Presentation for the Renewable Energy and Energy Efficiency Advisory Committee

Overview of the International Geothermal Market and US Export Development Opportunities

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Introduction: Overview of the Internaitonal market

(For addition details, see *Geothermal Energy:International Market Update, May 2010,* available at: http://geo-energy.org/reports.aspx)

Both the number of countries producing geothermal power and the total worldwide geothermal power capacity under development appear to be increasing significantly.

In 2005, there were 8,933 MW of installed power capacity in 24 countries, generating 55,709 GWh per year of green power, according to the International Geothermal Association. IGA reports in 2010 that 10,715 MW is online generating 67,246 GWh. This represents a 20% increase in geothermal power online between 2005 and 2010. IGA projects this will grow to 18,500 MW by 2015, which based upon the large number of projects under consideration appears reasonable if not conservative.

According to IGA, the countries with the greatest increase in installed capacity (MW) between 2005 and 2010 were: 1) US - 530 MW, 2) Indonesia - 400 MW, 3) Iceland - 373 MW, 4) New Zealand - 193 MW, and 5) Turkey - 62 MW. In terms of the percentage increase the top five countries were 1) Germany - 2,774%, 2) Papua-New Guinea - 833%, 3) Australia - 633%, 4) Turkey - 308%, and 5) Iceland - 184%

While power online grew 20% between 2005 and 2010, countries with projects under development grew at a much faster pace. GEA reported in 2007 there were 46 countries considering geothermal power development. In 2010, GEA identified 70 countries with projects under development or active consideration, a 52% increase since 2007.

Projects under development grew the most dramatically in two regions of the world, Europe and Africa. Ten countries in Europe were listed as having geothermal projects under development in 2007, and in 2010 this has more than doubled to 24. Six countries in Africa were identified in 2007, and in 2010 eleven are found to be actively considering geothermal power. It would appear that efforts such as ARGeo and the European Bank for Reconstruction and Development's geothermal initiatives are having considerable beneficial effect.

Despite these growth trends, however, the potential of geothermal resources to provide clean energy appears to be under-realized. In 1999, GEA prepared a report that examined geothermal power potential internationally. The results of this report show that in the vast majority of countries the estimated potential remains undeveloped and largely untapped, even assuming the lowest projections for geothermal resource potential. Moreover, the number of countries with geothermal power potential that are not developing their resources is still high. In fact, of the 39 countries identified in 1999 as having the potential to meet 100% of their electricity needs through domestic geothermal resources, significant power production had been developed in only nine -- Costa Rica, El Salvador, Guatemala, Iceland, Indonesia, Kenya, Nicaragua, Papua New Guinea, and the Philippines. However, this report identified projects under consideration in another 14 of these countries.

The underlying trend of the expansion of geothermal power is complemented by the development of projects in entirely new areas. It is interesting to note that there are 24 countries identified with geothermal power projects under development that were not included in the GEA 1999 study. Most of these countries are in Europe and are accessing resources due to new technology developments that allow development of lower temperature resources. In addition, EGS technologies, or enhanced geothermal systems, are being developed in a number of countries including Australia, France, Germany, the United Kingdom and the US.

The trends in both the number of new countries developing geothermal energy and the total of new megawatts of power capacity under development appear to continue a growth trend showing a clear reverse from slowdowns in international markets seen in the late 1990s. Buttressed by the development of low-temperature power and EGS technologies, the geothermal market appears to be expanding to encompass most of the world's nations.

This report finds that both national and international policy and financial support are key in achieving the potential of successful geothermal development.

Key Export Markets and the Leading Goods and Services to Export

Last year, GEA conducted a survey of its members regarding exports and export markets for its internal planning purposes. Roughly 40% of GEA member companies indicated they were already involved in the export market, and all of those companies plus others indicated an interest in expanding their role in exports.

The companies were asked which countries/regions they expected to be the best markets for geothermal goods/services. The leading areas in the response were, ranked from highest response:

1. South America

2a. Central America

2b. Indonesia (tied with 2a)

3. New Zealand

4. Mexico

5a. The Philippines

5b. Southeast Asia (tied with 5a)

For each of the areas identified above, 50% or more of the companies responding expressed interest in that export market.

When asked about which areas of geothermal technologies were best opportunities, the leading response was overwhelmingly "utility scale geothermal power," with over 90% of respondents noting their involvement and interest in this sector. The top responses, with percent responding, were:

1. utility scale geothermal power, 92%

2. combined heat and power, 42%

3a. oil field co-production of geothermal power, 38%

3b. local/village energy and/or power, 38%

4a. enhanced geothermal systems, 35%

4b. small/low-temperature power, 35%

The groups was also asked which goods/services they viewed as the best opportunities for US export development. There was a tie for the top ranking between turn-key development and power systems/turbines. The leading export opportunities from the survey were:

1a. turn-key development

1b. power systems/turbines (tied with 1a)

2. exploration/geologic services

3. drilling services

4a. drilling equipment

4b. project construction (tied with 4a)

Finally, companies were asked what they thought US government agencies could do best to help export efforts by geothermal companies. Most of the leading responses related to financial support, from incentives to loans. Specifically, the top five were:

1. tax breaks for export sales

2. loan guarantees for export projects

3. direct grants to support early market development

4. encouraging government support through country-country contact

5. engaging multilateral organizations to support US companies

Finally, an overwhelming 82% of respondents indicated their interest in working to support President Obama's National Export Initiative.