

GIA-IGA Workshop

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Global & Regional Development
Potentials and Deployment
Projections

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Agenda

- I. Introduction - future deployment of geothermal energy
- II. Categories and Definitions
- III. Current Use, Theoretical and Technical Potential
- IV. Future Geothermal Potentials: Technical and Economic Factors; Barriers and Opportunities, Estimates and Predictions (for low & high temperature), and contribution to climate change mitigation.
- V. Outputs

Session I. Introduction – procedure: panels, brief presentations, discussions, debate, AND reasonable acceptance ?

Stimulus: Contribution of Geothermal Energy to Climate Change Mitigation:

the IPCC Renewable Energy Report

Lead Authors of Report:

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...with help from several other contributing authors...

Abstract - Key Messages

- A special report on renewable energy has been commissioned by the IPCC (Inter-Governmental Panel on Climate Change) to provide guidance on future mitigation options for climate change through reducing CO₂ emissions. A better understanding is required of potential global and regional geothermal resources, across a natural continuum from convecting high-grade hydrothermal to conduction-dominated thermal energy, in both sedimentary and crystalline crustal rocks. Other important issues include: energy security and sustainability, status of current utilisation applications, future technology advances, cost predictions, projected deployment rates, energy integration and infrastructure requirements, environmental risks and benefits, technology transfer, and policy options.

Abstract - continued

- Increased geothermal energy development is well suited to climate change mitigation because it provides base-load power and heating or cooling from a large resource that is well-distributed globally. It has a good track record of sustainable production using existing technology, applicable to both developed and developing countries, and for generating cost-effective and highly-dispatchable power.
- Geothermally heated fluids are available for a variety of industrial applications, including space heating and cooling, ranging from small-scale to district-wide installations. In addition, geothermal heat pumps are being deployed worldwide enabling substantive gains in heating and cooling efficiency of buildings. Relative to other renewable energy technologies, geothermal resources are utilised at high average availability factors (typically > 90%) for electricity generation. Overall, geothermal has been shown to be socially acceptable with some positive social and environmental impacts, including a relatively small land-use footprint. Adverse impacts are manageable. Sustainable management of water resources is inherent in best practice reservoir management.
- New technologies under demonstration, and wider deployment of existing technology, have the potential to significantly increase the use of low, high and supercritical temperature geothermal resources. Enhanced Geothermal Systems (EGS) offer the potential for global scale utilization when and where it is needed.
- For these potentials to be realised, research and field testing at commercial scale is required with multi-year government and private support and investment. The benefits will include mitigation of climate change through provision of CO₂ offsets at competitive costs, and improved energy security.

The IPCC geothermal group noted that a better understanding was needed of:

1. Global and regional future resource potential [very important]
 - Hydrothermal resource development
 - Need to include opportunities for “non-conventional” development, including:
 - resources at depth (EGS, deep sedimentary)
 - supercritical temperatures, offshore, etc
2. Cost predictions
3. Energy security and sustainability
4. Future technology advances
5. Projected deployment rates
6. Energy integration constraints
7. Environmental risks and benefits
8. Technology transfer
9. Policy options for support of geothermal
 - **deployment**: feed-in tariffs, tax breaks, low-cost loans;
 - **innovation**: R&D funding, university grants, industry tax breaks; joint government-industry R&D grants