



Co-funded by the Intelligent Energy Europe
Programme of the European Union

GEOELEC

Deliverable n° 4.1 -APPENDIX I

Report presenting proposals for improving the regulatory framework
for geothermal electricity - Appendix 1

Date : September 2013

Authors: S Fraser (BRGM),

APPENDIX I OVERVIEW OF NATIONAL RULES OF LICENSING FOR GEOTHERMAL

The sole responsibility for the content of this publication etc. lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EACI nor the European Commission are responsible for any use that may be made of the information contained therein.

APPENDIX I

OVERVIEW OF NATIONAL RULES OF LICENSING FOR GEOTHERMAL

The purpose of this appendix is not to provide a complete overview of the existing licensing systems governing geothermal exploration and development in European countries.

Its purpose is rather to highlight the commonalities and differences between some existing national licensing systems that are effective to date.

Although these existing licensing systems for geothermal show some differences, it may be noted that they also share strong similarities. These similarities allow for the identification of the broad outlines of a licensing system towards which all European countries shall progress.

In these considered legal frameworks, some issues however remain unaddressed such as competition between different underground activities and the means to fully protect geothermal reservoir exploration and development from underground interferences.

On the contrary, some countries do not benefit from any rules framing the exploration and development of geothermal energy (e.g. UK, Switzerland). Instead, rules of permitting apply to drilling activities and their potential impact on the environment or groundwater. In this case, these rules of permitting are briefly discussed, although they do not amount to true licensing systems thus not allowing the protection of exploration and development rights within a certain area and for a given time period, and therefore not securing potential investment in the geothermal electricity sector.

As a consequence, it is obviously towards the implementation of an effective licensing system, as presented in this report, that those countries shall aim at. Some countries are most aware of this overriding objective and have already achieved some legal reforms in this respect (e.g. Hungary).

Legal and financial certainty for geothermal electricity development at European stage can only be genuinely achieved at the cost of an effective and pragmatic licensing system being in force in each European country. National policy makers are most aware of this reality and shall be further encouraged in their efforts to reach such effective licensing rules for geothermal.

FRANCE

Legal framework

- Exploration and production of geothermal resources fall under rules of licensing provided by mining law. French mining law is scattered throughout the mining code (voted by the Parliament) and several decrees which are made by the government and which precise the way the law must be applied (see *infra* 'References').
- Depending on the targeted geothermal resource being below or above a 150°C threshold, different licensing authorities are competent and different rules of licensing apply. This notably aims at alleviating the regulatory burden for shallow geothermal projects.
- To some extent and under certain circumstances, geothermal exploration and production may also have to abide by other legislations than the mining law. This is particularly true when considering drillings over a 100-meter depth or the issue of the prevention of groundwater pollution. In such circumstances, geothermal developers may have to meet requirements from other legislations. However, in order to avoid redundant statements and administrative steps, the mining law provides for some regulatory gateways so that the whole relevant data needed to fulfil all legislative requirements can be submitted to the geothermal licensing authority at once and for all.

General principles

The French mining law distinguishes two steps in every mining project, including geothermal: the first one is exploration and the second one production. Therefore, the rules of licensing consist in two permits: the **exploration license** or the **production license**. The overall objective of these permits is to check that the underground will be explored or harnessed quickly and efficiently. The public authority is looking for ambitious projects to valorise this national wealth that is located in the underground. For this reason, a competition will be organised to identify the best project. The financial and technical capacity of the project developer will be checked. A second objective attached to these permits is to secure the investment made by the project developer so that, for instance, the company which spends money to explore an area is sure to be the one which will exploit the resource that it will have identified during exploration.

In addition to these permits, it is necessary to obtain a specific permit for each operation that is performed in relation to the underground, in order to prevent pollutions and industrial risks. Drillings

and stimulation will for instance be strictly controlled. This step consists in the delivery of a **work permit** which can be in relation to an exploration or a production step.

It should be noted at this stage that only rules of licensing for deep geothermal (>150°C) are now laid out. These rules are globally the same as the one for oil & gas or mineral resources.

Rights conferred by the license

The exploration license gives the licensee the exclusivity for exploration of the geothermal resource within the defined area and for the time specified in the license. The term can be set up to 5 years and may be extended twice.

The production license gives the geothermal developer an exclusive right to use geothermal energy within a defined area for the time specified in the license. The term of a production license may be up to 50 years. It may be extended for 25 years.

During the validity period of the exploration license, its holder is the only one who may obtain a production license concerned with the area and geothermal resources provided for in the exploration license.

Application for licences

As far as the application for an **exploration license** is concerned, the application file shall include:

- The identification of the applicant;
- The proof of his financial and technical capacity;
- A technical brief and relevant maps;
- The program of contemplated work;
- An environmental impact statement*;
- A financial commitment specifying the minimum cash amount that the applicant intends to spend for exploration;
- If need be, the consent of the holder of an existing license;

**The French Environment Code has recently undergone a deep overhaul paying heed to the need to bring the French environmental legislation into line with the EU requirements dealing with environmental impact assessments. Following this reform, the notion of 'environmental impact statement' (less demanding than the environmental impact assessment) does no longer exist. However, mining decrees do not incorporate this legislative change yet. In practice, the geothermal*

licensing authority usually requires an environmental impact assessment to be submitted when appropriate.

The application file for a **production license** shall include the same piece of information. It shall however include in addition, and when required, the convention agreed upon by the applicant with the holder of an existing license, let it be a license for mining or for carbon capture and storage, and setting their respective rights and obligations.

The application for an exploration work permit or a production **work permit** shall include:

- The identification of the applicant;
- The main characteristics of the contemplated work including all necessary documents and maps;
- An environmental impact assessment;
- A brief specifying the methods of exploration or production;
- A health and safety report;
- A brief indicating, on a provisional basis, the conditions under which work will be terminated as well as an estimation of the cost of this termination;
- A report setting out the potential impacts of the contemplated work on water, appropriate measures to compensate such impacts and the compatibility of the project with the regional masterplan for water management and development;

Competent authorities and main steps of the licensing procedure

→ Exploration

The application is submitted to the Minister of Mines and examined by the local representative of the State (*'Préfet'*).

The Préfet publishes a competition notice in the French Gazette. Counter-applications can be submitted within 1 month from the date of publication.

Competent authorities, including the regional environment directorate (DREAL), are then required to provide their formal opinion on the application.

The Préfet then submits these opinions as well as his own advice to the Minister. He shall do so within 3 months from the date the competition notice is issued.

The Minister of Mines receives the analysis of its technical services (the General Directorate for Energy and Climate), submits its decision to a General Council notably in charge of Mines and eventually decides. When he remains silent for 2 years, the application is rejected; that means that the Minister shall actually comply with a 2-year time limit to provide his decision on an application for an exploration license.

→ Production (operation and development)

Here again the competent authority to deal with the application is the Minister of Mines. The Préfet deals with the examination of the application.

The application for a production license requires a 1-month public enquiry to take place. An effective press release announces the public enquiry. If no exploration license has been issued previously, competition shall also be allowed. A competition notice is published in the French Gazette and counter-applications can be submitted within 1 month.

Competent authorities, including the DREAL and the geographically concerned mayors shall then provide their opinion on the application.

The Préfet then submits these opinions, the comments raised during the public hearing as well as his own advice to the Minister. These documents are analysed by the General Directorate for Energy and Climate of the Ministry and the draft decision is submitted to the General Council in charge of Mines.

The production license is granted in the form of a decree issued by the Council of State. When the application is rejected, the refusal takes the form of a Ministerial Order. In theory, the Minister has a 3-year time limit to provide his decision on the application. In practice however, a production license is usually granted between 6 to 9 months from the date of the application.

→Permits for exploration/production work

Permit applications for exploration or production work must be sent to the Préfet. The Préfet then organizes a public enquiry.

State services and geographically concerned town councils are required to provide an opinion within 1 month after public enquiry.

On the basis of the application file and the opinions of aforementioned competent authorities, the Préfet decides to deliver the permit or not. This procedural step is quite significant in the overall licensing process as the environmental impact of the geothermal project as well as its compliance with the interests protected by the environmental legislation are usually assessed at this stage i.e. when considering the application for a work permit. In particular, the environmental impact assessment provided by the developer in his application file shall address potential induced seismicity issues when relevant.

The Préfet may then deliver the permit and attach conditions he deems fit to prevent, minimize or compensate the potential environmental impact of the geothermal project. In particular, he may require the developer to measure seismicity on the geothermal field so as to avoid any adverse effect on time. Such conditions are currently in force in relation to some significant projects, such as the Soultz-sous-Forêt site, where seismicity sensors have been installed.

Once the permit has been issued, the Préfet may later dial down or tightened the conditions attached to it as he thinks appropriate.

The developer shall in any case report to the Préfet on the progress of work and shall inform him of any contemplated modification in the on-going work, existing structures or applied methods.

General rules governing the license

The developer must annually report to the Préfet on the compliance with the work programme, the work already accomplished and forthcoming activities.

The licensee shall always maintain the technical and financial abilities on the basis of which the license has been granted. He shall inform the Minister of Mines of any circumstance likely to compromise the viability of the project.

Where the production license is not granted to the holder of the exploration license, the production licensee shall provide compensation to the exploration licensee, provided results of exploration are technically worthwhile for the production licensee.

In the same way, where exploration or production of the geothermal field is made on private land, the landowner shall receive fair compensation.

The licensee may apply for extension, transfer and farm-out of the exploration or the production license.

Conclusions and perspectives

The French mining law specifically addresses geothermal licensing. It provides for a two-step process requiring an exploration and a production license to be obtained. In addition, a work permit must be obtained for each work carried out during any of these two phases that can have an environmental impact (drilling, stimulation, etc.).

In the framework of this licensing and permitting process, room is left for the geothermal licensing authority to consider all the varied issues that may stem from a geothermal project, including the induced seismicity that may be generated. In this respect, the licensing authority may impose conditions upon geothermal developers to mitigate any adverse effect that may occur. This power entrusted to the geothermal licensing authority ensures that the project fulfils legal, environmental and public acceptance requirements. It should be noted that a public inquiry is organised for each work permit.

In this context, the French authorities intend to conduct a reform of mining law. The scope of the reform shall include rules of licensing. It shall also deal with better public information (which was, for work permits, lighter for oil & gas than for geothermal and which is not organised for the exploration and production licences); it should also include some further regulatory relief for shallow geothermal projects, qualified as being of '*minimum significance*', to be understood as being unlikely to have adverse environmental impacts. For the time being, the regulation of these operations is unclear and not appropriate to develop the geothermal applications for the heating and cooling of buildings.

References

- The French mining code;
- The Decree No 2006-648 on mining licences and underground disposal as effective 2nd of June 2006;
- The Decree No 2006-649 on mining work as effective 2nd of June 2006;
- L'étude d'impact version "Grenelle 2", La Gazette, 28 mars 2011, http://www.seban-associes.avocat.fr/fichiers/pub_etudedimpact.pdf?PHPSESSID=io8r75r7gv0c62871j6jdvjgf1;
- Bézèlques-Courtade S., Martin J.C. (2011) – Synthèse de la réglementation française codifiant la recherche et l'exploitation de l'énergie géothermique. Rapport final. BRGM/RP-60195-FR, 110 p., 8 ann.;
- Etude Mines, Editions legislatives;
- GTR-H project, Country report for France;

ICELAND

Legal framework

- Research and utilisation of geothermal resources is subject to licensing according to the Act on Survey and Utilisation of Ground Resources No. 57/1998;
- Research and utilisation of geothermal resources are also subject to the Nature Conservation Act, the Environmental Impact Assessment Act and the Planning and Building Act;
- The same rules of licensing apply, regardless of the depth or temperature of the targeted geothermal resource;
- Exploration and development licenses cover both the right of exploration or development and the permitting of work on the geothermal field;

Application for licenses

Applications for prospecting and utilisation licenses shall reveal in a clear manner the purpose of the application and contain detailed information on the proposed operations of the applicant. It shall in particular include an environmental impact assessment.

Competent authorities and main steps of the licensing procedure

→ Exploration

A prospecting license must be sought from the Ministry of Industry. This is a general rule, whether exploration is planned on public or private land. In this regard, a prospecting license can be granted to other persons than the landowner. Although the competent authority remains the Ministry of Industry, legislation provides that licenses can be granted by Orkustofnun (the National Energy Authority) on behalf of the Minister.

The application is officially announced and the Minister of Industry may post a single advertisement for applications for a prospecting license. No competition takes place but this notice in the Official Gazette gives all interested parties the right to inspect the application and submit their views within 4 weeks from the publication of the notice. Then Orkustofnun has 2 months to evaluate the application and the remarks made.

The opinion of Orkustofnun, the Ministry of Environment and the local government shall be obtained before a license is granted. They shall submit their comment within 2 months from the date they have been requested for comment.

Conditions can be attached to the license to ensure the Act on Survey and Utilisation of Ground Resources is complied with. The Minister or Orkustofnun may also attach conditions deemed necessary, in particular regarding interference that may occur with mining already in progress or possibilities of later utilisation.

➔ **Development**

An utilisation license for exploitation of geothermal resources, whether on public or private land, must be sought from the Minister of Industry. Here again, Orkustofnun can grant licenses on behalf of the Minister.

A landowner does not have priority for an utilisation license on his land unless he holds a prospecting license.

The Minister of Industry may post a single advertisement for applications for an utilisation license. Here again, the opinion of Orkustofnun, the Ministry of Environment and the local government shall be obtained before an utilisation license is issued. And here again, interested parties may comment on the application.

In granting utilisation licenses, the Minister or Orkustofnun shall take care that the utilisation of geothermal resources is carried out in a manner which takes account of environmental viewpoints, that the utilisation of the resources is efficient from a macro-economic point of view and that account is taken of any utilisation already begun in the vicinity. If the Minister is of the opinion that the applicant for an utilisation license does not meet these requirements, he may refuse to grant the license or insert special conditions in the license.

➔ **Rights conferred by the license**

The prospecting license confers the right to search for the geothermal resource within a specific area during the term of the license, survey extent, quantity and potential yield. The Minister is authorized in a prospecting license to give assurances of precedence to an utilisation license for up to 2 years from the expiry of the term if the prospecting license and that another party will not be issued a prospecting license during such time.

An utilisation license permits the license holder to extract and use the geothermal resource during the term of the license within a specific area. The maximum term of up to 40 years can be decided and it may be extended. Besides, under the Icelandic legislation, the licensee may not benefit from a perimeter of protection that would preserve his geothermal reservoir from any underground interference.

➔ **A prospecting and an utilisation license shall specify:**

- The boundaries of the geothermal area;
- The term of the license as well as the time limit for the work to begin and be completed;

- Provisions on quantity and rate of utilization;
- The approval from Orkustofnun of the preliminary drawings of any proposed structure;
- Safety and environmental protection measures to be complied with;
- The obligation of the licensee to inform and notify, including the obligation to provide samples and documents and how this obligation should be met;
- The obligation of insurance purchase for any potential liability of the license holder for damages;
- Monitoring and cost of payment for monitoring;
- Payment of a license fee to meet the cost of issuing the license;
- The manner of disposal of extracting structures and equipment following the end of the license term;
- Clean-up of work areas and land that has been altered in the course of prospection or development;

General rules governing the license

Before the holder of an utilisation license begins extraction on private land, he needs to reach an agreement with the landowner on compensation for the resource or obtain permission for expropriation. If no agreement on compensation or permission for expropriation is reached within 60 days following the date of issue of the utilisation license, the license is cancelled.

In any case, an utilisation license is cancelled where the utilisation of the geothermal resource has not started within 3 years of the issuance of the license.

If a landowner has himself had geothermal resources surveyed on his private land, but has not been granted an utilisation license, he may claim the utilisation licensee the verifiable cost of the survey, its market value if any, against surrender of the conclusion of the survey, provided they are useful to him.

If a license holder does not comply with conditions attached to the license or contracts relating to the license, the Minister of Industry shall issue a written warning and provide time limit for rectification. If not, the license may be revoked.

Orkustofnun is responsible for monitoring geothermal areas where a license has been issued. Orkustofnun reports to the Minister of Industry on the conduct of exploration and extraction. In this regard, Orkustofnun ensures that exploration and extraction abide by the Nature Conservation Act.

Parties extracting geothermal energy shall conduct such extraction so as to maximise long-term efficiency. This includes not extracting more geothermal energy than necessary. Drilling shall be conducted in a manner that will cause the minimum possible inhibition of further utilisation.

The holder of a prospecting or utilisation license shall at least once a year, and at the end of the license term, submit to Orkustofnun a report containing information on the results of exploration and utilisation, on the nature and the extent of the resources, total quantity and assessment of the value of the geothermal resource utilised and further matters as provided in the license.

The licensee shall also submit geological samples at the request of Orkustofnun. In case of drilling, a journal shall be kept to provide information and be left at the disposal of Orkustofnun. This data is subject to confidentiality during the effective term of the license.

Exploration and utilisation licenses are non-transferable and cannot be used as security for financial obligations except with the permission of the Minister.

Short additional description

The Icelandic government decided in 1997 to develop a Master Plan for hydro and geothermal energy resources. According to the Master Plan, all proposed projects are being evaluated on the energy efficiency and economics but also on the basis of their environmental impact.

References

- Legal Framework and National Policy for Geothermal Development in Iceland, Ketilsson et al., Proceedings World Geothermal Congress 2010;
- Orkustofnun website (<http://www.nea.is/geothermal/legal-and-regulatory-framework/>);
- Act on the survey and utilization of ground resources No. 57/1998 as amended by Act No. 5/2006;
- Electricity Act No. 65/2003;

THE NETHERLANDS

Legal framework

- Exploration and development of geothermal resources under 500 meter depth are subject to licensing in accordance with the Environmental Management Act and the Groundwater Act;
- Exploration and development of deep geothermal resources (>500 meter depth) are subject to licensing under the Mining Act and the Mining Regulation. It must be pointed out that rules of licensing for deep geothermal, being of concern here, are those that apply in relation to oil and gas activities;

Application for licenses

For both exploration and development licenses, the application file shall include:

- Some general information such as the identification of the applicant;
- Some financial details such as the manner in which the applicant intends to finance the intended exploration or possible production;
- Some technical details;
- The local geological situation and subsurface description;
- The area applied for with relevant map;
- The period the license is applied for;
- The proposed installations and operating methods during the drilling activities including the safety precautions and methods to prevent pollution and nuisance;
- The effects on the sub-soil including risks of subsidence and proposed measures to avoid them;
- The expected timeframe of the proposed activities;
- The potential interference with other applications;
- The envisaged results;

It should be noted that, although the application file shall state the methods envisaged by the applicant to prevent pollution and nuisance, no environmental impact assessment is required as such.

In addition, the application file for an exploration license shall include:

- A program describing the reconnaissance and exploration activities the applicant intends to carry out, the pertaining time schedule and techniques that will be used;

- A geological report detailing at least: the exploratory surveys used for the support of the application and other geological data, the interpretation of this data and the risk analysis used thereby as well as a description of the local and regional geology;

As for the application file for a development license, it shall also include:

- An estimate of the expected geothermal resource;
- A multi-annual program describing the production activities to be performed , techniques used thereby and an estimate of the annual production, investment and operating costs;

Competent authorities and main steps of the licensing procedure

➔ **Exploration**

The competent authority is the Minister of Economic Affairs.

The official licensing process being a two-step process, the geothermal developer shall first apply for an exploration license. Only when the geothermal resource will be located shall he then apply for a production license.

However, the exploration license gives right to explore but also allow for drillings to take place, which are used for production. Nevertheless, as soon as the production levels are stable the exploration license shall be replaced by a production license. In any case, before drilling starts, the developer shall obtain a BARMMA i.e. a notification that drillings are performed in a safely and environmentally sound way.

The application for an exploration license is published in the State Gazette offering a period of 13 weeks for counter-applications. Once the 13 weeks have passed, advice is collected from TNO (Geo-Sciences Group), SODM (State Supervision of Mines) and the Provincial executive of the province in question. The application and counsels are then forwarded to the Mining Council.

Eventually, the Minister issues the license and publishes his decision in the State Gazette. The Minister shall reach a decision on an application for an exploration license within 6 months after its receipt. This period can be extended once only, by a maximum of 6 months.

➔ **Development**

Once the first well has been drilled and tested under the exploration license, a production license can be applied for, here again to the Minister of Economic Affairs. A development license will only be granted if an economical geothermal production is ensured.

Here again, the application is published in the State gazette and counter-applications can be made within 13 weeks.

Once 13 weeks have passed, advice from TNO, SDOM, the Provincial executive and the Mining Council is sought.

When issuing a production license, the Minister particularly takes into account:

- The technical and financial capacity of the applicant;
- The manner in which the applicant intends to carry out his geothermal activities;
- The sense of responsibility for society that the applicant has demonstrated in activities under previous licenses;

As for the exploration license, the production license specifies the area and term of the license.

Here again, the Minister shall reach his decision on an application for a production license within 6 months, with a possible 6-months extension.

➔ **Informal practice**

Although rules of licensing provide for a two-step process for exploration and production licensing, there is a current tendency to replace this process by a one-step process where the first exploration step is avoided and developers apply for a production license at first in cases where sufficient information on the geology is available and the economic viability of the production can be expected.

Rights conferred by the license

The exploration license gives the developer the right to explore the defined area during the specified time period and to undertake some drillings. The development license gives him the right to use the geothermal resource for the planned use.

As a general rule, earlier license holders should, within their license area, not be negatively affected in their operations by later applicants for production licenses. In this regard, the license area is defined so as to prevent such interference.

Besides, the holder of an exploration license who, under the terms of that license has demonstrated the presence of the relevant geothermal resource.

General rules governing the license

If a license for the production applies to an area in which a reservoir is present which can reasonably be expected to extend beyond the boundary of the license area, the license holder is obliged to cooperate in reaching an agreement with the license holder of the adjacent area.

The holder of a license must take all steps that can be reasonable be expected to prevent that as a result of the activities carried out:

- Adverse consequences for the environment are caused;
- Damage as a result of soil movement is caused;
- Safety is jeopardized;
- The interest of a systematic management of terrestrial heat is jeopardized;

The production of geothermal energy is carried out according to a production plan, which needs to be approved by the Minister of Economic Affairs. The production plan set forth:

- The expected geothermal resources and their location;
- The commencement and duration of the production;
- The manner of production and the activities relating thereto;
- The expected annual production;
- The annual cost of production;
- The soil movement as a result of the production and the measures to prevent such a soil movement;

The Technical Committee Soil Movement provides its advice to the Minister on this plan. The Minister may refuse his consent, approve the plan subject to restrictions or later withdraw his consent and amend the restrictions with regard to management of technical heat and the risk of damage as a result of soil movement.

The Minister may attach conditions to an exploration or a production license with regard to, notably, safety, the protection of the environment and the limitation of damage as a result of soil movement.

Annually, the licensee submits a report to the Minister of Economic Affairs on the progress of the execution of the production plan and on any deviation from that plan. In case of significant deviations, the licensee is required to submit an update of the production plan, again to be approved by the Minister.

State mining services are in charge of monitoring the carrying out of reconnaissance survey, exploration and production of geothermal energy. Annually, the General Inspector of Mines shall issue an annual report to the Minister on operations that took place during the year, including his recommendations for the purpose of the efficient and dynamic handling of future activities.

So far, potential alternative use of the area concerned with geothermal energy production are not considered to be a reason for refusing a license except for those that interfere with existing licenses.

Short additional description

The most recent review of the legal framework for geothermal can be found in the 2011 Actieplan Aardwarmte by the Ministry of Economic Affairs, providing a vision of the potential for geothermal in the Netherlands and methods on how to reach such potential.

A consultation process conducted by the Ministry of the Environment and the Ministry of Economic Affairs is currently addressing the particular issue of competing underground uses. The idea is to develop the tools for comparing underground resources uses.

References

- Mining Act of the Netherlands (Mijnbouwwet), as effective 1st of January 2003 and amended in 2006, 2008 and 2009;
- Mining Regulation of the Netherlands, as effective 1st of January 2003;
- GTR-H project, Specific framework for geothermal regulation, Final version, Deliverable D 17, Recommendations and template for country specific action plans;
- Stichting Platform Geothermie, The Netherlands Country Report, Legal Framework & Geothermal Policy Issues;
http://geothermie.nl/fileadmin/user_upload/documents/bestanden/Engels/Dutch_Country_Report_Legal_Framework_1_3.pdf

SWITZERLAND

Legal framework

- There is currently no national licensing framework in Switzerland for mining or underground activities, such as geothermal energy. This legal gap leads to conflicting underground uses where activities may take place in secrecy and the first-come first-served principle unfortunately applies. However, efforts are being made to incorporate a strategy and rules of licensing for underground uses into the national planning law.
- Shallow wells usually fall under private law and are excluded from any permitting system. On the contrary, inserting a geothermal probe requires a permit. Town councils are competent to issue these permits.
- Despite the lack of national legislation, geothermal energy is usually governed in many cantons by legislation on water protection and permits are required to ensure the project complies with the said legislation. In addition some cantons have created some instances to deal with deep geothermal and are working on adequate rules of licensing for geothermal. For instance, the canton of Aargau is currently considering a legislative project for relevant licensing. The outlines of this legislative project are briefly summarized.

Example of the Aargau canton's project for rules of licensing dealing with deep geothermal

→ Exploration of geothermal resources

An exploration license shall be applied for to competent authorities. The exploration license would be limited to the time needed to adequately fulfil exploration. When necessary, it could be extended for an adequate time period. The exploration license would expire where no exploration is undertaken within 2 years from the date the license has been issued. The exploration license would not be transferrable. In addition, the granting of an exploration license would not guarantee the issue of a development license.

The application for an exploration license would be published in the cantonal Gazette and counter-applications could be submitted within 3 months. The applicant would be regarded as having the technical skills and financial capacities that he declares in his application.

When exploration requires private land to be intruded on, a fair compensation should be paid to the landowner.

The cantonal authorities would be free to communicate the results of exploration.

➔ **Development of geothermal resources**

The development of deep geothermal resources would require a development license ('Konzession') to be applied for. The competent body to grant the development license would be the Regierungsrat.

The license would be issued for a maximum 30-year term. The term may be longer provided the geothermal developer cannot amortize his investments within 30 years.

Here again, the application for a Konzession would be published and competition would take place. Counter-applications may be submitted within 3 months.

In his application file, the geothermal developer would notably have to prove:

- That the contemplated structures are adequately installed, used and maintained;
- That the financing of equipment, exploitation and dismantling is provided for;
- That a sufficient insurance coverage is agreed upon;

If the holder of the exploration license is, thanks to the exploration he has carried out, better able to launch the production phase, he shall be given the preference for Konzession over competitors.

The license notably sets the area and term of the license, the obligations to meet in case of the Konzession terminating and calculations of the license fee. The Regierungsrat may include additional provisions relating to the commissioning of the plant, security operations, purchasing of the license and financial compensation for transferring the license.

The holder of the Konzession shall compensate the holder of the exploration license for the results of the exploration campaign that are worth to him.

The Regierungsrat shall approve any transfer of the development license. Any substantial modification or transfer of the license shall be subject to the same rules of licensing than any initial application.

Cantonal authorities shall monitor the geothermal production, structures installed on the geothermal field and the decommissioning. They may visit the site any time.

UNITED-KINGDOM

The Konzession may be revoked if the conditions met at the time of application are no longer fulfilled or if the Konzession was granted on the basis of false information.

Short additional description

Again, the above description relates to a legislative project currently discussed in the Aargau canton and does not reflect the national legal background. Although no national rules of licensing exist in Switzerland, OFEN, the Federal Office for Energy overtly supports the efforts of the cantons to provide adequate rules of licensing for deep geothermal.

References

- Braucht es neue Regelungen für eine untertägige Raumplanung? Situationsanalyse zum Stand der Planung im Untergrund, Susanne Haag, Juli 2011;
- Weshalb sich die Raumplanung um den Untergrund kümmern muss, Kantonsgeologenkonferenz 27.05.11, ARE Sektion Planung, Lena Poschet;
- Gesetz über die Nutzung des tiefen Untergrunds und die Gewinnung von Bodenschätzen (GNB);
- Journée romande de la géothermie 2010, Rapport final, Potentiel, recherche et développement de la géothermie, Avancement des projets d'importance dans le canton de Vaud et en Suisse romande, Confédération suisse/OFEN/DETEC ;

Legal framework

- There are currently no rules governing rights of exploration and development of geothermal resources in the UK.
- Geothermal developers shall however obtain planning permission for the geothermal plant and a number of environmental permits and consents. These permitting rules are summarized below. However, unlike rules of licensing, such permitting rules cannot secure investment in the

geothermal sector and ensure its full development, as after demonstration of a successful well in one area, there is a real danger of another developer coming in and drilling nearby.

→ Planning permission

For geothermal plants generating less than 50 MW, the competent authority to issue the planning permission is the Local Planning Authority (LPA) or the Secretary of State, shall the permission be appealed.

When issuing the planning permission, the LPA takes into account planning as well as environmental considerations and other competent administrative bodies shall be consulted such as the Environment Agency and English Heritage.

For geothermal power plants generating more than 50 MW, the competent authority for issuing a planning permission is the Infrastructure Planning Commission (IPC). Planning permission takes the form of a development consent order.

→ Environmental permits and consents

The permission of development and operation of a geothermal plant requires:

- An environmental permit;
- A water abstraction license, for abstraction exceeding 20 m³/day;
- An hazardous substance consent, depending on the quantity of toxic metals and substances in the sludge by-product of geothermal activities;
- A conservation area consent, where geothermal development is to take place in a European Special Protection Area, a Special Area for Conservation or a UK Site of Special Interest;
- The consent of the landowner to avoid liability for trespass;

Additional description

The Draft Energy Bill has been discussed in the past months. In the course of the discussion, Lord Marland, the trade Minister, maintained that the UK government is looking at the practicalities of implementing a licensing system for deep geothermal in the UK. In this perspective, the option of transposing the licensing system existing in Ireland has been considered. It has also been suggested that the UK licensing system could be managed through local planning consents.

Nevertheless, the Minister has stressed that specific licensing rules for the UK were the best option. He pointed out that as the UK legal system is silent on the issue, a whole licensing had to be created from scratch, which is a complex, costly and time-consuming process.

The Minister statement was made in response to an amendment to the Energy Bill proposed by Lord Teverson.

The amendment was written as follows:

“Geothermal power

(1) Within eighteen months of this Act coming into force, the Secretary of State shall, after a period of consultation with industry, geological experts, the devolved administrations, local authorities, energy producers and other interested parties, put into place for the United Kingdom a licensing system and regulations for the exploitation of heat from deep geothermal sources for both the direct use of that heat and for the generation of electricity.

(2) The licenses shall relate to—

(a) individual geographically delineated areas on land;

(b) the heat held by rocks greater than one kilometer below the surface.

(3) Licenses shall give exclusive exploration and production rights for the purpose of energy production from geothermal sources, both direct heat and electricity generation, to the licensee, for that area, and for a specific period of time.

(4) The Secretary of State shall lay down regulations for the method of allocation of licenses to those organizations wishing to explore or exploit those resources, or both.

(5) The Secretary of State shall undertake the first round of allocations within six months of the licensing regulations under subsection (1) being approved.

(6) Any organization already undertaking exploration or exploitation from geothermal sources within the United Kingdom, in that they have already undertaken, at the time the licensing regime comes into force, boring for the purpose of exploiting geothermal heat to below one kilometer, shall be entitled to hold the first license awarded for that license area, and any license fee or other consideration for that license area as a part of the licensing regime will then be determined by arbitration under rules determined by the Secretary of State reflecting the fees or other consideration paid for licenses deemed to have similar potential.

(7) The holding of a license for the exploration or exploitation of deep geothermal heat, or both, shall not convey any automatic rights in terms of planning permissions for surface development, or give any rights in terms of surface access.”

Following the Lords’ discussion in Grand Committee, and as required by the Minister, the amendment was however withdrawn.

The Energy Bill will be published by the end of November 2012. For now, it remains to be seen how the UK government will handle the process of establishing a licensing system for deep geothermal both for electricity generation and direct heat use. It should however be noted that the Lords Informal Working Group report on the Draft Energy Bill published in July 2012 considered that it would not be realistic to support technologies such as deep geothermal as they have not yet been demonstrated at scale. In this context, it seems unlikely that a proper licensing system for deep geothermal in the UK will be launched in the coming years.

References

- Geothermal power plant planning and environmental regulation, November 2012, Norton Rose Group
<http://www.nortonrose.com/knowledge/publications/32416/geothermal-power-plants-planning-and-environmental-regulation>
- Draft Energy Bill and Lords Working Group on the Draft Energy Bill
<http://www.decc.gov.uk/en/content/cms/legislation/energybill2012/energybill2012.aspx>
- Amendments to the Energy Bill, Grand Committee, 8th of February 2011, Amendment 35 moved by Lord Teverson

ITALY

Legal framework

- Geothermal energy is considered as a mining resource;
- A specific legal framework for geothermal has been introduced into the Italian legislation. Originally, exploration and development of geothermal resources were governed by the law No 986 dated 19th of December 1986 and its related presidential decree No 395 dated 27th of May 1991. Rules of licensing were the specific objet of the presidential decree 485 dated 18th of April 1994;
- More recently, the law No 99 dated 23d of July 2009 promotes the development and internationalization of pilot projects;
- The legislative decree No 22 dated 11th of February 2010 reshapes the legal framework for exploration and development of geothermal energy;

Competent authorities and main steps of the licensing process

→ Exploration license

The competent authority is the Region. However, where exploration takes place on the continental shelf or within the limits of the territorial sea, the competent authority is the Ministry of economic development in relation with the Ministry of environment.

The applicant shall apply for an exploration license by submitting information on his technical and financial capacity as well as his work program.

The application is then published in the official Regional Gazette and counter-applications can be submitted within 60 days.

When considering the application for an exploration license, the authority takes into account, notably:

- The interest of the contemplated exploitation;
- The geological knowledge of the applicant;
- The completeness and rationality of the work program;
- The way the work program deals with security and environmental issues;
- Expertise and experience of the applicant in the geothermal sector;

The applicant shall ensure he has a bank guarantee and an appropriate insurance for the exploration work envisaged.

➔ **Development license**

Here again, the competent authority is the Region. Here again, where exploitation of the geothermal resource is concerned with activities occurring in the territorial sea or on the continental shelf, the Ministry of economic development is competent in relation with the Ministry of Environment.

Within 6 months from the date geothermal resources have been found, the holder of the exploration license may ask the authority for a development license. Beyond this 6-months period, competition takes place. The application for a development license is published in the Regional Gazette.

When several applications are made, the authority takes into account:

- The rationality and completeness of the work program, in particular regarding the long-term management of geothermal reservoirs;
- The way the work program takes into account environmental and security issues;
- The experience and the expertise of the applicants in the geothermal sector;
- The planned schedule of the exploitation phase;

The applicant shall have bank guarantees and appropriate insurance.

→ **Common rules to both licenses**

Both for exploration and exploitation of geothermal resources, the applications, the licenses themselves as well as all decision relating to these acts shall be published in the Official Gazette.

Under certain circumstances the licenses can be revoked.

License holders shall submit an annual report on the results of exploration and exploitation.

Besides, some fees apply both for exploration and exploitation.

Rights of the licensee

The exploration license gives the holder the exclusive right for exploration within a defined area and a specified time period. The area cannot exceed 300 km² and the term can be set up to 4 years. The exploration license can be extended up to 2 years.

The development license can be granted up to 30 years.

General rules governing the licenses

Once the holder of the exploration license has found some geothermal fluids, he shall inform the regional authority, which in turn informs the public by publishing an official statement in the Official Regional Gazette.

Short additional description

In recent months, there is a growing demand for exploration licenses for geothermal electricity development. This has been explained by the great potential for geothermal electricity development in Italy and the refinement of technologies that may be used in order to generate such geothermal electricity.

References

- Normativa Nazionale in ambito geotermico, Energia Geotermica, Antonio Martini, Ufficio Nazionale Minerario per gli Idrocarbure e le Georisorse ;
- Esplosione di richieste per nuovi permessi di ricerca di risorse geotermiche idonee a produrre energia elettrica in Italia, Buonasorte Giorgio, Franci Tommaso, Consiglio Direttivo union Geotermica Italiana, Novembre 2011;
- Decreto legislativo 11 febbraio 2010;

GERMANY

Legal framework

Rules of licensing for geothermal exploration and development in Germany fall under two Federal legislative umbrellas:

- The Federal Mining law;
- The Water Framework Act;

As far as groundwater protection is concerned, water legislation at State level applies in addition to the Federal Water Framework Act, which is a national framework to be declined at State level and be applied by State water authorities. As a consequence, there are currently 15 different State water regulations in force in Germany.

In addition some related Federal legislation has to be considered in relation to geothermal projects (e.g. the Nature Conservation Act, the Environmental Impact Assessment Act).

In this context, geothermal energy is defined as a mineral resource. Prospection and exploitation of deep geothermal can only be done under licenses issued by the State Mining authority, which is usually the State Ministry of Economic Affairs, except in Hessen and Thuringia where the Ministry of Environment is competent. German law provides that when a mining license is required, which is always the case for deep geothermal, other aspects such as water protection and environmental issues are dealt with by the Mining authority in collaboration with the relevant offices and necessary approvals are included in the mining license.

When the geothermal project involves the use of groundwater, a license shall also be obtain from the State Water authority.

It should also be noted that the Federal Mining Act also requires any drilling over 100 meters depth to be subject to supervision by Mining authorities. This however is of no relevance to the licensing process and is mainly concerned with technical and management reasons.

It should be noted at this stage that only the process relating to issuing the mining license is laid down.

Competent authorities and main steps of the licensing process

Regarding the German mining legislation, rules of licensing rely on a two-step process. In relation to geothermal exploration, the developer shall first obtain an exploration license and then, secondly, the approvals of his operation plan for exploration. In relation to geothermal development, here again the developer shall first obtain a development license and then, secondly, the approval of his operation plan for exploitation.

Application for an exploration license or a development license shall be made in writing to the competent State Mining authority. However, the prerequisite for any exploration or development is for the geothermal developer to gain the consent of the landowner.

The State Mining authority has to issue the license, unless one of the legal bases to refuse it is met.

The State Mining authority may refuse to grant an exploration license where, inter alia:

- The resources concerned are not sufficiently known;
- The work program is inadequate;
- The geothermal developer does not engage in delivering the results of exploration no later than the date the license term expires;
- The geothermal developer, as a legal person, is deemed unreliable;

A development license for exploitation may be refused in particular where exploitation is not considered viable.

If the application for a license is concerned with an area where another license is already in force, the Mining authority shall inform the holder of the existing license that an application has been made. If, within the three months that follow the notification of the application to the holder of the existing license, he decides to submit an application, he is given precedence for obtaining the license applied for.

Where several applications are made, the Mining authority shall decide to issue the license on the basis of the credibility of the applicants' arguments for a systematic and relevant exploration or development.

While assessing the application for a license, the State Ministry shall give the authorities in charge of public interest protection the opportunity to give their opinion. These authorities are the geological survey, the water authority, and the authority for nature conservation, planning authorities as well as town councils on which territory the exploration or development is considered. In particular, for geothermal projects concerned with underground water, the State water authority shall give its own independent consent and takes its decision regarding the regional conditions.

In general, the application for an exploration or a development license is examined within 2 to 3 months. Usually, operation plans are examined in parallel to the application for licenses.

Application

Applications for an exploration or a development license shall notably include:

- The identification of the developer (name, persons and partners);
- Maps and work program (geological and geophysical prospection, drillings, performance tests, the expected heat, an estimate of the exploration risk);
- Schedule of work;
- Technical description of drillings;
- An estimate of the cost of the work program;
- Projections regarding the possible use of geothermal energy*;
- Financial aspects;

**The license is issued for a certain zone and a specified time. The license zone includes the surface delineation and the corresponding depth column. Thus the expected use (heat/electricity) may not yet be settled when exploration starts.*

In addition and as previously pointed out, the developer shall submit some operational plans. These have a 2-year term. Actually, there are five kinds of plans the developer is required to submit to the Mining authority:

- A long-term general business plan (< 50 years);
- The prospection plan to get allowance for prospection (2 years);
- The production plan to get the allowance for exploitation (2 years);
- The main operational plan which may cover up to 5 years;
- The short-term intermediate operation plans (2 years) for seismic, drilling and testing;

Rights of the license holder

The exploration license gives the geothermal developer the exclusive right for exploration within a defined area and for the specified resources. The license covers both the right to explore as well as any work and installation needed for the purpose of exploring the geothermal resource.

The exploration license can be granted for up to 5 years and may be extended for 3 years subject to the initial license zone not being sufficiently explored within the 5-year time period.

In the same way, the development license confers its holder with exclusivity for the targeted geothermal resource development within the license zone and for the time specified in the license. Here again, the development license includes authorization for work and installation needed for the purpose of exploiting the geothermal resource.

The exploitation license shall be granted for a reasonable time without exceeding 50 years. It may be extended for the purpose of fully exploiting the targeted geothermal resource.

The original license zone can later be extended where the competitive position of the geothermal developer is threatened.

General rules

The license may be transferred subject to the written approval of the Mining authority.

Through the operational plan, the geothermal developer shall comply with monitoring and reporting obligations as set by the State Mining authority.

Where the geothermal project involves drillings over 1000 meters depth or is considered in protected areas, including areas protected by the Flora-Fauna-Habitat Directive, or involves water abstraction, the operational plan shall include an environmental impact assessment.

Short additional description

Due to the coexistence of Federal mining law, Federal water legislation and State water legislation, with the different authorities thus implied, the system is rather complex. Although the licensing process seems to be operated quickly, some points still need to be addressed.

In particular the issue of the appropriate license zone to be granted as well as the adequate term of license to be set is still at the center of discussions.

Besides, the German legal framework does not specify any criteria to distinguish between shallow or deep geothermal. The right to explore or exploit is granted for a certain area, with the accompanying depth delineation, and only once the geothermal field is being prospected and developed can the targeted use (heat, electricity) be determined. In this regard, it is impossible for several geothermal activities to take place on the same site. The fact that the holder of an existing license shall be informed of any application made in the vicinity of his project and has precedence in the licensing process is no help to the impossibility for coexisting activities to take place.

References

- Feed-in tariffs, support policy and legal framework for geothermal energy in Germany, Proceedings World Geothermal Congress 2010, Bali, Indonesia, 25-29 April 2012, H. Gaßner;
- Genehmigungsverfahren für tiefen geothermische Anlagen -Bergrecht, Wasserrecht, Baurecht, Immissionsschutzrecht, Naturschutzrecht, Flächen und Wege für Leitungen, Strahlenschutzrecht, R.Brumme, 28. Mai 2009;
- Über ein Konzept zur Förderung, Entwicklung und Markteinführung von geothermischer Stromerzeugung und Wärmenutzung Bericht der Bundesregierung,
http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/bericht_geothermie_bf.pdf
- Gutachterliche Äußerung “Rechtshemmnisse für die Genehmigung Tiefengeothermischer Anlagen”, 3. März 2009, Becker, Büttner, Held;
http://www.erneuerbare-energien.de/files/pdfs/allgemein/application/pdf/gutachten_bericht_geothermie.pdf
- GTR-H project, Best Practice (BP) Country Report for Germany

HUNGARY

Legal framework

- Hungarian licensing procedure for geothermal falls under dual regulation of mining and water management. The Hungarian Mining Act XLVIII of 1993 was amended in February 2010.
- Different rules of licensing apply and different licensing authorities are competent depending on two parameters:
 - Whether geothermal exploitation requires water abstraction;
 - The depth of the targeted geothermal resource;

Basically, utilization of geothermal energy falls under the scope of the Mining Act XLVIII of 1993, and when water abstraction is involved, provisions of the environmental and water management legislation shall in addition be considered. Besides, depending on the targeted geothermal resource being above or below 2500 meter depth, a concession may be required.

Competent authorities and main steps of the licensing procedure

➔ Preliminary surface survey

According to the Mining Act, preliminary surface survey does not require a permit. However, the geothermal developer shall reach an agreement with the caretaker/user of the land and report the commencement of prospection to the mining authorities 30 days in advance.

➔ Open area (depth from 20/30m to 2500 m)

In case no groundwater abstraction is involved, the Regional Mining Inspectorate is competent to issue an exploration license and a license for the exploitation and utilization of geothermal energy occurring between 20m to 2500m, including the construction and putting into use of the related underground and surface facilities.

Where groundwater abstraction is involved though, the Regional Inspectorate for Environment, Nature and Water is the competent authorities and issues a license for the utilization of thermal groundwater occurring between 30m to 2500m ('water permit'). However, such license is simultaneously considered as a license for prospection, exploitation and utilization of geothermal energy and the Regional Mining Inspectorate intervenes in the procedure as a co-authority, notably

by delivering a technical-safety license for drilling. There are three types of water permit: the planning (preliminary) permit, the construction permit and the operation permit. In the course of this permitting procedure, production and reinjection wells have to be handled separately.

Most of the time, exploration and utilization of geothermal energy in this depth interval (open area) require groundwater abstraction. As a consequence, the Regional Inspectorate for Environment, Nature and Water is most of the time competent to issue the water permit serving as exploration and development licenses.

Application

Application for water permits (planning, construction and operation) has to be submitted to the Regional Inspectorate for Environment, Nature and Water.

The planning permit describes the general water management objectives and basic technical parameters of the planned activity and determines the amount of water to be used in the future but it does not authorize for drilling of wells or any kind of water utilization. The application for a water planning permit shall include, inter alia: the aim of the planned water use, the quality and quantity of the water to be abstracted, the time schedule, the planned methods for water treatment, the technology of the acquisition, the results of preliminary investigations if any, a location map, the area to be affected by the well and other water uses in the vicinity.

The construction permit is the one necessary for drilling, reconstruction or abandonment of a well. The application for a water construction permit shall notably include: the documentation relating to the property rights, information on the category of water use (public, private), the utilization purpose, the type of the targeted aquifer, the groundwater temperature, the exact location of the drilling, technical parameters of the operation, technical parameters of the well, a geological description of the location, a hydrogeological model, potential contamination sources and measures of protection.

The water operation permit is the one which authorizes the execution of water use within a given period. The application for an operation permit shall notably include the name of the operator, results of testing, the conditions, rights and obligations of operation and a hydrogeological report.

Rights of the geothermal developer

The water permits give the geothermal developer the right for exploration and development, including water abstraction. They can be modified both by the applicant and the Regional Inspectorate for Environment, Nature and Water over time. The water permit can be amended at the request of the license holder in case of the reconstruction of well, a different type of utilization

occurring, a different amount of water to be exploited or if the owner/the operator changes. The permit can be modified by the Regional Inspectorate in case the conditions on the basis of which the license was granted change.

The water permit can be withdrawn if the license holder does not fulfill his obligations or conditions on the basis of which the permit was granted change fundamentally.

➔ **Closed area (depth over 2500 m)**

Exploration and development of geothermal energy below 2500 m takes place in the frame of a concession.

License for exploration, exploitation and utilization of geothermal energy from this depth is issued by the Regional Mining Inspectorate. However, as a water license is normally required irrespective of the depth, the Regional Inspectorate for Environment, Nature and Water is a licensing co-authority.

Application

The Minister of Mines shall consider the closed areas to be designated for concession, in which the exploitation of geothermal energy seems favorable. The Minister then calls a public tender for concession. The call for tender shall be published in two national newspapers as well as in the Official Journal of the European Union respectively 30 days prior to the date of starting the acceptance of tenders. The call for tender shall include:

- The location of the concessional area with the indication of other already existing bids owned by a third party;
- Activities to be performed in the frame of the concession;
- A work program;
- Regulations set up in the complex vulnerability and impact assessment*;
- Securities for performance for the work program;

**The complex vulnerability and impact assessment is meant to determine those areas where mining activity cannot be performed due to environmental and nature protection, water management and water resources protection, protection of cultural heritage, agriculture, national defense, land use, transportation issues as well as mineral resource management. The Hungarian Office for Mining and Geology sends this report to public authorities, which in turn determine those areas where mining activity cannot be performed.*

The tender has to be evaluated within 90 days after the closing of the tender acceptance period. The Minister shall then conclude a concessional contract with the winner of the public tender, specifying the duration of the concession, the work program and securities serving its performance.

Rights of the geothermal developer

The concession is concluded for a period of up to 35 years and may be extended once by not more than half of the term. The planned period of prospection for geothermal energy cannot be longer than 4 years within the concession period. This prospection period may be extended twice by half its duration. Within the 1-year period of completion of the prospection period, the geothermal developer may initiate the designation of a geothermal protection zone.

The concession license gives the geothermal developer the exclusive right to submit a technical operation plan, and where approved, he has the exclusive right to begin exploration and initiate the designation of the geothermal protection zone based on the accepted closing report of prospection. In other terms, the prerequisite for exploration to take place is an existing concession contract for a given area and specified term and an approved technical operation plan. In the same way, the prerequisite for exploitation to start is the approval of the final prospection report that has to be submitted within 6 months from finishing exploration.

Exploitation can then only take place in the geothermal protection zone designated by the Regional Mining Inspectorate and should begin within 3 years after its designation.

General rules governing the licenses

An environmental impact assessment has to be submitted in the license application where geothermal activities include groundwater abstraction exceeding 5 million m³/year or reinjection of 3 million m³/year for the generation of electricity or direct heat, or in all cases where groundwater exploitation from karstic aquifers exceeds 500 m³/day or 2000 m³/day from porous aquifers.

An EIA shall always be prepared for geothermal power plants of 20 MW or more and for all power plants without restrictions which are established within the protection zone of mineral, medicinal or drinking water resources or on nature protection areas.

The EIA is licensed by the Regional Inspectorate for Environment, Nature and Water.

The geothermal developer has to comply with monitoring requirements under water management regulation. Under the Mining Act, he shall also comply with reporting requirements. In this respect, geoscientific data in general gained during the preliminary survey of exploration shall be sent to the Hungarian Office for Mining and Geology. The geothermal developer shall also send annually the geological data gained in the course of his activity. Information on the site prospection, the annual amount of production and the identity of the licensee are public. Data concerning technologies, exploration and exploitation methods, logistics, know-how supplied in the closing report and resource assessment are confidential during the license period.

Short additional description

Although the Mining Act has recently been amended, the regulation framework for geothermal energy is rather complex. Some pitfalls have been identified. The following are some examples:

- There is a lack of concession tenders. Currently there is no area in Hungary which has been tendered out for geothermal concession. The evaluation of the possible geothermal sites is ongoing. Yet, without concession contract for exploration and development of geothermal energy over 2500 m depth, the licensing procedure for exploration cannot start;
- It is not clear how the procedure of getting a water permit fits into the procedure of concession. Although the concession contract can be agreed for up to 35 years, it is not clear whether the water permit could be withdrawn within this timeframe if conditions on the basis of which it is granted substantially change;
- The exclusive usage of a permitted groundwater reservoir of the applicant is not guaranteed. The reservoir can be used by several competitors and projects;

However, recent amendment of Hungarian legislation shows the continuous efforts made by Hungarian authorities towards the implementation of effective rules of licensing for geothermal.

References

- Transenergy project, Legal aspect of transboundary aquifer management, Andrej Lapanje and Joerg Prestor in cooperation with GeoZS, ŠGÚDŠ, GBA, MÁFI, 31 December 2011;
- In-house information from Mannvit;

SLOVAKIA

Legal framework

- The realization of geothermal wells abides by the Geological Act No.569/2007;
- Building permit procedure follows the Water Act No.364/2004;
- The process of approval for individual localities is minimum 3 years (survey area, well drilling, well itself, EIA, land permit, building permit, etc.);
- Implementation of projects is subject to three laws with no compliance between them, especially between the Geological Act and the Water Act. According to the Geological Act, geothermal wells can only be realized as a survey well. The Geological Act does not recognize the category of pumping wells and it classifies wells as survey wells. The Water Act applies in relation to the approval of pumping wells;

Competent authorities

The Ministry of Environment is competent for geological prospection and research, in accordance with the Geological Act, as well as for water utilization, disposal, quantity, quality and protection with regard to the Water Act.

The Ministry of Environment is also competent for EIA.

Main steps of the licensing process

The geothermal developer shall first obtain an exploration license. In this context, technical works (e.g. wells, drillings) that serve for obtaining the geological information are considered as geological work. Such geological work can only be performed subject to the authorization of the Ministry of Environment.

In addition, the utilization of geothermal water and waste water disposal require permission from the Regional Environmental Office.

After the positive prospection survey, the borehole has to be reclassified from geological object (under the Geological Act) to water work (under the Water Act). Then the borehole can serve as a pumping well for geothermal under the Water Act.

The exploitation rights are issued by the Regional Environmental Office based on the decision of the Ministry of Environment that approves the final report of the exploration phase;

AUSTRIA

Where geological research shows that the realized geothermal well is positive and realization of additional geothermal wells is planned, a business plan shall be established and depending on the aims of the business plan, an EIA shall be submitted. An EIA is always required for geothermal exploitation wells over 500 m depth.

Rights of the licensee

The exploration license holder is granted a prospection area in which he has the exclusive right to carry out geological work and exploration.

The prospection area is issued under certain conditions (e.g. prospection time schedule, size of the area, retribution for size of the area, no overlap with other prospection area for the same purpose).

General rules

The data from drilling and prospection must be reported to the Ministry of Environment. However, the investor may decide to protect the data gained during prospection for a 10-year period.

References

- Transenergy project, Legal aspect of transboundary aquifer management, Andrej Lapanje and Joerg Prestor in cooperation with GeoZS, ŠGÚDŠ, GBA, MÁFI, 31 December 2011;

Legal Framework

- There are no rules of licensing for exploration and development of geothermal resources in Austria. However, research and exploitation of geothermal fall within the scope of various legislation actually governing drilling activities and testing of the geothermal reservoir.
- In this respect, geothermal developers have to obtain several permits from water authorities as well as mining authorities. As for the UK legal framework, such rules of permitting cannot however ensure security of investment in the geothermal sector in the absence of rules of licensing.

Competent authorities and main steps of the permitting process

→ Before drilling takes place

The developer shall first obtain consent from landowners. This also includes properties, which are only hit by the track of the geothermal drilling. Consent from landowners is required whether exploration implies non-invasive methods or not (e.g. surface seismic or geological mapping). Compensation shall be settled.

Where the exploitation of the targeted geothermal reservoir is meant to interfere with active concessions of hydrocarbon exploitation, consent of the concession holder shall be sought.

Where utilization of thermal water is at stake, the developer shall apply to the responsible water authority for exploration and provide the authority a technical report consisting of an exploration and utilization plan. The report shall include, inter alia, some general information, the geological and hydrogeological conditions, the general technical concept, the explorative concept and the list of existing utilizations and land property owners. A hearing shall then take place where all interested parties can intervene. The water authority then issues the water exploration permit including orders to be fulfilled.

In addition, drillings deeper than 30 meters require a drilling permit. The application shall be submitted to the mining authority in the form of a technical report. The technical report shall notably include some general information, borehole data, a description of drilling facility, surveys and test reports, concept of waste disposal, a description of operating materials and machinery, safety plans and the responsible person. Here again, some hearing takes place where interested parties, notably the holders of hydrocarbon concession areas, may intervene. Here again, the mining authority may attach some orders to be fulfilled to the drilling permit.

Depending on the characteristics of the geothermal project, an EIA may have to be submitted

The permits issued by the water and the mining authorities are temporary. They expire after success of the drilling has been proved by pumping tests.

After accomplishing the drilling and hydraulic tests, a technical summary has to be reported to the mining authority as well as to the water authority. These reports shall include the achieved results. They are the prerequisite for the mining authority to authorize a well base to be installed on the accomplished drilling and for the water authority to allow a water permit in terms of consent on the quantity of water that can be extracted and injected.

In case of non-successful drilling before testing, the developer shall notify the liquidation of the drilling to the mining authority.

→ After drilling and testing

On the basis of the technical summary, the mining authority authorizes a well base to be installed and the water authority issues a water permit. The water permit limits the quantity of extracted and injected water. It is only valid for temporary use. They are usually negotiated on an annual basis with reported monitoring data. A prolongation can be applied for six months before the expiration of the license validity.

The water authority can impose monitoring obligations upon the geothermal developer. The water permit sets the parameters to be monitored. The handling of monitoring programs and associated reporting vary a lot from one Austrian state authority to another.

Short additional description

Rules governing geothermal exploration and development in Austria are those governing drillings within the scope of the Water Act and the Mining Act. Depending on the characteristics of the project, an EIA may be needed.

References

- Ökologische & ökonomische Bewertung eines konkreten Geothermieprojektes in Gmunden;
- Transenergy project, Legal aspect of transboundary aquifer management, Andrej Lapanje and Joerg Prestor in cooperation with GeoZS, ŠGÚDŠ, GBA, MÁFI, 31 December 2011;