

Sector Case Study: Geothermal Energy

The United States is the world's leading geothermal market with a supply chain of manufacturers and service providers ready and able to export their products and expertise around the world. Unfortunately, growth in the geothermal sector globally remains limited compared to other renewable energy subsectors, with most export opportunities tied to post-2015 projects. In the near-term, ITA expects ineffective policy regimes and poor market conditions to allow only a handful of projects to move through development and ultimately to commission. Exporters are encouraged to position themselves now for opportunities in the future by introducing their technology or services to local procurement officials or development firms.

No country produces as much geothermal energy as the United States. Installed capacity reached 3.4 GW domestically in 2012, nearly thirty percent of all geothermal capacity installed globally.

Yet geothermal export opportunities have traditionally been limited by the lack of development occurring in foreign markets. Nevertheless, at the end of 2013, the Geothermal Energy Association had identified 70 countries that were advancing nearly 700 new geothermal projects. In 2007, a similar report found that only 46 countries were actively developing geothermal projects.¹ As new technologies are brought to market that provide opportunities to produce geothermal energy in locations previously unavailable to the industry, growth should continue into the future.

Overview of Global Export Market Opportunities

The geothermal industry is reliant on the availability of naturally occurring geothermal reservoirs and, as such, has thus far been limited to markets near tectonic fault lines. The top five markets in terms of installed geothermal capacity – the United States, the Philippines, Indonesia, Mexico, and New Zealand – all exist along the so-called “ring of fire.” These countries collectively account for over two-thirds of the world's total installed geothermal capacity, which reached 11.4 GW in 2013.

Bloomberg New Energy Finance projects that total installed capacity globally will increase only 1.5 GW over the next two years.² However, near term capacity additions do not generally reflect export opportunities, because of the long project cycle for geothermal power

plants. Procurement decisions are typically made about three years in advance of the project's expected completion date. Fortunately, the global pipeline of announced projects includes 13.2 GW – a pipeline that exceeds the entirety of global capacity currently online. The increased capacity is expected to come from more than 300 different projects that should come online in

Top Geothermal Export Markets to 2015

- 1. Kenya**
(large share; large market)
- 2. New Zealand**
(small share; large market)
- 3. Turkey**
(large share; large market)
- 4. Indonesia**
(small share; large market)
- 5. Japan**
(small share; large market)
- 6. Philippines**
(small share; large market)
- 7. Chile**
(large share; small market)
- 8. Ethiopia**
(small share; small market)
- 9. El Salvador**
(large share; small market)
- 10. Iceland**
(small share; large market)

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the medium-term, creating important export opportunities for American firms in the near-term.

Most of this development will occur around 2020 when policy and regulatory frameworks being developed now begin to materialize into completed geothermal power plants. Indonesia is expected to account for the most geothermal capacity growth with 3.2 GW of capacity currently under development. The Philippines, Kenya, and Chile are expected to account for a further 2.5 GW of development³ – although Chile has yet to bring any capacity online so future development is relatively uncertain.

Importantly, unlike other sectors where project development is both quicker and more consistent, many announced geothermal projects never reach completion. Instead, projects are often neglected out of resource concerns, a lack of policy support, or development opportunities that occur elsewhere. *Bloomberg New Energy Finance* notes that less than half of the capacity planned to be brought online between 2015 and 2017 will likely never be fully commissioned.⁴

The Geothermal Energy Export Opportunity in the Near-Term

The United States enjoys a strong competitive position within the global geothermal market. U.S. companies enjoy significant market share both in terms of development and component part shipments. Unfortunately, global investment in geothermal projects is expected to be less than one percent of total renewable energy investment through 2015.

According to ITA's analysis, Kenya, New Zealand, Turkey, Indonesia, Japan, the Philippines, Chile, and Ethiopia will account for over 90 percent of all geothermal exports through 2015. Kenya alone will likely account for over half of all geothermal exports – a fact supported by anecdotal evidence and the growing list of planned geothermal projects in the country. Unlike other markets where geothermal projects can be difficult to finance, projects in Kenya appear to enjoy an easier time attracting investors and thus move quicker through the development cycle.

U.S. exporters may also find short-term export opportunities exporting geothermal heat pump technologies. While not considered directly in the *Top Markets* analysis, demand for geothermal heat pumps

appears to be increasing globally with U.S. companies enjoying significant market share.

Planning for the Long-Term

Over the next two decades growth in the global geothermal market should accelerate, as power demands continue to increase worldwide and the cost of geothermal production becomes more attractive. *Bloomberg New Energy Finance* expects online geothermal capacity to double over the next 17 years with 610 to 950 MW of new capacity added worldwide every year.⁵

ITA expects the trend of most new projects utilizing “flash” technologies will continue. Most projects currently under development are greenfield projects at a site that is yet to confirm the expected resource via full diameter deep drilling (the industry standard), but drilling has commenced at those sites that are expected to be “high-grade flash” resources.

This may ultimately limit component exports, as Japanese firms continue to dominate this market segment. However, ITA expects considerable export opportunities to develop for U.S. geothermal service companies – something in which the United States already excels.

As investment continues to flow into the natural gas drilling market, the skills and companies that develop should be well positioned to provide geothermal services to projects overseas – as the skill set for both industries is similar. Deploying geothermal drilling rigs in foreign markets, however, is decidedly difficult. For example, according to industry reports, a rig from the United States arriving in Chile must enter the country dismantled, packed in 70 different shipping containers.⁶ Such practices add costs and limit the likelihood that developers will utilize U.S.-based providers if there is a local rig ready to assist in a drilling effort.

Most geothermal drilling contracts lease the equipment that is used in the resource assessment. OPIC's announcement in the Renewable Energy and Energy Efficiency Export Initiative that it would support the leasing of U.S. renewable energy equipment is therefore of critical importance to the long-term export potential of the geothermal industry. For more information on OPIC's financing options, visit <http://www.opic.gov/what-we-offer/financial-products>.

2014 Renewable Energy Top Markets Report



This *Top Markets* case study is part of a larger report that includes rankings of 75 different markets in terms of overall U.S. renewable energy exports through 2015, as well as specific rankings for the ethanol, geothermal, hydropower, biomass pellets, solar and wind sectors. To access the full report, visit <http://export.gov/reee/topmarkets>.

¹ http://www.geo-energy.org/pressReleases/2013/GEA_2013_Expanding_Global_Growth.aspx

² *Bloomberg New Energy Finance*, "Q2 2013 Geothermal Market Outlook" (27 June 2013) pp. 12

³ *Bloomberg New Energy Finance*, "Q2 2013 Geothermal Market Outlook" (27 June 2013) pp. 4

⁴ *Bloomberg New Energy Finance*, "Q2 2013 Geothermal Market Outlook" (27 June 2013) pp. 3

⁵ *Bloomberg New Energy Finance*, "Q2 2013 Geothermal Market Outlook" (27 June 2013) pp. 2

⁶ *Bloomberg New Energy Finance*, "Q2 2013 Geothermal Market Outlook" (27 June 2013) pp. 9

About the Office of Energy and Environmental Industries

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