Geothermal Training course

Strasbourg

from 5 to 9 of November 2012

Location: Cap Europe Appart'hôtel,

Rue de Bitche

67000 Strasbourg

Program:

Nov. 5, 2012

- Market aspects
- Legal, environmental, financial aspects

Nov. 6-8, 2012

- Technical Courses

Nov. 9, 2012

- Site visit: Géothermie Soultz, ECOGI project

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Day 1, Nov. 5, 2012

9:00 – 9.20 Welcome and Introduction
Philippe Dumas,
European Geothermal Energy Council (EGEC)

9.20 – 9.45 Short Round of introductions

Session I: Market aspects

Constantine Karytsas, Dimitrios Mendrinos
Centre for Renewable Energy Sources and Saving (CRES), Greece

9.45 – 10.30 International Geothermal Market overview

Geothermal resources of Europe can contribute to the EU targets of 20% less greenhouse gas emissions, 20% RES share and 20% more energy efficiency by 2020. The session provides an overview of the present status and future prospects of global geothermal electricity market niche, including

- market size (turnover, capacities, energy yields)
- near term growth, quality of resources, technologies employed,
- competition, energy costs, market barriers and incentives.

Case studies of plants in operation will be presented.

- First EGS plant: HDR project Soultz
- Low temperature plant: Simbach-Braunau.

10.30 – 11.00 Coffee Break

Session II: Legal, environmental & financial aspects

Gerd Wolter, Lawyer´s Office Gaßner, Groth, Siederer & Coll., Germany
Sarah Fraser, Bureau de Recherches Géologiques et Minières (BRGM), France

Stringent demands of investors and banks require an accurate planning of geothermal power projects; more precisely of the technology and phases of the project and the expected financial inflow and outflow. Risk management specially focuses on drilling risks and evaluates the risks in terms of their probability and economic consequences and prospects of suitable insurance products in Europe. The development of geothermal electricity in Europe depends on national legislations, for investors it is important to know in advance about current legal barriers and law-related conflicts.

11.00 – 12.30 Risk insurance:

- risk management: drilling
- existing insurance concepts to cover the geological risk in Europe
- risk insurance scheme at European level

Regulatory barriers

- regulation of geothermal electricity through national legislation
- legal barriers and law-related conflicts

12.30 – 14.00 Lunch Break

14.00 – 15.30 Financing / costs of geothermal power projects

- work cycle / capital investment for geothermal projects
- financing of geothermal projects

15:30 – 16.00 Coffee Break

16:00 – 17.30 Financing / costs of geothermal power projects

- market demands for project financing

Day 2, Nov. 6, 2012

9:00 – 9:20 Welcome and Introduction (EGEC)
Philippe Dumas,
European Geothermal Energy Council (EGEC)

9.20 – 9.45 Participants Introductory ice breaker
5 facts to introduce yourself

Session III: Geothermal Exploration

Pierre Durst, Bureau de Recherches Géologiques et Minières (BRGM), France
Jan-Diederik van Wees, Organization for Applied Scientific Research (TNO), Netherlands

The session will provide an overview of geothermal exploration methodologies, describing a step-by-step procedure on how to locate a reservoir using different techniques. It will introduce different tools and approaches to investigate resources from regional, local and reservoir scales. Examples will be provided to various geo-environments depending on the geological context of the site: from sedimentary to volcanic to crystalline reservoirs, both for natural system and EGS perspectives.

9.45 –10.15 What is geothermal energy: origin and relation with earth dynamics

- Thermal phenomena and earth internal structures
- Plate tectonics and geothermal energy
- The different types of geothermal energy

10.15 – 10.45 Coffee Break

10.45 – 13.00 Resource assessment: targets and tools

- An overview of targets
- Geophysical methods
- Geochemical methods

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13.00 – 14.30 Lunch

14.30 – 16.00 Resource assessment: targets and tools

- Geological and hydrogeological assessment
- Remote sensing
- Stress field analysis for EGS

16.00 – 16.30 Coffee Break

16.30 – 18.00 Site screening

- Best practice to localize a geothermal site

Case studies

- Various examples from known geothermal systems will be described and discussed

Day 3, Nov. 7, 2012

Session IV: EGS Technology

Jan-Diederik van Wees, Organization for Applied Scientific Research (TNO), Netherlands
Günther Zimmermann, Deutsches GeoForschungsZentrum (GFZ), Germany

This session provides an insight into the process of hydraulic fracturing and induced seismicity in EGS projects. Basic concepts of geomechanics and hydraulic fraccing, results of hydraulic stimulation and induced seismicity in EGS projects will be covered by lessons learned from the GEISER FP7 project.

9.00 – 10.30 basic concepts

- Rock mechanics and tectonics
- Hydraulic stimulation : objectives, physical principles, and best practices from oil and gas

10.30 – 11.00 Coffee Break

11.00 – 12.30 case studies

- Enhancing flow rates
- Induced seismicity
- Outlook

12.30 –14.00 Lunch

Session V: Drilling

Miklos Antics & Pierre Ungemach, GPC Instrumentation Process, France

The session will provide an engineering insight into drilling and completion technology with focus on design and implementation of deep, geothermal district heating (GDH) oriented, well doublets in sedimentary environments and urban/suburban locations.

14.00 – 15.30 Scope, introduction

- Geothermal vs Petroleum
- Deep well drilling/completion features
- Case study, Paris Basin GDH triplet

15.30 – 16.00 Coffee Break

16.00 – 17.30 Future, non-conventional, well and completion designs are also discussed.

- Medium enthalpy CHP exploration
- Unconventional geothermal well designs
- Drilling contract, rig management, work supervision

Day 4, Nov. 8, 2012

Session VI: Flash steam & binary technology

Elín Hallgrímsdóttir, Mannvit Reykjavik Iceland
Lilja Tryggvadóttir, Mannvit Reykjavik Iceland

The session provides an overview of geothermal power plants with focus on flash and binary thermodynamic cycles, geothermal steam gathering system and mechanical equipment used. The course will provide examples and highlight the special features of utilizing geothermal fluid for power generation.

- Thermodynamic modeling for process flow.
- Design process of geothermal steam gathering system.
- Different design considerations compared to conventional steam plants
- Operation and maintenance

9.00 – 10.30 Process flow and steam gathering system

- Presentations reviewing different cycles and design process
- Demonstration of thermodynamic models for different working cycles
- Calculated example showing methods used within geothermal steam gathering system design

10.30 – 11.00 Coffee Break

11:00 – 12:30 Mechanical equipment and operation and maintenance

- Presentations presenting features of mechanical equipment used in geothermal power plants and their operation and maintenance

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- Calculated example showing methods used for basic engineering within mechanical equipment design in geothermal energy
- Photographs of extreme conditions shown and discussed with solutions

12.30 – 14.00 Lunch

Session VII: Plant operation, energy supply and grid integration

Dr. Franz Heilemann, EnBW Energie Baden-Württemberg, Germany
Sören Reith, EnBW Energie Baden-Württemberg, Germany

The session provides a broad understanding of the grid integration of geothermal energy. Although electric power cables are the most obvious precondition for a grid connection, many other topics become important in this context. The session will therefore answer beside technical also regulatory and economical questions.

14.0 – 15.30 Fundamentals of energy economics

- regulation and energy trade
- electricity grid
- demand for geothermal power

15.30–16.00 Coffee Break

16.00 – 17.30 Grid integration of geothermal power

- approach for the grid integration of an increasing share of renewable power generation
- process of grid integration
- costs of grid integration

17.30 – 18.00 Conclusion / Feedback

Day 5, Nov. 9, 2012

SITE VISITS (OPTIONAL)

Departure time: 7.30

Strasbourg Railways Station – at the Lufthansa Bus stop (which can be found near the taxi rank)

Géothermie Soultz

The Soultz-sous-forêts geothermal site is located within the Upper Rhine graben, where granite basement rocks occur in 1.5 km depth overlain by Mesozoic and Cenozoic sediments. In depth of 5000 m a temperature of 200 °C is reached. In April 2004 three 5000-m deep wells were completed in the crystalline basement. In this EG-System the HDR-method is developed since 1987 to produce electricity.An OCR power plant was installed in December 2007; currently an electrical power of 1.5 MWel is produced with a geothermic heat power of 30 MWth. The operating test started 2008.

http://www.geothermie-soultz.fr/

Ecogi project in Rittershoffen

The goal of ÉCOGI is to use subterranean energy innovatively to feed industrial processes on the Roquette Frères operations plant in Beinheim (Bas-Rhin, France), using techniques tested in Soultz-sous-Forêts, in the same departement.In order to meet its goal, ÉCOGI will build a geothermal plant in Rittershoffen. It will be coupled with two 2 500 meter-deep wells, and with our operations plant in Beinheim through a 15 km-long pipe. It will produce 24 MW of renewable energy out of the 90 MW the plant requires to operate, replacing 16 000 TOE of fossil fuel annually and thus decreasing CO2 emissions by 39 000 tons each year.

http://www.roquette.com/news-2011-food-feed-pharma-paper/e-c-o-g-i-when-geothermal-meets-industry/

Lunch : Restaurant-Auberge du Fleckenstein (26 route de soultz, 67250 KUTZENHAUSEN)

Return in Strasbourg in the afternoon: 16.00 Strasbourg center