

# GeoTHERM

*expo & congress*



Messe  
Offenburg -  
Ortenau

## GUIDE 2019 KATALOG

Guest of Honor  
**Baltic Sea**

Freitag, 15. Februar 2019 · Kongress 1 · Ortenauhalle

- 09.15 - 09.45**    Sektorkopplung im Markt Holzkirchen zur ökologischen Energieversorgung  
Dr. rer. pol. Thomas Reif, Gaßner, Groth, Siederer & Coll. Partnerschaft von Rechtsanwälten mbB
- 09.45 - 10.15**    Aktuelle Informationen zum Betrieb der geothermischen ORC-Kraftwerke in Europa  
Andrea Duvia, Turboden S.p.A.
- 10.15 - 10.45**    Geothermiekraftwerk Insheim: Sechs Jahre erfolgreicher Betrieb – Mehr Chancen als Risiken!  
Jörg Uhde, Pfalzwerke geofuture GmbH
- 10.45 - 11.15**    Rekordinvestitionen in Geothermie im Nordwesten Ungarns durch PannEnergy  
Atilla Csaba Kovacs, Geo-Log Ltd
- 11.15 - 11.45**    ThermoDrill - Projektbeschreibung und erste Ergebnisse  
Dipl.-Ing. Thomas Stoxreiter, Montanuniversität Loeben
- 11.45 - 12.30**    Pause
- 12.30 - 13.00**    Untersuchung von „soft stimulation“-Maßnahmen aus einer technisch-ökonomischen Perspektive unter Berücksichtigung von Risikofaktoren  
Sören Welter, EnBW Energie Baden-Württemberg AG
- 13.00 - 13.30**    Innovative Behandlungsflüssigkeit zum Lösen von Carbonaten und Silikaten im Sandstein und Granit: Entwicklung, Evaluierung und erster Feldversuch in einer Geothermalbohrung  
Dr. Nils Recalde Lummer, Fangmann Energy Services GmbH & Co. KG
- 13.30 - 14.00**    Lithium im Thermalwasser – Eine Chance für die Geothermie im Oberrheingraben  
Dr.-Ing. Horst Kreuter, Geraldine Löschan, GeoThermal Engineering GmbH
- 14.00- 14.30**    Verschiedene Zementierungstechniken bei Öl- bzw. Gasbohrungen und Geothermiebohrungen  
Yashar Yadigarov, DEUTECS GmbH
- 14.30 - 15.00**    Kompakte & flexible Verstromung von Überschusswärme  
Julian Lechner, Orcan Energy AG

Friday, 15. February 2019 · Congress 1 · Ortenauhalle

- 09.15 - 09.45**    Linking sectors for an ecological power supply in Markt Holzkirchen  
Dr. rer. pol. Thomas Reif, Gaßner, Groth, Siederer & Coll. Partnerschaft von Rechtsanwälten mbB
- 09.45 - 10.15**    Update on the operations of the geothermal ORC plants delivered to Europe  
Andrea Duvia, Turboden S.p.A.
- 10.15 - 10.45**    The Insheim geothermal energy plant: six years of successful operation; more chances than risks!  
Jörg Uhde, Pfalzwerke geofuture GmbH
- 10.45 - 11.15**    PannErgy's largest geothermal energy investment in north-western Hungary  
Atilla Csaba Kovacs, Geo-Log Ltd
- 11.15 - 11.45**    ThermoDrill - a project description and first results  
Dipl.-Ing. Thomas Stoxreiter, Montanuniversität Loeben
- 11.45 - 12.30**    Break
- 12.30 - 13.00**    Investigation of soft stimulation measures from a techno-economic point of view under consideration of risk factors  
Sören Welter, EnBW Energie Baden-Württemberg AG
- 13.00 - 13.30**    Premium treatment system for granite and sandstone formations – Fluid development and field trial in a geothermal well  
Dr. Nils Recalde Lummer, Fangmann Energy Services GmbH & Co. KG
- 13.30 - 14.00**    Lithium in thermal water: a chance for geothermal energy in the Rhine rift valley  
Dr.-Ing. Horst Kreuter, Geraldine Löschan, GeoThermal Engineering GmbH
- 14.00- 14.30**    Differences in cementing between oil-gas and geothermal wells  
Yashar Yadigarov, DEUTECS GmbH
- 14.30 - 15.00**    The compact and flexible generation of power from excess heat  
Julian Lechner, Orcan Energy AG

**Dipl.-Ing. Thomas Stoxreiter**

Montanuniversität Leoben

**EN ThermoDrill – Project Description and Preliminary Results**

The utilisation of enhanced geothermal systems (EGS) is one of the future cornerstones of Europe's renewable energy strategy. Because of the great depth of suitable geothermal reservoirs, drilling costs often represent more than half of the total costs of EGS, as well as an important share in CO<sub>2</sub>e emissions. Significantly increasing the rate of penetration (ROP) is one possible option to reduce the overall drilling costs. Therefore, an alternative drilling technology is under development in the frame of the H 2020 research project "ThermoDrill", where high pressure jetting is combined with mechanical drilling techniques.

Although the concept of combining hydraulic and mechanical rock destruction methods is not basically new, novel techniques and methodologies were developed within the project. One major challenge was to ensure a sufficient jet cutting performance in crystalline rock under simulated wellbore conditions. Since the few available literature consistently indicated termination of jet cutting above a critical ambient pressure level, a comprehensive experimental study was performed to identify boundary conditions which allow for an adequate jet cutting performance. For that purpose, a novel testing device was designed and manufactured, capable of 450 bar ambient pressure, and jetting experiments with different nozzle size, stand-off distance, jet pressure but also different drilling fluids and rock types were performed. As a result, the critical parameters were defined and specifications for the jetting process in the borehole provided.

To prove the concept, full-scale drilling experiments were conducted at a drilling simulator. During the project, two novel drill bit prototypes (8 1/2 in size) were developed and manufactured. The three-cone based design is distinctly different to earlier approaches and breaks away from traditional standard roller cone bit design. The drilling simulator experiments were again conducted with hard to drill crystalline rock. The test bench was adopted to allow for an external high pressure supply. In total, 17 rock samples were drilled and a maximum increase in ROP of more than 70 % was achieved. Three different drilling/jetting fluids were used, including a specially designed sepiolite based fluid and an established xanthan gum based fluid. Besides the very successful proof of concept, vital knowledge was created for the preparation of the upcoming field tests in a real wellbore.

Co-author: Mag. Karin Rehatschek

**Acknowledgement of funding**

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**Sören Welter**

EnBW Energie Baden-Württemberg AG

**EN Investigation of soft stimulation measures from a techno-economic point of view under consideration of risk factors**

The EU research project DESTRESS investigates the practical application of stimulation measures to create enhanced geothermal systems (EGS) with sufficient productivity for an economic usage of geothermal energy. DESTRESS, with its soft stimulation approach, aims to minimize the environmental impact of stimulation measures to accelerate the time to market for EGS. Risk factors, their evaluation and mitigation play a major role within the project, not only for the practical implementation but also for the economic evaluation of soft stimulation.

An isolated or stepwise assessment of economics, technics and uncertainty caused by risk factors does not take into account the complex interdependencies of these different fields. Therefore an interdisciplinary model is used to interlink all these aspects on a highly detailed level. Thereby the significance and reliability of the evaluation can be improved.

Geothermal power production is characterized by a complex cyclic process. Starting from the mining of the thermal water as an energy carrier over the energy conversion at surface to the reinjection of the cooled thermal water, multiple interactions must be taken into account. For this reason, an integrated simulation model was developed. It represents all areas of the geothermal energy supply, technically and economically, thus enabling an assessment of technical measures. Based on this model, the so called soft stimulation approach can be investigated. Besides the effectivity of stimulation measures, also the economic side is mapped in detail based on research done within the DESTRESS project. The main leverage of interest is the improvement of the reservoir properties, which is mapped under consideration of uncertainty. Next to soft stimulations also improvements in power plant modelling, simulation of thermal water pumps and others will be presented. From a project developer's point of view the mapping of risk factors can improve the relevance of results from techno-economic simulation models. Therefore selected risk factors for soft stimulation were investigated and integrated into the modelling approach. The modelling improvements will be presented based on example sites within the DESTRESS project.

Co-authors: Carl Bormann, Dorothee Siefert, Elif Kaymakci, Thomas Kölbl



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- Normann Zeisig, Technischer Produktionsleiter
- Sebastian Kouřil, B.Eng. Elektrotechnik/ Automatisierungstechnik

Wir freuen uns auf Ihren Besuch!

**EN** Terra Calidus GmbH - Manufacturer and turn-key supplier of geothermal system components

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### terratec geophysical services GmbH & Co. KG

terratec führt seit 25 Jahren geophysikalische Dienstleistungen für Geotechnik, Geothermie, Wassererkundung und Rohstoffexploration (Steine-Erden, Metalle), im In- und Ausland durch.

Neben dem Hauptsitz in Deutschland und Niederlassungen in Namibia, Mali und Marokko arbeitet terratec mit Partnerfirmen in Finnland, Österreich und der Schweiz zusammen. Ein Team aus erfahrenen Geophysikern, Geologen und Messtechnikern steht zur Verfügung.

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- Erdwärmesonden Bohrlochgeophysik (0 – 300m): Sonden für Gamma, Verlauf, Temperatur und Kamera-befahrung,
- TEC-CORIM: teufenbezogene digitale optische Aufnahme und Archivierung von Bohrkernen

Forschung und Entwicklung:

- Erdwärmesonden: Miniatursonden mit einem Durchmesser von 18mm für Messung von Temperatur, Gammastrahlung und Bohrlochverlauf bis in 300m Tiefe. Weitere Messverfahren sind in Entwicklung und Erprobung (in Zusammenarbeit mit der DMT).
- Hochauflösendes Resistivity- und IP-Imaging (HIRIP): hohe Auflösung des Untergrunds bis 500m Tiefe

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### Montanuniversität Leoben – ThermoDrill

**EN** In the ThermoDrill project, an interdisciplinary team of research institutions and industrial partners from across Europe have joined forces to innovate deep geothermal drilling by combining proven and cost-effective technologies into a completely new process. The unique feature of the new concept is that penetration is achieved by a high pressurized water-jet which supports conventional rotary drilling by breaking the stress in front of the bit to increase bit performance. This combination of water jetting and rotary drilling is expected to at least double the rate of penetration.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 641202.

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