



# The Geothermal Energy Report

Direct Use and Power Generation



**Edition 6 2010**

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## **Published By**

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# The Geothermal Energy Report

Edition 6, 2010

## Introduction

2009 was a poor year for power generation from Geothermal Energy with only 405 MW of new installed electric capacity. Only ten projects were commissioned in the USA (181 MW), Indonesia (137 MW), Turkey (47 MW) and Italy (40 MW). Investment has been down due to the high capital costs for geothermal and high financial risks in the development stages. Growth in the USA was boosted by the American Reinvestment and Recovery Act of 2009 which extended producer and investor tax credits to 2016 and funded several development stage projects.

However, the sector is expected to grow rapidly in several countries over the next 5 years due to current and proposed incentives. It is expected that the market will grow by 78% from 10,711 MW at the end of 2009 to 19,016 MW in 2015. In terms of new capacity, growth markets will be the three biggest geothermal countries: the USA, the Philippines and Indonesia. Countries generating electricity from geothermal is expected to rise from 24 at the end of 2009 to 36 in 2015.

The geothermal market is composed of three sectors with different technologies. Geothermal energy can be harvested in two ways, *direct use* of hot water or steam from low enthalpy deposits for space heating or industrial use such as aquaculture, thermal baths and hot springs, and *indirect use* which transforms the energy in high and medium enthalpy deposits into electricity in geothermal power generation plants. A third category is the increasingly important sub-category of direct use, the **ground source heat pump (GSHP)**.

The geothermal market is expanding, although it has not escaped the effects of the financial crisis in the short term. Big ticket investment in renewable energy has been hit by the 2008 - 2010 global recession. Working off a low base, it might be argued that geothermal investment has not taken the same type of knock as, for example, wind power. However, the long list of projects at early stages in the United States which we include in this report suggests that the process of installing geothermal resource has at least slowed.

## Report Scope

The report describes the world-wide geothermal energy industry and its markets, and the technologies, in three segments; power generation, direct use and an increasingly important category, ground source heat pumps.

***The report contains extensive statistics about GSHP.***

- This report provides an excellent introduction and understanding of the three technologies for exploiting geothermal energy; power generation, GSHPs (ground source heat pumps), direct use (excluding GSHPs)
- It describes the industry's development and use of technology, power generation, efficiency and location of resources
- It provides an overview of geothermal energy, capacity and utilisation
- The geothermal power industry is reviewed looking at the power operators and equipment manufacturers
- Geothermal revenue and costs are analysed, including generation, construction and equipment costs

- The report looks at country use and development of geothermal energy with an analysis of the major market places - North America, Central America & Caribbean, Europe, Asia, Africa
- A listing of major geothermal manufacturers with address and telephone and fax numbers where available is provided at the end of the report
- A listing of major national targets and incentives is also provided at the end of the report.

The report highlights developments in the geothermal market and pinpoints regions which are developing geothermal capacity. Developments have been quite substantial in the last year, and these are outlined, including company changes. The report also contains extensive statistics about GSHP.

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## 6.5.2 Albania

### *Overview*

There are many thermal springs and wells of low-enthalpy in the country, with temperatures up to 65.5°C. Many abandoned oil and gas wells are being investigated for geothermal direct heat use. There are many possibilities for direct use, especially for hotel and spa heating to develop the tourist industry. Five locations are known to be using geothermal waters for bathing and balneology, with a combined installed capacity of 9.57 MWt and an annual energy use of 8.53 TJ. The 105 geothermal heat pumps in operation account for 1.914 MWt produce 31.93 TJ/year. This resulted in a combined capacity of 11.48 MWt producing 40.46 TJ/year of thermal energy per annum.

## 6.5.3 Austria

### *Geothermal power generation*

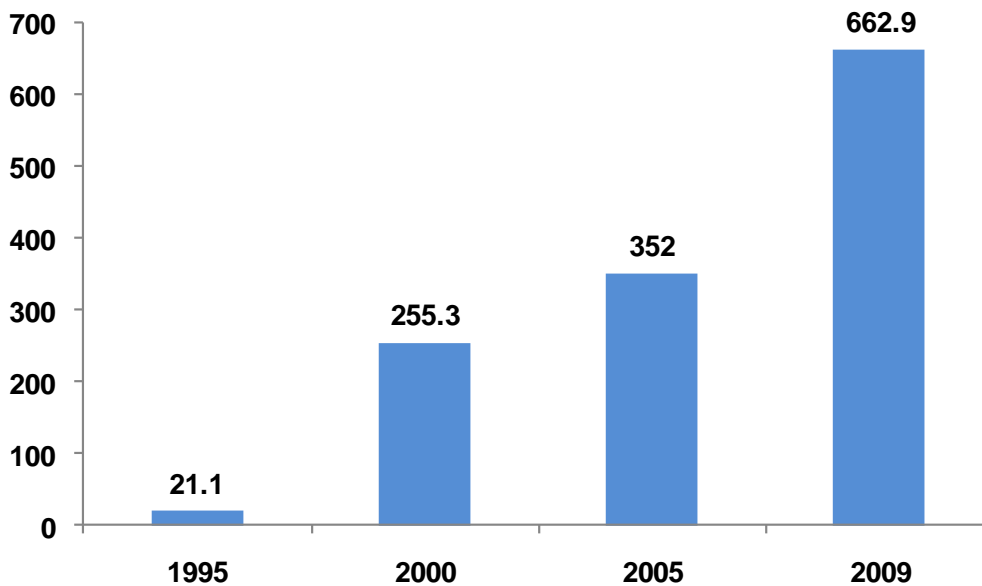
Austria currently has only 1.2 MW of power generating capacity, with two small binary plants installed in Altheim and Blumau. A cross-border project in Simbach/Braunau, with a 200 kW capacity was commissioned last year, increasing capacity to 1.4 MW. The Bad Blumau facility with 110 degree liquid is also exploited for heating a spa facility, and the Simbach/Braunau project produces 50 MW of heat. It is expected that 6 MW will be installed by 2015.

Research and development are active but are focused mainly on low temperature applications.

Austria has a RES-E (renewable energy sources – electricity) target of 78% of gross electricity consumption by 2010, of which geothermal power is a marginal player. However, the country's low feed-in tariff (EUR 0.073 per kWh) and lack of public support has stalled development. Only 7 new wells were drilled between 2005 and 2009, all for balcaneology and wellness.

### *Direct use*

Over the past 17 years, a total of 63 geothermal exploration wells were drilled in the country. A large number of the wells were intended for accessing thermal water for balneology (therapy, thermal spas, leisure resorts, hotels, etc). Drilling activities focused on the Styrian Basin in Southeast Austria and the Upper Austrian Molasse Basin in Northeast Austria.



**Figure 6.35.** *Development of Direct Use Geothermal Power (MW), Austria*

*Source; World Geothermal Congress and International Geothermal Association*

The installed capacity for direct utilisation is 662.85 MW producing 3,727.70 TJ/year of thermal energy. Of which, geothermal heat pumps are the main users followed by district heating (50.03 MWt and 602.4 TJ/year), then bathing and swimming (8.87 MWt and 185.0 TJ/year); then industrial process heat (2.15 MWt and 31.3 TJ/year); and greenhouse heating (1.80 MWt and 29.0 TJ/year).

Two district heating projects (Atlheim and Bad Blumau) receive cascaded water from low temperature binary power plants (105°C and 110°C). The largest district heating project in Central Europe is at Simbach-Braunau, which is a cross-border project between Austria and Germany having a capacity of 30 MWt, of which 9.3 MWt is geothermal.

In 2010, Austria, Slovakia, Slovenia and Hungary formed the TRANSENERGY project to map transboundary geothermal resources. Models of the geothermal resources will be used to assess the impacts of different extraction scenations.

**Ground-Source Heat Pumps (GSHP)**

36,847 GSHP were installed by the end of 2005, with 612 MWt of capacity. This increased to over 50,000 producing 800 GWh/year by the end of 2009. 17,894 HPs were sold in 2009, down from 18,690 in 2008.

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