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The GIA Trend Report,

an Annual Survey Report on Geothermal Applications and Developments

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& GIA Country Representatives

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International Energy Agency – Geothermal Implementing Agreement (IEA-GIA)
Annex X – Data Collection and Information

IEA-GIA

- International network operating under the auspices of the International Energy Agency (IEA)
- 14 member countries and three sponsors
- Tasks and goals:
  - Promote international cooperation in the field of geothermal utilization
  - Realize collaborative Research and Development Projects
  - Dissemination of information on geothermal energy
  - Outputs for decision makers, financiers, researchers and the general public

IEA-GIA Annexes

Implementation of work program in currently six Annexes:

- Annex I: Environmental Impacts of Geothermal Energy Development
- Annex VII: Advanced Geothermal Drilling and Logging Technologies
- Annex VIII: Direct Use of Geothermal Energy
- Annex X: Data Collection and Information
- Annex XI: Induced Seismicity
- Annex XII: Deep Roots of Volcanic Geothermal Systems

Annex X – Date Collection and Information

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- Annex I: Environmental Impacts of Geothermal Energy Development
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- **Annex X: Data Collection and Information**
- Annex XI: Induced Seismicity
- Annex XII: Deep Roots of Volcanic Geothermal Systems

IEA-GIA Data Collection Activities

→ collect data on geothermal energy uses in GIA countries

→ publication of annual report (web, hardcopy)

→ data trends (power and heat) + relevant political/ econo-mic information

Request Information →

Home > Work Program > Annex X

Annex X- Data Collection and Information

Operating Agents: Leibniz Institute for Applied Geophysics (LIAG), Germany; and the Federal Office of Energy (BFE), Switzerland

Annex Leader: Josef Weber, Leibniz Institute for Applied Geophysics (LIAG), Germany

Status: Ongoing

Participants: Mandatory participation of all GIA Country Members

Description

The main objective of Annex X is to collect essential data on geothermal energy uses, trends and developments in GIA Member Countries and to publish these data in an annual reports available as hardcopy and on the GIA website for wide public distribution. This report will provide a brief overview of data trends such as installed capacities and produced electricity and heat, as well as relevant political and economic information. All Country Members are required to participate in this Annex, and all Sponsor members support this effort by providing supplementary material. There are plans to extend the data collection to non-GIA Member Countries, with emphasis on the remaining leading geothermal nations.

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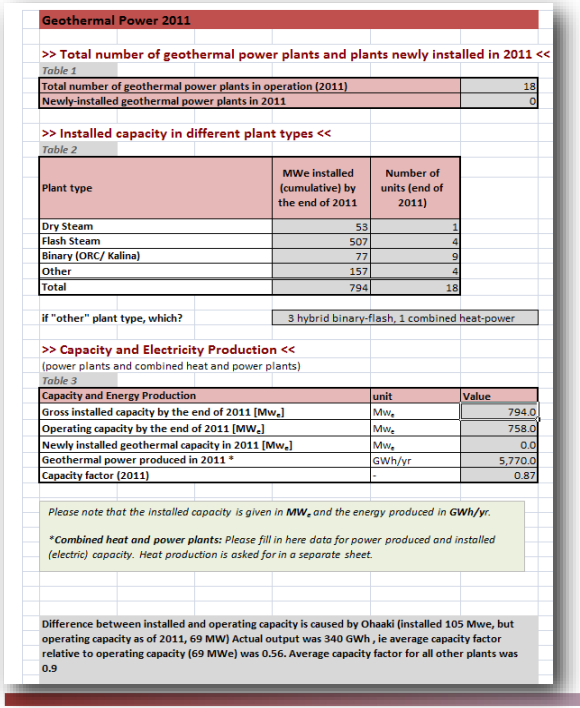
IEA-GIA Data Collection Activities

POWER



Geothermal Power 2011

>> Total number of geothermal power plants and plants newly installed in 2011 <<

Table 1

Total number of geothermal power plants in operation (2011)	18
Newly-installed geothermal power plants in 2011	0

>> Installed capacity in different plant types <<

Table 2

Plant type	MWe installed (cumulative) by the end of 2011	Number of units (end of 2011)
Dry Steam	53	1
Flash Steam	507	4
Binary (ORC/ Kalina)	77	9
Other	157	4
Total	794	18

if "other" plant type, which? 3 hybrid binary-flash, 1 combined heat-power

>> Capacity and Electricity Production <<

(power plants and combined heat and power plants)

Table 3

Capacity and Energy Production	unit	Value
Gross installed capacity by the end of 2011 [MW_e]	MW_e	794.0
Operating capacity by the end of 2011 [MW_e]	MW_e	758.0
Newly installed geothermal capacity in 2011 [MW_e]	MW_e	0.0
Geothermal power produced in 2011 *	GWh/yr	5,770.0
Capacity factor (2011)	-	0.87

*Please note that the installed capacity is given in **MW_e** and the energy produced in **GWh/yr**.*

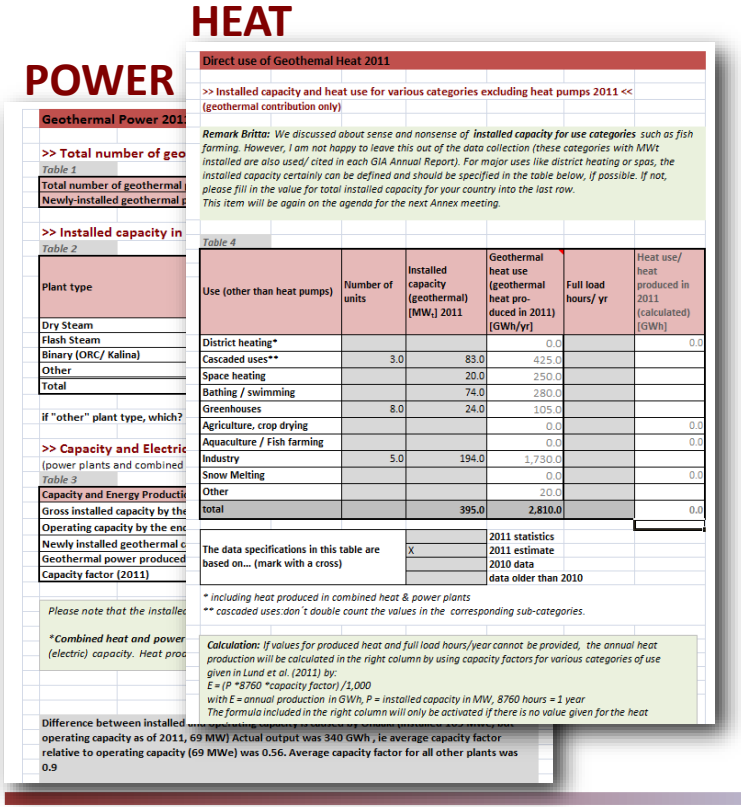
***Combined heat and power plants:** Please fill in here data for power produced and installed (electric) capacity. Heat production is asked for in a separate sheet.*

Difference between installed and operating capacity is caused by Ohaaki (installed 105 Mwe, but operating capacity as of 2011, 69 MW) Actual output was 340 GWh , ie average capacity factor relative to operating capacity (69 MWe) was 0.56. Average capacity factor for all other plants was 0.9

Power

- Plant types
- Installed (+ new) capacity
- Electricity production

IEA-GIA Data Collection Activities



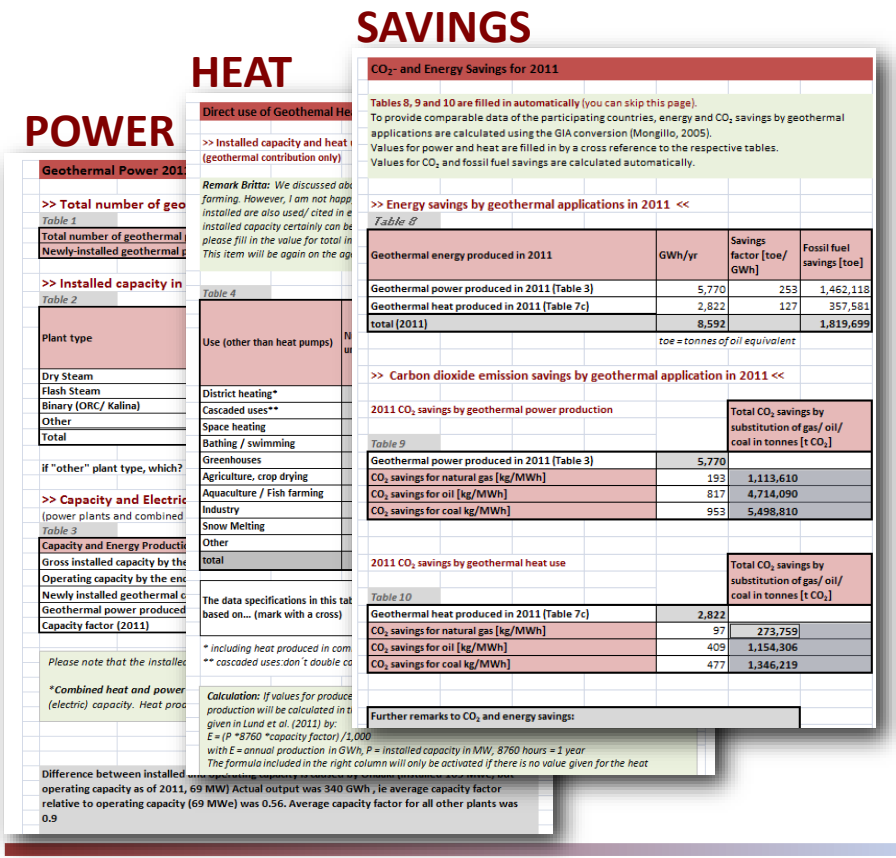
Power

- Plant types
- Installed (+ new) capacity
- Electricity production

Direct use

- Installed capacity and heat use
- Categories
- Geothermal heat pumps (GHP)
- Geothermal contribution
- Cooling with GHP

IEA-GIA Data Collection Activities



Power
- Plant types
- Installed (+ new) capacity
- Electricity production

Direct use
- Installed capacity and heat use
- Categories
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Fossil fuel and CO2 Savings
Automatic calculation by produced energy and savings factors

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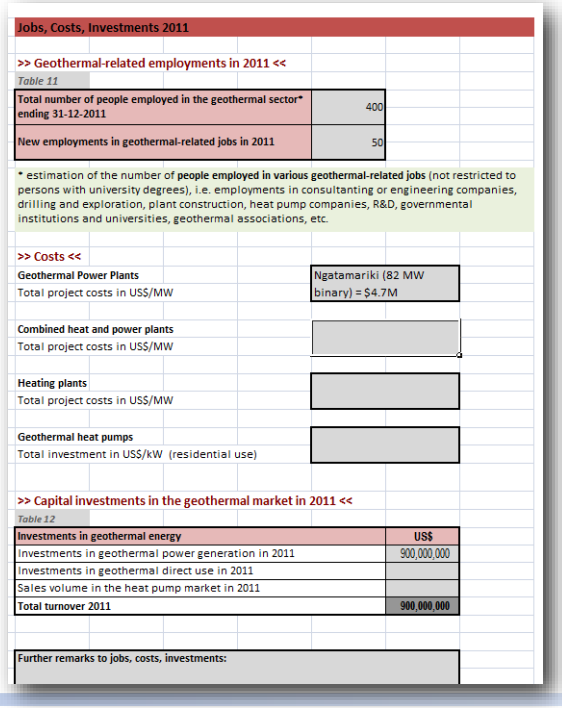
IEA-GIA Data Collection Activities

Jobs, costs, investments

- Plants costs, GHP costs
- Investments in geothermal market
- Employments

JOBS & COSTS



Jobs, Costs, Investments 2011

>> Geothermal-related employments in 2011 <<

Table 11

Total number of people employed in the geothermal sector* ending 31-12-2011	400
New employments in geothermal-related jobs in 2011	50

* estimation of the number of **people employed in various geothermal-related jobs** (not restricted to persons with university degrees), i.e. employments in consultanting or engineering companies, drilling and exploration, plant construction, heat pump companies, R&D, governmental institutions and universities, geothermal associations, etc.

>> Costs <<

Geothermal Power Plants Total project costs in US$/MW	Ngatamariki (82 MW binary) = $4.7M
Combined heat and power plants Total project costs in US$/MW	
Heating plants Total project costs in US$/MW	
Geothermal heat pumps Total investment in US$/kW (residential use)	

>> Capital investments in the geothermal market in 2011 <<

Table 12

Investments in geothermal energy	**US$**
Investments in geothermal power generation in 2011	900,000,000
Investments in geothermal direct use in 2011	
Sales volume in the heat pump market in 2011	
Total turnover 2011	**900,000,000**

Further remarks to jobs, costs, investments:

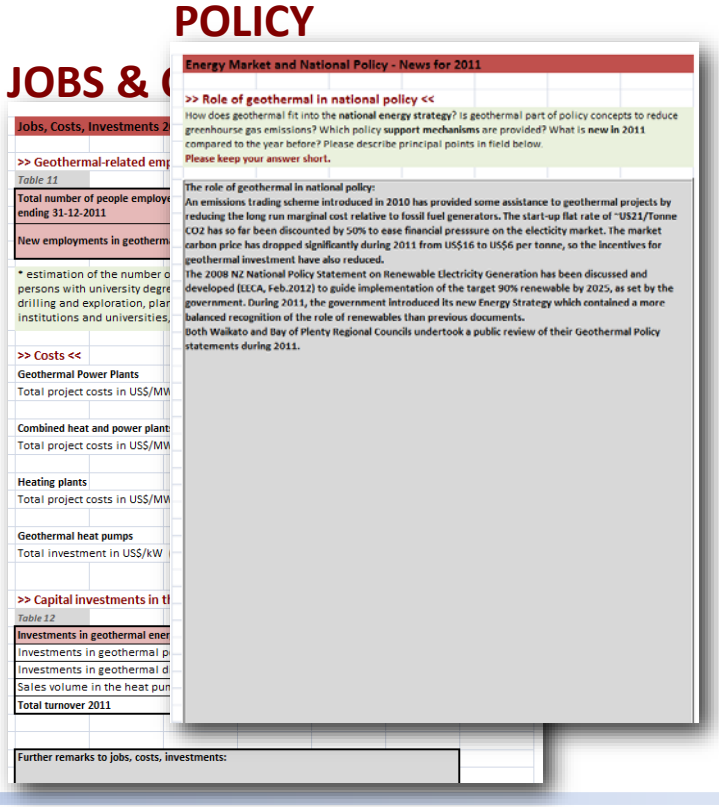
IEA-GIA Data Collection Activities

Jobs, costs, investments

- Plants costs, GHP costs
- Investments in geothermal market
- Employments

Policy

- Role of geothermal in national policy
- Funding, feed-in tariff, market incentives, R&D programs



IEA-GIA Data Collection Activities

Jobs, costs, investments

- Plants costs, GHP costs
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Policy

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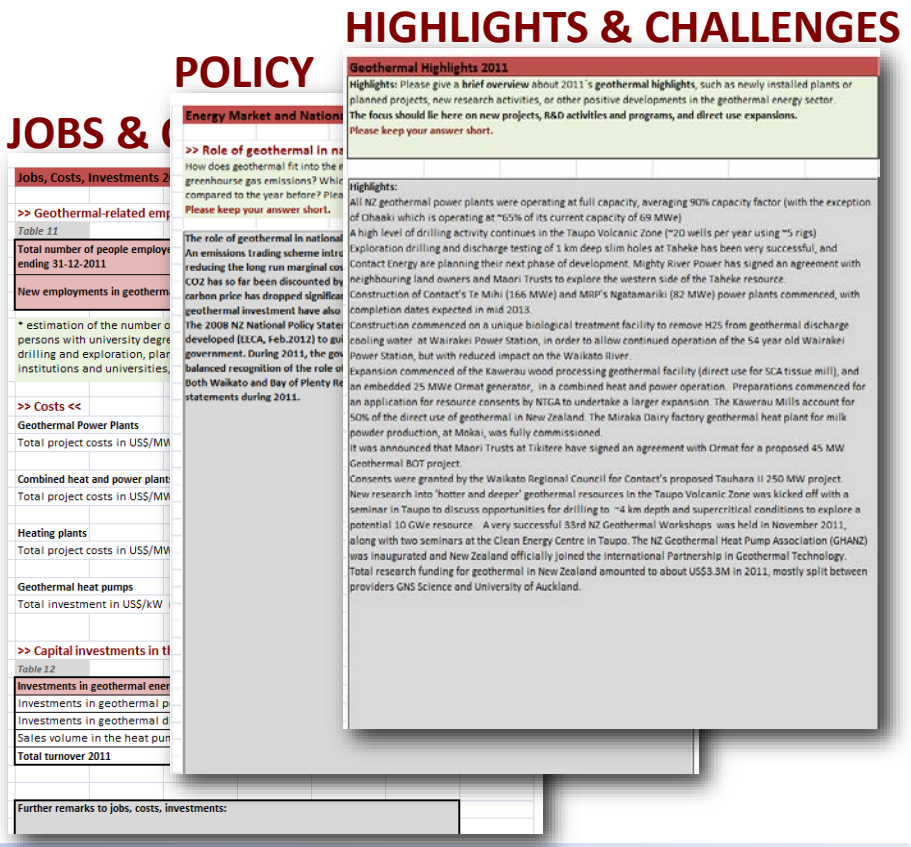
Highlights & Challenges

- New projects
- Research and development
- Challenges and development constraints (induced seismicity, technical problems, legal aspects)



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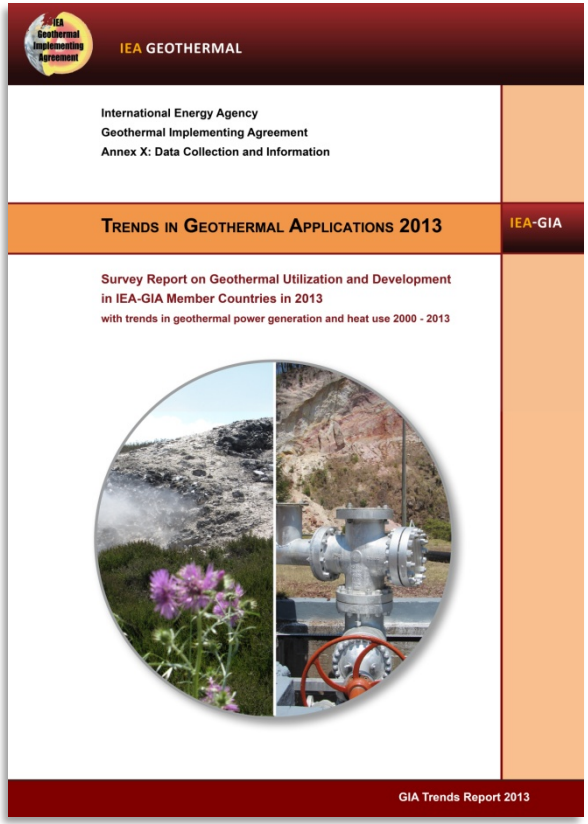
IEA-GIA Annex X Trend Report



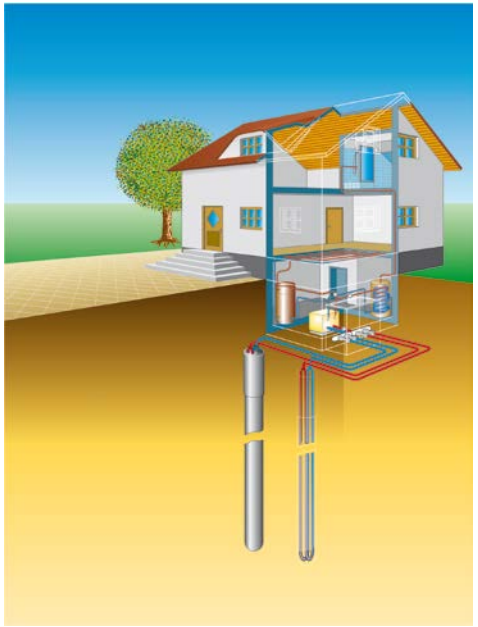
- First published for year 2010
- 4th edition published March 2015
- Visit IEA-GIA booth for a free copy
- Free download at www.iea-gia.org
- Provides compact overview of geothermal developments in GIA member countries

Direct Heat Use

Direct heat use

- District heating
- Space heating
- Thermal spas
- Aquaculture
- Green houses

Heat pumps



Direct Heat Use

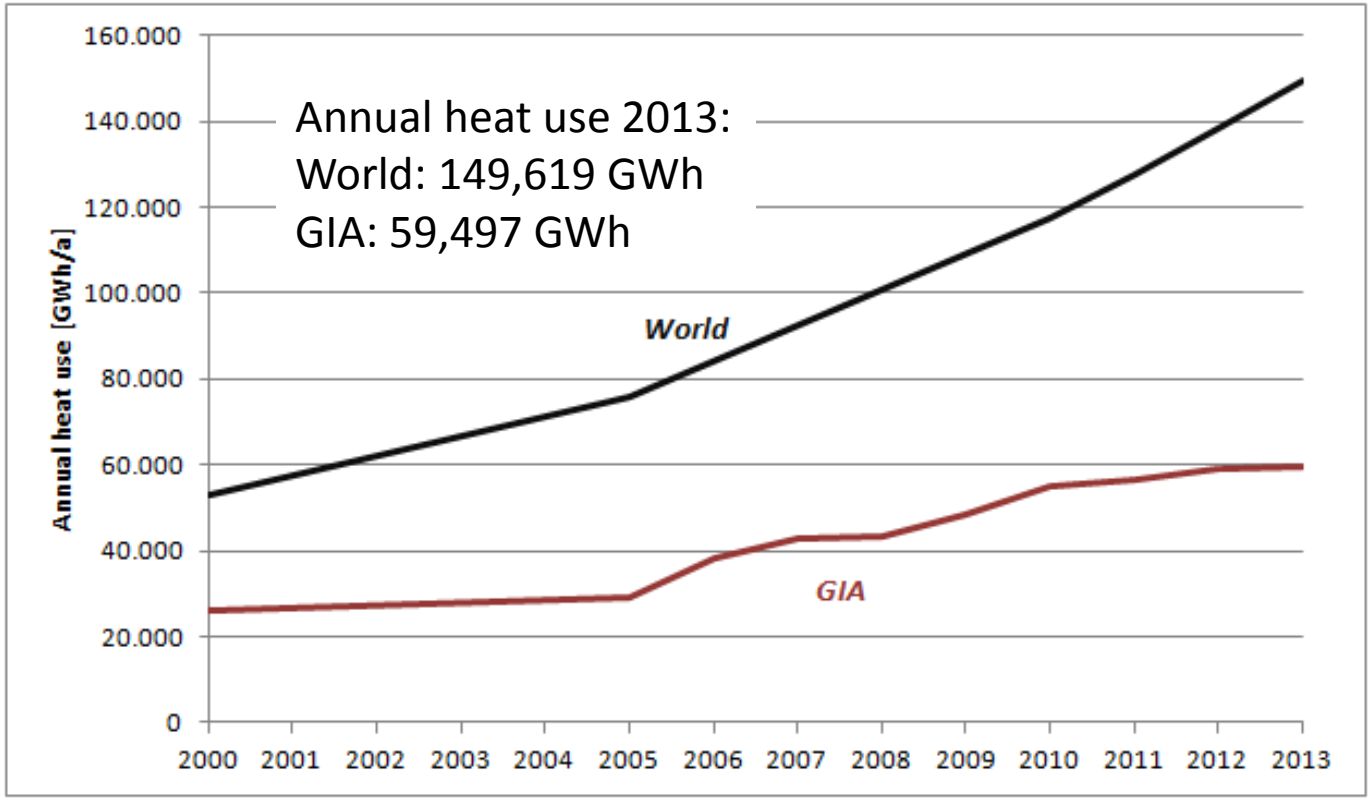
- GIA: standardized data from 2010 on, but reliable, up-to-date statistics often not available
- Geothermal cooling: almost no official data

→ correct data from previous years

→ heat use data best possible estimation

→ aim to further improve data-base

Annual heat use (GWh/a) 2000 - 2013

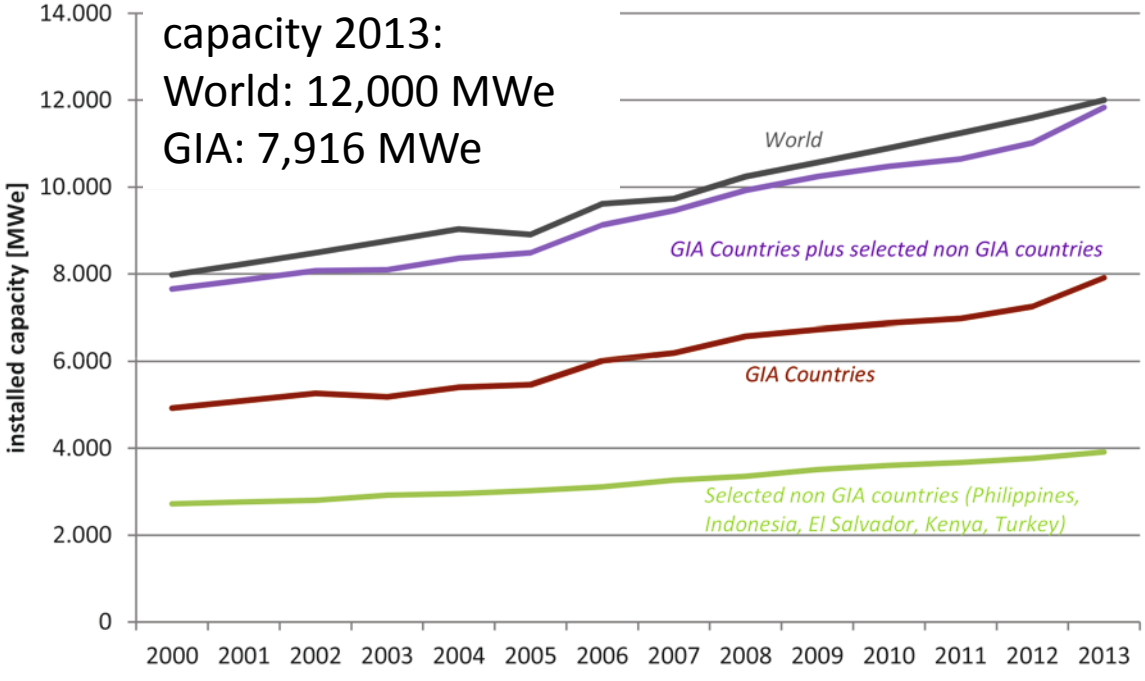


Installed thermal capacity 2013:
World: 68,755 MWt
GIA: 27,900 MWt

Geothermal Power

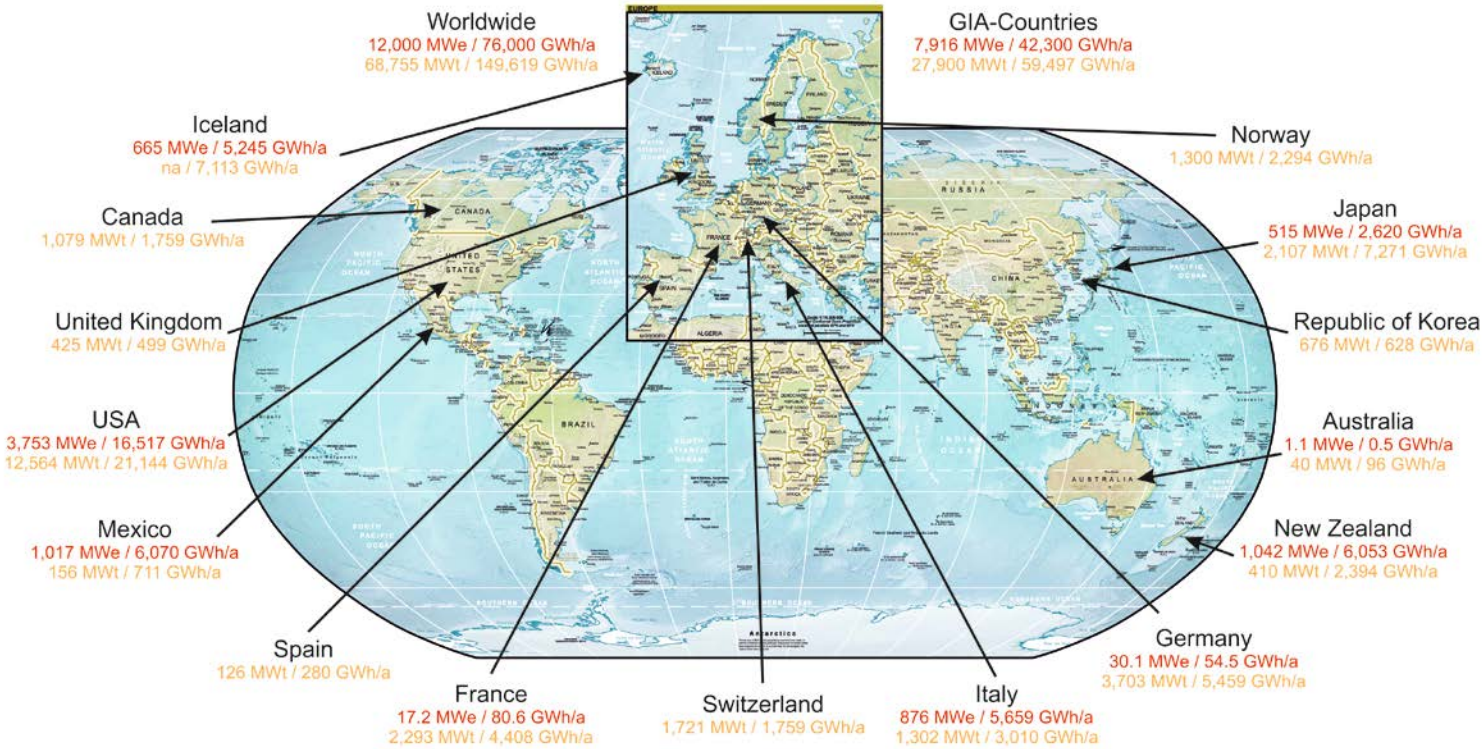
- Data in general easily accessible
- Good quality
- Nine GIA member countries operate geothermal power plants
- Since reporting year 2012 Trend Report also includes data of non-GIA countries

Geothermal Power – Installed Capacity 2000 - 2013



Annual power production 2013:
World: 76,000 GWh
GIA: 42,300 GWh

Overview



Overview of geothermal power (red) and heat (orange) utilization in GIA countries and worldwide.
Map: The World Factbook 2013 (CIA, www.cia.gov).

Conclusion

- Good data base for geothermal power
- Heat use data of less quality, but estimation of heat use in GIA countries possible
- Information on ecologic benefits (CO2 and fuel savings)
- Relevant political and economic information (not always representative)
- Project highlights and R&D news from various countries
- Challenges for geothermal developments

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→ **GIA Trend Report adds substantial information on geothermal energy uses on an international scale and helps to point out trends and developments.**

- For more information visit the IEA-GIA booth 28 at the exhibition

  or

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Thank you for your attention