[Gaßner, Groth, Siederer & Coll.]

www.ggsc.de

Legal barriers to the use of geothermal energy

Potsdam, 15th-18th April 2013

The Topics:

Part 1 - Approval process for exploration, drilling and mining

I. Federal Mining Law

II. Groundwater Protection

III. Immissions

IV. Comparative Law

    1. Italy

    2. Iceland

Part 2 - Competitive reservoir utilizations

I. Carbon Capture and Storage (CCS) Conflict

II. Nuclear waste final storage Conflict

III. Fracking Conflict

Part 3 - Further legal aspects, in particular, civil law and dispute resolution

I. Public procurement law

II. Legal protection for ordinary and extraordinary emissions

III. Planning and building Permit

IV. Duties and taxation

Part 4 - Access and protection of geological data, implementation of the INSPIRE Directive

Part 1 - Approval process for exploration, drilling, mining

I. German Federal Mining Law

- German Federal Mining Law strongly promotes geothermal use!
- The German Federal Mining Law (BBergG) is the most important law for the geothermal projects approval.
- Underground resources do not belong to the surface proprietor. Therefore, usually it is denied to the land owner to take legal action against the mining operation because of expected damages.

It grants the owner a substantial right, according to public interest.

- For the exploration and exploitation of geothermal energy a mining authorization is required. The operator has to apply for a mining license including a working program and a proof of his financial capacity.
- Mining authorizations are issued by the local Bergamt and include all aspects, especially the complete technical equipment.

Exploration permit from the state mining office (Requirements for authorization)

- Work program must be available (nature, scope, purpose, period of exploration activities).
- License area must be precisely described.
- Reliability is to be checked.
- Necessary funds must be raised.
- Natural resources shall not be compromised.
- It should not conflict with public interest.

Usually the area reaches from 50 km² until 250 km².

⇨ In geothermal projects the most important points are the work program and the financial capacity.

Federal Mining Law, Paragraph 4 Section 7

"A permit, license or a mining property is a portion of the Earth's body, which is bounded by straight lines on the surface and to the depth of vertical planes, unless the limits of the scope of this Act require a different process."

- A change in the paragraph above, which regulates the exploration exclusivity, could remedy the created effect that allows the authority to give various subterranean stocks to different interested parties.

Licence (Requirements)

- The place of exploration must be specified.
- The necessary data field for a permit must be completed.
- The geothermal water must be winnable.
- A work program is obligatory (technical execution of the recovery, under and above ground facilities are insufficient, the successful extraction in a reasonable time).

⇨ Such a license subsists for a very long term (20 or 30 years, can be elongated up to 50 years), so the investment is save.

Operation plan

- The approval of the presented operation plan does not grant a new right, due to its mere control function.
- The prerequisites are:

a. That the applicant holds a mining authorization

b. He must have the required reliability and professional customer

c. The risks should be avoided according to the state of technology

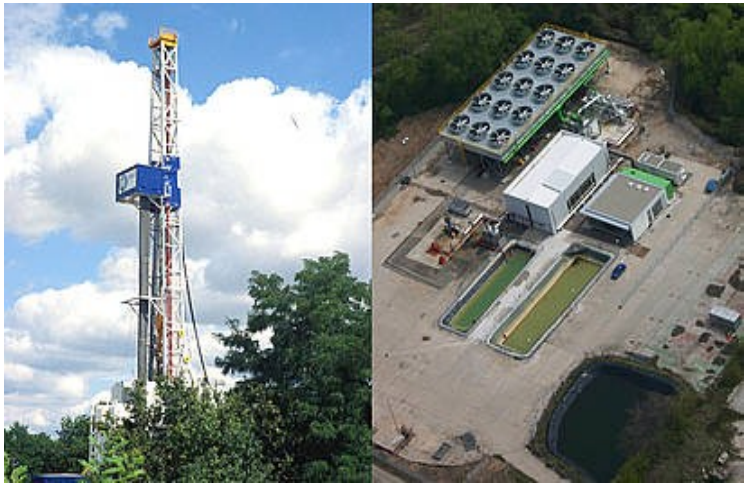
d. There must be no overriding public interests against the exploration

Types of operation schedule:

1. Basic operating plan
2. Main operating plan
3. Special operating plan
4. Community management plan
5. Closure plan

Case example in Landau

- After incidents at the geothermal power plant Landau, the legal instrument of operational plans was subsequently adapted to help the prevention of damages in the foreground standing.
- On August 15th and September 14th 2009 earth quakes happened in Landau, with strengthening of 2.7 and 2.4 on the Richter scale. These are dimensions that can cause damage to buildings. Since the start of commissioning there have been no noticeable micro-earthquake.



- Consequently, the mining authority issued requirements for all operational plans. The operator of the Landau power plant was henceforth obliged to attend the institution and to prove the emission network security. Besides that the operator must reduce the injection pressure to normal operation level and firm a higher mining damages insurance.

II. Groundwater Protection

- General duty of care.
- Permit according to water right laws:

  a. Water utilization: contamination, extraction, etc.

  b. Decision makers: Bergamt together with Water authority

  c. Water protection zones: no geothermal drilling

III. Immissions

- The Federal Immission Protection Law does not have great impediments for geothermal projects.
- During the drilling compliance with the noise limits can be of relevance, especially in the cementation of the liners and the hydraulic test work. Aircoolers of the power plants are subject to permits.

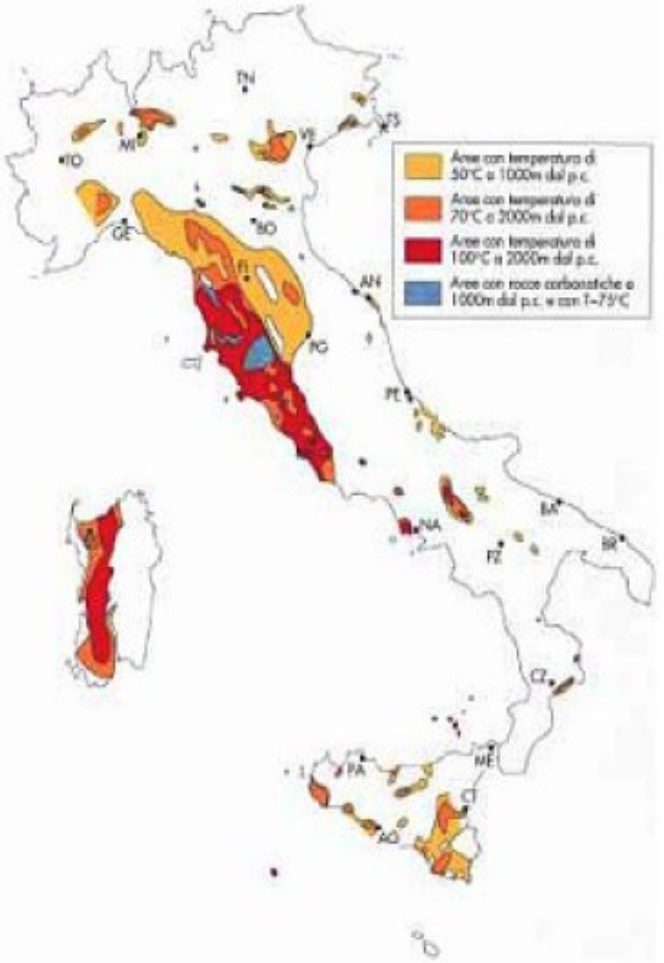
IV. Comparative Law

1. Italy

- In Italy, in contrast to the German legal system, which exclusively governce the geothermal utilization, the regulation legal orders are less media-related (water, mining, etc.), but primarily plant-based or sector-based.
- The geothermal resources belong to the central state and the regions.
- The permits for exploration and mining are granted by the regions of Italy.

High enthalpy reservoirs, which consist of vapors or liquids with temperatures over 150 degrees, are declared of national interest.

- The authorization shall apply exclusively a single person. With several interested parties a selection is to be made. The importance of the resource, the knowledge of the interested parties about the exploration field, the complexity of the project and the experience of the business operator are significantly for the decision.
- At the end of the successful research process, the mining authorities concedes the exploration allowance. An environmental impact assess (EIA) may be necessary.

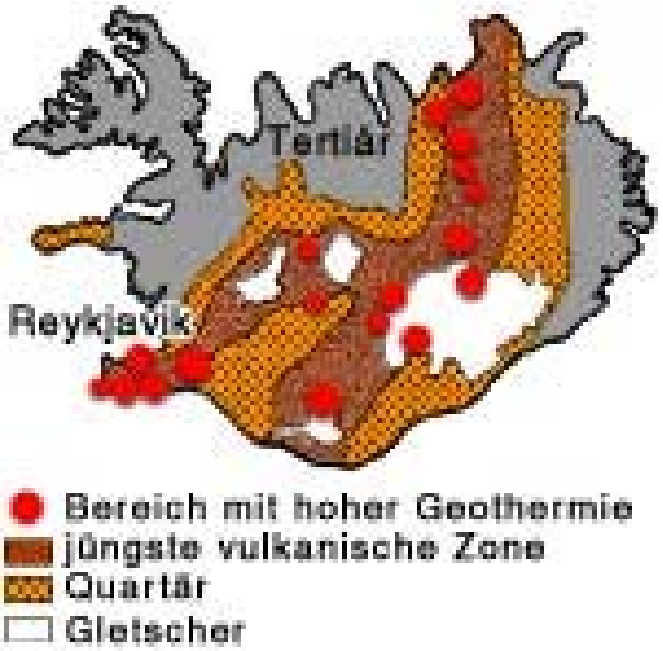


2. Iceland

- Special law for the use of geothermal energy: *Act on survey and utilisation of ground resources* and *Electricity Act.*
- The owner of the property owns the underground resources too.
- Industry Minister may grant several permits for a study area. This requires that interested parties have jointly submitted a request and agreed privately about their procedure example.

Property owners have the privilege to study and research without permission.

- The Electricity Act regulates the licensing of the powerhouse operations.
- The drilling of production holes or research holes may be subject to EIA. The entrepreneurs remain on the cost of implementation of the EIA.
- A major conflict arises from the landscape protection: geothermal resources are often in scenic areas. They are of great importance, especially for tourism and recreation areas.



Part 2 - Competitive reservoir utilizations

I. Carbon Capture and Storage (CCS) Conflict

- Currently there are 19 CCS projects in Europe in the planning phase.
- Germany: potential consists firstly in the northern regions, including Brandenburg, where the factory “Schwarze Pumpe” was built, the first functioning CO_2 storage facility in the world.
- The German federal government is obligated according to the spatial planning law to issue periodic reports about the development plan of CCS, its convenience and aims and also avoid possible use competitions.

- United Kingdom: holds the CO_2 deep storage for a good option to the climate change policy and promotes the research and development of new projects. No new coal power plant can be authorized without CCS projects.

  ⇨ Competition with geothermal is possible.

- Poland: the estimated total capacity of geological formations is nearly a billion tons of CO_2. The project developer must monitor the storage site for at least 20 years after the injection. Geothermal energy is not often used.

  ⇨ Competition with geothermal is unlikely.

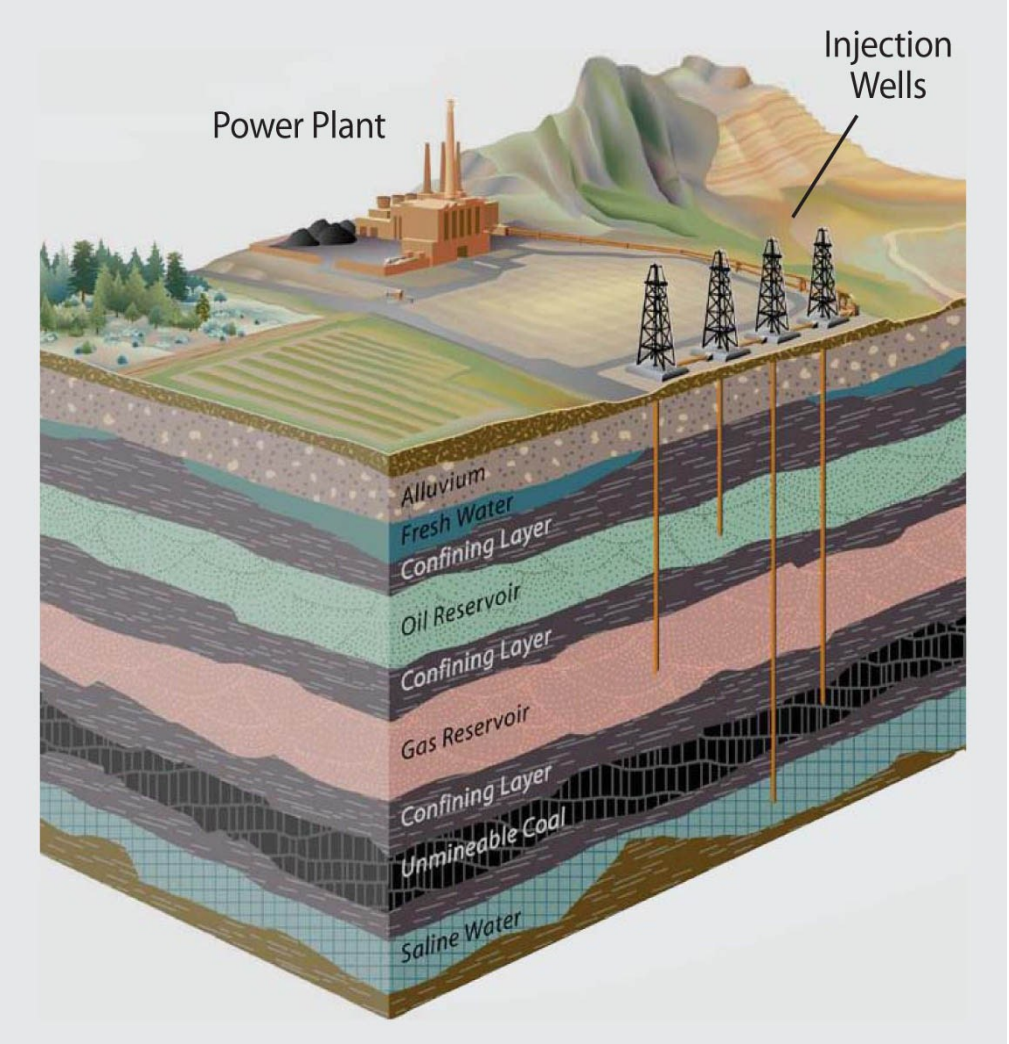
- CO_2 can be storaged in the following geological formations:

a) Oil reservoir;

b) Gas reservoir;

c) Unmineable coal;

d) Saline water;



II. Nuclear waste final storage Conflict

- Germany: actually there are only aboveground nuclear-final storages, the most in Niedersachsen.
- France: the nuclear energy is the main power source in the country. for high-level wastes a geological deep storage is intended - it will be located in Bure, near Nancy.
- Sweden: there are ten working nuclear reactors, which cover almost 45% of the power needs. The waste is disposed in only up to 100 meters deep final storages facilities, but the government plans to build a 500 meter storage.

⇒ Only a few limited areas are affected, so there is no conflict.

Nuclear power plants in Europe

III. Fracking Conflict

- This activity was used in the United States more than 50 thousand times since the 1940s. EU law allows the member states to exploit their natural resources, submitted to the ecological minimum standards. Some countries have already banned it, for example France and the Netherlands, while others are encouraging researches, for example Poland and Denmark.
- Germany: an ongoing discussion of opportunities, risks and also environmental requirements is being carried out by the federal authorities. The possible areas are in northern regions.

⇨ Competition could occur between geothermal sites.

- Poland: has the greatest interest on Fracking in Europe. There are enough recoverable gas reserves , that could help Poland to be independent of Russian gas. The government intends to encourage the researchs, and a new law will be enacted in 2013, which will regulate the taxes and control of the production and conditions for the exploration and distribution of the gas.

  ⇨ Competition is likely to occur.

- Denmark: wants to maintain its energy self-supply by using the fracking. Gas reserves were discovered near planned geothermal projects.

  ⇨ Competition is likely to occur.

Shale gas in Europe

Part 3 - Further legal aspects, in particular, civil law and dispute resolution

I. Public procurement law

- A geothermal project involves many different services, especially concerning the wells: the construction of the mining area, the purchasing of liners and the disposal of drilling mud and special waste.
- Public procurment causes project delay, is thus budget relevant and has the inherent risk that contracts are legally void (invalid).

II. Legal protection for ordinary and extraordinary emissions

- The local residents may be affected during the construction and operation powerhouses.

  ⇨ Conflict with neighborly protection.

- The possibility of subsequent arrangements creates a way for the far right protection. Moreover, the authority may order other approval requirements even before the operational plan.

III. Planning and building Permit

- The power plants have to be built in close proximity to the wells, because transportation of geothermal water is inefficient and expensive.
- Therefore it is necessary, that the project initiator gets the construction license for the power plant quick and easy.

⇨ Synchronisation is necessary,
reduction of barriers, simplification are desirable.

- Certain distance (or other protection) must be kept for other uses. Environmental, work safety, construction and traffic legislations should be respected.

- For buildings on the surface (the power plant) there are construction planning and building regulations. The electricity generation and distribution of heat are parts of the geothermal system, but not of the production. Thus the power plant permit is no longer subjected to the mining law.
- In Germany the permits are granted according to the federal state building law (Bauordnungen). The construction of plants of deep geothermal energy is permitted in industrial and commercial areas, depending on the type and size of surface structural and technical equipment.

- In Island the building of the power plants is regulated by the Planning and Building Act No. 73/1997. According to this act the power plant project, in order to obtain development permits, shall be in accordance with development plans and decisions on environmental impact assessment.

IV. Duties and taxation

- The costs for a geothermal power plant include legal and license fees, royalties and cost for environmental studies, public hearings, etc.

- Special taxes and charges on geothermal projects should be abolished.

- Example: in Germany the license holder has to pay 10 % of the market value, when he uses the mining resources economically. (§ 31 BBergG). If no market value exists, the authority estimates the value. At present, the authorities do not apply the article for geothermal projects, but it is a pending risk.

- In Italy the owner has to pay before approval 325 € per km² to the competent authority. The operator has to pay for the concession 650€ per km².
- In Turkey the charges for license are calculated according to the installed capacity power of the project. For example, for a power plant with more than 1000 MW production the fee is 250.000 Turkish Lira (about 107.000 €).
- The Act of 1998 from Iceland refers only to “payment of a license fee to meet the cost of the preparation and issue of the license.” The Minister for Industry may negotiate remuneration with license holders for resources on land owned by the state, but any payment is subject to the rules of the Act on Public Lands.

Part 4 - Access and protection of geological data, implementation of the INSPIRE Directive

- The INSPIRE Directive establishes a legal framework for access to spatial data, spatial data services and metadata set of spatial data holding and regulates the use of these data and services, especially for activities that could impact the environment.
- Italy, Iceland and Germany have already implemented the INSPIRE-Directive in the national law system.

[GGSC] Geothermie - Team

Dr. Thomas Reif
Dipl.-Volkswirt, Rechtsanwalt,
Fachanwalt für Steuerrecht

Hartmut Gaßner
Rechtsanwalt

Harald Asum
Dipl.-Betriebswirt

Dr. Georg Buchholz
Rechtsanwalt

Irene Pfoo
Dipl.- Betriebswirtin

Dr. Jochen Fischer
Rechtsanwalt

Martina Serdjuk
Master of Science
Agribusiness

Dr. Sebastian Schattenfroh
Rechtsanwalt, Fachanwalt für
Bau- und Architektenrecht

Robert Kutschick
Rechtsanwalt

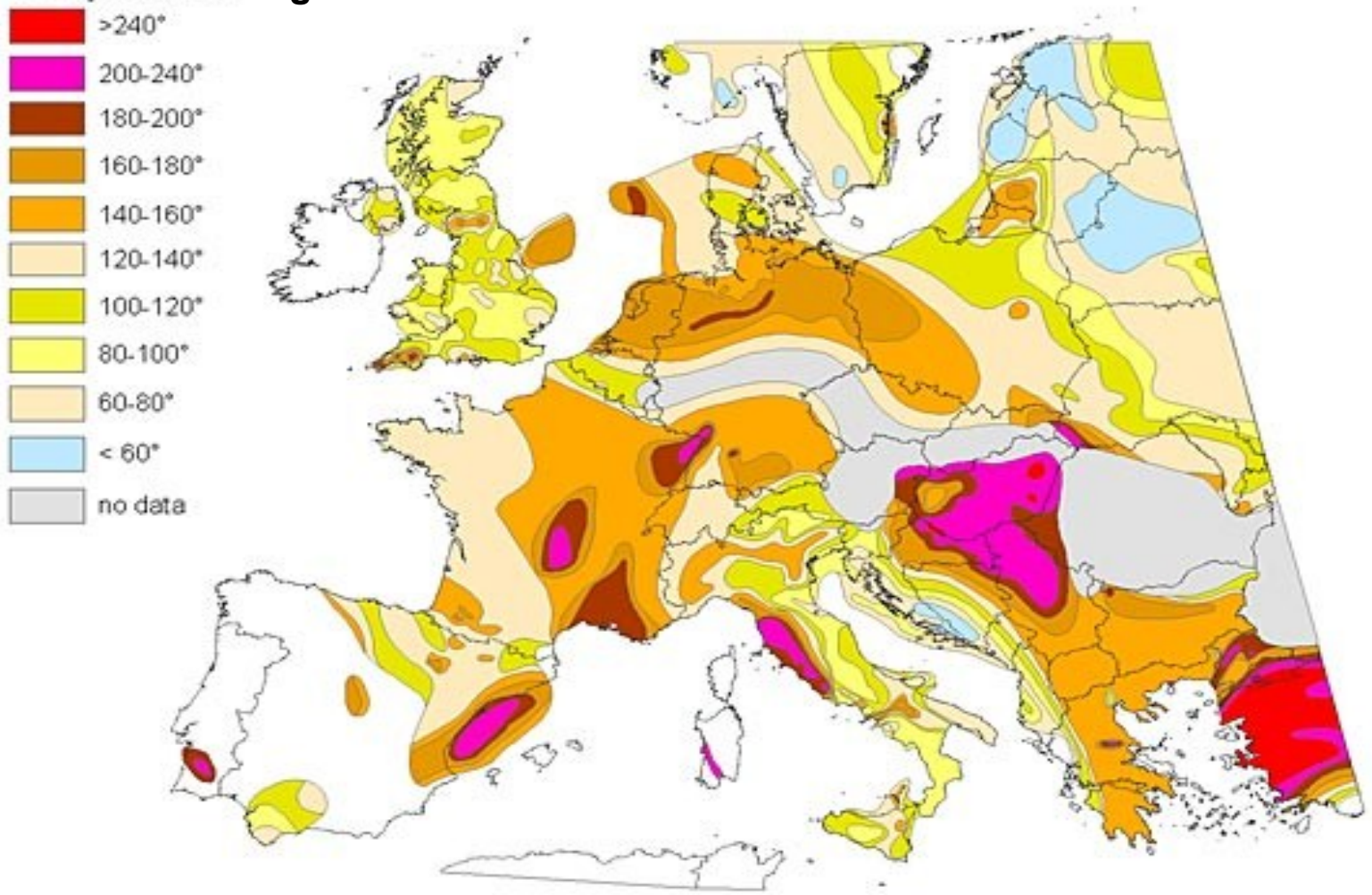
Karin Hitzler
Rechtsanwaltsfachangestellte

Ana Clara Discacciati
Praktikantin

Back-up


Europäisches Nordmeer
Grönland
Dänemark
ISLAND
Akureyri
Vatnajökull
REYKJAVIK
Färör Inseln
Dänemark
Shetland Inseln
GB
Orkney Inseln
GB
Hebriden
ATLANTISCHER OZEAN
NORWEGEN
SCHWEDEN
FINNLAND
Barents-see
Weißes Meer
Bottnischer Meerbusen
RUSSLAND
ESTLAND
LETTLAND
LITAUEN
DÄNEMARK
Ostsee
Nordsee
SCHOTTLAND
GROSS-BRITANNIEN
IRLAND
NIEDER-LANDE
BELGIEN
DEUTSCHLAND
POLEN
WEISS-RUSSLAND
UKRAINE
KASACHSTAN
FRANKREICH
TSCHECHIEN
SLOWAKEI
ÖSTERREICH
UNGARN
MOLDAWIEN
RUMÄNIEN
Kaspisches Meer
Schwarzes Meer
BULGARIEN
GEORGIEN
ARMENIEN
ASERBAIDSCHAN
TÜRKEI
USBEKISTAN
TURKMENISTAN
PORTUGAL
SPANIEN
ITALIEN
GRIECHENLAND
Ionisches Meer
Ägäis
ZYPERN
SYRIEN
IRAK
IRAN
AFGHANISTAN
TUNESIEN
ALGERIEN
LIBYEN
ÄGYPTEN
MAROKKO
ISRAEL
JORDANIEN
LIBANON
Biscaya
Keltische See
Der Kanal
Mittelmeer
Aralsee
Kaukasus
Karpaten
Pyrenäen
Alpen
Apennin
Balkan
Taurus
Zagros Gebirge
Mesopotamien
Ural

Temperature of geothermal water



Legislation to promote non-conventional gas reserves

Land	Stand der Gesetzgebung zur Förderung nicht-konventionelle Gasreserven
Germany	Ongoing evaluation of opportunities, risks, environmental regulation by federal agencies
Poland	Ongoing exploration of possible production sites
France	Prohibition of Hydraulic Fracturing (Fracking)
Italy	Fracking is not foreseen
United Kingdom	Temporary ban abolished in December 2012 - Explorations intended
Spain	Fracking ban in Cantabria / explorations in Aragon and the Basque Country intended
Sweden	Ongoing exploration of possible production sites

Institut Thomas More: Gaz de schiste en Europe. Analyse comparative dans 14 pays européens, Décembre 2012)

Types of operation schedule

- Basic operating plan: must contain general information about the proposed transaction, the technical implementation and the temporal procedures.
- For the entrepreneur there is the advantage during the implementation of the plan approval procedure that it contains also the water rights permit construction approval, the exemption of nature conservation law, among other necessary allowances, that normally should be applied separately.

  ⇨ The basic operating plan approval includes all these permits.

- As part of the review to the approval of operation plans, the competent authority examines the environmental impacts of the project. Therefore, there is a contrast to the traditional mining of coal or similar, because the geothermal utilizations do not have constant or new risks to the workers.
- Even if the authority has already checked the environmental impacts in the mining authorization process, a re-examination of the operational plan approval is necessary.
- Due to the possibility of adverse environmental impacts of EGS systems by smaller earthquake in reserved geologically sensitive zones, it is in the sense of the business operator that the impact should be avoided on the basis of the requisite process steps.

- Special operating plan: special request of the authority for certain of the operational information or certain projects, in particular in case of bore dismantling when water is not discovered.
- It also presents detailed security measures, for example the description of the execution of the drilling (depth, deviation, etc.) and the potential groundwater contaminants that may be caused by the project.
- The fixing of bailouts, which the authority normally makes with all plan and operating approval, is in the initiator's discretion. It is primarily used to secure the fulfillment of the prerequisites for admission. This may be the case if the economic power of entrepreneurial is questionable or if the authority deems the bailout by general principles.

- Main operating plan: is for the initiator the most important plan, because he must define the principal points of the operational with it. For that reason the entrepreneur needs to be creatively active, in order to convey the authority with "a comprehensive picture of the planned operating system and device and its production“.
- This plan includes, for example, the description of the exploration drilling in the field, the later bore for the extraction of geothermal energy, as well as the reinjection of liquids and the system of energy production.

Rights of the land owner

- If the the owner of the ground on surface owns the geothermal resources too, it may turn into a difficult situation, as for a larger project multiple owners will be concerned, whilst for deep geothermal project very time would be consumed.
- Normally the state/crown owns the underground resources. Therefore the exclusivity of the mining law concession brings the obligatory tolerance of land owners. In administrative courts is considerably difficult to obtain a favorable sentence against the exploration and extraction. The land owners have often to rely on compensation claims.
- The main question is, what extent the mining law concession concept for geothermal utilizations allows, especially in areas with seismic activity and whether the neighborhood acceptance is necessary.

- In case the ownership is with the state, the following items are crucial for geothermal development:

1. Who can apply for a license (non-discriminatory process)
2. One- or two-step-process (exploration, exploitation)
3. Time period for which a license can be obtained, possible prolongations
4. Royalties (based upon what parameter? Fixed or as a percentage of production?)
5. Time for obtaining a license

[Gaßner, Groth, Siederer & Coll.]

www.ggsc.de

We thank you for the attention.

Dr. Thomas Reif

Gaßner, Groth, Siederer & Coll.
Partnerschaft von Rechtsanwälten

Martini Park
Provinostr. 52 ▪ 86153 Augsburg

Tel. +49 (0) 821.747 782.0
Fax. +49 (0) 821.747 782.10
E-Mail: reif@ggsc.de
www.ggsc.de
www.geothermiekompetenz.de