Geothermal Energy Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

Market Report | 2023-01-23 | 125 pages | Mordor Intelligence

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Report description:

The geothermal energy market is expected to register a CAGR of more than 4.5% during the forecast period of 2022-2027. The outbreak of the COVID-19 pandemic had significantly impacted the geothermal energy market due to disruptions in the international supply chain and a reduction in investment for upcoming projects. Although annual capacity additions correspond to the driven market, some projects were delayed due to COVID-19-related lockdown measures. For example, in Europe, Bolivia's state power company Ende suspended its consultancy procurement call for the 100 MW Laguna Colorada geothermal project as a result of the COVID-19 pandemic in 2020. Increasing electricity security concerns due to clean and eco-friendly resources are driving the growth of the geothermal energy market. In addition, increasing demand for heating and cooling systems, including ground source heat pumps and district heating, are estimated to fuel the growth of the geothermal energy market. However, the lucrative market for alternative clean energy sources like solar and wind is likely to hinder the market growth during the forecast period.

The binary cycle power plants segment is likely to witness significant demand, as they can be operated at low-temperature reservoirs (200□F to 330□F).

Government-undertaken initiatives such as financial benefits and tax refunds to promote sustainable energy production are estimated to generate numerous growth opportunities for the geothermal energy market over the upcoming years.

North America is expected to be the largest market during the forecast period, with the majority of the demand coming from countries like the United States, Mexico, etc.

Geothermal Energy Market Trends

The Binary Cycle Power Plants Segment is Expected to Witness Significant Growth

In binary cycle power plants, the water or steam below the earth never comes in direct contact with the turbines. Instead, water from geothermal reservoirs is pumped through a heat exchanger where it heats a second liquid-like isobutene (which boils at a lower temperature than water).

This second liquid is heated into steam, which powers the turbines that drive a generator. The hot water from the earth is recycled into the earth through the injection well, and the second liquid is recycled through the turbine and back into the heat exchanger where it can be used again.

Moreover, out of 2,558 MW of geothermal power plant capacity operating in the United States,1,826 MW capacity is from steam-powered plants, and 731 MW of capacity is from binary cycle powered plants. However, according to the United States Energy Information Administration (EIA), in August 2020, geothermal power technology was shifted from steam to binary cycle. The reason for the shift from steam to binary-cycle power may be a matter of flexibility.

As of 2020, the United States has 93 binary-cycle generators averaging 8 MW of capacity each and 79 steam generators averaging 23 MW each. Dry-steam and flash plants, which require rarer, high-temperature, shallow reservoirs, produce higher power output and are more economically efficient than binary plants. However, because binary plants can operate at reservoirs with lower temperatures, they offer more options for suitable locations.

Many new installations have been announced in recent years, which may support the growth of the market during the forecast period. For example, in February 2021, Turboden SpA, a group company of Mitsubishi Heavy Industries Ltd (MHI) and Mitsubishi Power Ltd, jointly announced that it had received an order for 29-megawatt (MW) binary cycle power generation equipment to be installed at the geothermal power plant operated in Palayan, in the Philippines, by Energy Development Corporation (EDC).

Similarly, in 2020, a binary cycle power generation system for ships, jointly researched by Japanese shipping company Mitsui O.S.K. Lines (MOL) and compatriot steel manufacturer Kobe Steel, was installed on a very large ore carrier (VLOC) newbuild. The project is said to be a key element of "NEXT -MOL SMART SHIP PROJECT".

Therefore, based on the above-mentioned factors and recent developments, the binary cycle power plants segment is expected to witness significant growth during the forecast period.

North America is Expected to Dominate the Market

North America is one of the leading markets for geothermal energy across the world, with the United States leading the regional and global market in terms of installed capacity. In 2020, geothermal power plants produced about 17 billion kilowatt-hours (kWh), equal to 0.4% of the total US utility-scale electricity generation.

Most of the geothermal power plants in the United States are in western states and the island state of Hawaii, where geothermal energy resources are close to the Earth's surface. California generates the most electricity from geothermal energy, whereas the Geysers dry steam reservoir in Northern California is the largest known dry steam field in the world.

According to the Energy Information Administration (EIA), as of 2020, California has 91% of the country's steam-powered capacity, and 65% of binary-cycle capacity is found in Nevada.

Geothermal power is generated primarily in California and Nevada. For example, in 2020, 11,345 gigawatt-hours (GWh) of

electricity was generated from geothermal power in California. On the other hand, Nevada had 235 MWe gross (196 MWe net) installed capacity in 2020. The remaining geothermal energy in the country comes from power plants in Alaska, Hawaii, Idaho, New Mexico, Oregon, and Utah.

Moreover, new projects are also planned in the region, which is expected to support the region's market growth. For example, in March 2021, Canada's Minister of Natural Resources announced USD 40.5 million of investment for the Clarke Lake Geothermal Development Project. The project is likely to develop one of the first commercially viable geothermal electricity production facilities in Canada.

Therefore, based on the above-mentioned factors, North America is expected to dominate the geothermal energy market during the forecast period.

Geothermal Energy Market Competitor Analysis

The geothermal energy market is moderately fragmented. Some of the major players include Mitsubishi Power Ltd, Ormat Technologies Inc., Engie SA, Tetra Tech Inc., and First Gen Corporation, among others.

Additional Benefits:

The market estimate (ME) sheet in Excel format
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Table of Contents:

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