensure that students gain access to the education and training they need to qualify for jobs in the geothermal energy field.

Geothermal power plants have a small environmental footprint, the ability to produce energy consistently around the clock, and emit little or no greenhouse gas.

Jobs in Geothermal Development: A Broad Spectrum

Physical and Earth Sciences – Research and development in academia, industry, and the national laboratories

- Chemists
- Geologists
- Hydrologists
- Physicists

Field Work and Operations

- Carpenters
- Construction workers
- Designers
- Drilling equipment operators
- Electricians
- Engineers (electrical, mechanical, and structural)
- Excavators
- Machinists
- Mechanics
- Pipe Fitters
- Plumbers
- Surveyors
- Welders

Sales and Finance

- Accountants
- Attorneys
- Computer technicians
- Developers
- Entrepreneurs
- Financiers
- Investors
- Suppliers

Policy and Permitting

- Environmental consultants
- Land leasing specialists
- Land surveyors

U.S. DEPARTMENT OF
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EERE Information Center
1-877-EERE-INF (1-877-337-3463)
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