KNOWLEDGE EXCHANGE WORKSHOP ON LEGAL REQUIREMENTS, PROCEDURES AND POLICIES

Deliverable: D.T2.4.3 **Final**

Project partner: LP-GBA **01/2018**

D. Rupprecht[1] & the GeoPLASMA-CE team

[1]Geological Survey of Austria

Contact details of author: doris.rupprecht@geologie.ac.at

The involved GeoPLASMA-CE team

Geological Survey of Austria (LP)	D. Rupprecht (author), G. Goetzl (review)
Saxon State Office for Environment, Agriculture and Geology (PP04)	M. Heiermann (review)

Table of Content

1. INTRODUCTION

Activity A.T2.4: Elaboration of quality standards for planning, construction and monitoring geothermal sites

Description of deliverable D.T2.4.3: Knowledge exchange workshop on legal requirements, procedures and policies.

The application form states:

"Minutes of the knowledge exchange workshop concerning adequacy of current policies and legal implications of new management strategies. This expert workshop addresses project team members of GRETA and previous projects (ReGEoCities).

Deliverable D.T2.4.3 will be compiled from presentations and discussions at a Knowledge Exchange Workshop, which took place in the framework of the GRETA midterm conference in Salzburg on 8 November, 2017. All participants were asked for statements concerning the workshops and discussed topics.

The received statements, the minutes and the presentations of the workshop as well as the attendance list are attached to this document as annexes.

2. KNOWLEDGE EXCHANGE WORKSHOP

The knowledge exchange workshop took place at the 8th of November 2017 in Salzburg during the GRETA mid-term conference. This international expert workshop focused on the current legal framework and policies on shallow geothermal use in Europe and combined the knowledge of two Interreg projects GeoPLASMA-CE and GRETA. The workshop was addressed to public authorities and community administrations, energy planners, research teams and the interested public.

The workshop was attended by 38 participants from nine countries covering the Central Europe and Alpine Space region. In the first part of the workshop keynote presentations were given by D. Rupprecht (GeoPLASMA-CE) and J. Prestor (GRETA) on the progress and outcomes reached so far of the before mentioned projects. D. Rupprecht completed the first session by a presentation of selected existing studies and initiatives dealing with the legal framework of shallow geothermal energy use. A concluding discussion reviewed the adequacy of current procedures and policies and identified gaps where modifications are needed. Based on the keywords *data policy*, *harmonization*, *incentives*, *regulation* and *simplification* five break-out groups elaborated ways for enabling efficient governance solutions on the use of shallow geothermal energy for heating, cooling and seasonal heat storage. Each break-out group prepared a poster presentation, which was the basis for a final panel discussion.

See ANNEX 1 for the minutes of the workshop.

3. STATEMENTS FROM PARTNERS

After the Knowledge Exchange Workshop, partners from both projects were asked to prepare a short written statement on the discussed topics. The statement should include a general part concerning the outcomes of the workshop and recommendations on future activities.

See ANNEX 2 for the complete partner statements.

4. CONCLUSION

The workshop revealed the following important topics related to the legal framework of shallow geothermal use in Europe:

- Needs for harmonization between the European countries
- Regulations – what needs to be considered?
- Data policy and e-government in the context of shallow geothermal energy use
- Incentive measured to foster the use of shallow geothermal energy
- Is there a need for simplification of regulations?

Harmonization

The break-out group came to the conclusion that the question "What can be harmonized at which level of detail?" is important to be answered or defined in the beginning. It makes a big difference, if harmonization should be applied on the legal framework and procedures (governed by national laws) or on technical standards and guidelines (in most countries not defined by law but accepted at state-of-the-art). Most partners mention that the harmonization of the legal framework and administrative procedures is not possible without a clear commitment by the EU by a respective directive. The partners agreed during the workshop that harmonization should aim at simplifying procedures, closing knowledge gaps at follow-up countries and ensure international quality standards. In that context GBA mentions Renewable Energy Directive (2009/28/EC) on the promotion of the use of energy from renewable sources, which calls for harmonization of administrative procedures to reduce hurdles on applying renewable energy sources. In the deliverable D.2.21 of the project GRETA, the responsible project partner (GeoZS) also gave the following conclusion: *"Harmonization should not mean inducing additional changes, but above all, to make the procedures easier to learn and to implement, to make them adaptable to similar objectives in varying situations and to support a joint sense of ownership of decisions and actions"*. GeoZS also mentions guidelines and good practice examples as a helpful tool of harmonization.

The participants of the workshop also agree that a higher level of harmonization could and should be achieved in Europe for technical aspects including operational- and environment monitoring of shallow geothermal use, as such measures also support the (economic) efficiency of the systems (e.g. reduction of the electricity consumption of the heat pump). University of Basel proposes to harmonize quality assurance systems (e.g. quality certificates of drillers and installers) in Europe. Switzerland has already introduced such systems.

Most partners also emphasise connecting harmonization to simplification. Kai Zosseder mentioned in his remark: "…simplification of regulations instead of harmonization would help more to understand and consider the regulations from planners and the public". However, G. Goetzl (GBA) would like to remark that simplification should never lead to a decrease in technical and environmental standards! LfULG meantiones in their statement, that "High quality standards aid gaining consumer trust and thus market penetration while incompetent execution and inferior materials at dumping prices…" may cause a decrease in confidence (author's note).

Previous studies as well as GeoPLASMA-CE and GRETA revealed that the process chains of licensing procedures are very heterogeneous and mostly depend on the legal recognition of shallow geothermal as an important energy source. All partners agree that an important step towards simplification of procedures can be realized by the establishment of a one-stop-shop licencing scheme in Europe. This means that licensing

is only depending on one procedure associated to just one authority. This is not the case in most European countries.

Furthermore, also definition should be a topic when talking about harmonization. Until now, no uniform and widely accepted definition of shallow geothermal energy itself and scales of use are existing. The latter aspect is important for defining incentives and monitoring measures. The lack of definitions also leads to a lack of uniform methods for assessing resources and possible conflicts of use. Both projects, GRETA and GeoPLASMA-CE deal with harmonization of methods and standards. In that context GeoZS mentions, that harmonization should also aim at the transfer of knowledge between leading and follow up countries. The participants agree that the outcomes of GRETA and GeoPLASMA-CE should be brought to a greater, pan-European scale to raise awareness and change the attitude of policy makers. All participants agreed that sowing differences in practice in the countries is an important step for raising awareness.

Finally, the following concerns have been raised towards harmonization:

- TUM: Harmonization of legal procedures should not be too defensive and inflexible as this may lead to a reduction of licences in case of non-standard, complex subsurface conditions.
- SGIDS /CGS / GeoZS, University of Basel: Harmonization should be seen as a long-term, gradual process also having in mind to give enough space for the historically developed national acts. Procedures still have to be determined by the national legal framework.

Regulations

The speaker of the break-out group on regulations, W. Kozdroj (PGI-NRI) proposed to create a joint document of the projects GRETA and GeoPLASMA-CE on recommendations towards efficient regulations in Europe. Such a document may be the fundament for an eventual future EU directive on regulating shallow geothermal energy use. Many participants of the workshop (e.g. GBA and LfULG) see a joint document on regulation as too ambitious in the moment and clearly beyond the scope of the two projects. LfULG in turn proposes to commentate and respond to the to the “Recommendation guidelines for a common European regulatory framework” produced in the ReGeoCities project.

GeoZS thinks that the EU already established a sufficient regulation framework and defined objectives for the use of renewables. The problem is given by an insufficient transfer to decision makers at a local level. Regulatory- and energy supply objectives should be made better accessible for local stakeholders to obtain realistic plans, which are afterwards efficiently monitored. Projects like GeoPLASMA-CE and GRETA can and should support this transfer of knowledge and ideas between the European and the local level by dissemination and communication, especially training activities. POLITO proposes to also differ between the scales of shallow geothermal installations for the regulation procedures. GBA also supports the idea of simplifying regulations for small scale use to attract private investors and to include effective environmental- and operational monitoring in prioritized or large scale applications.

GeoZS and SGIDS again point out, that a certain degree of regulations should be left on the decision of each Member State. As mentioned in the chapter harmonization, comparative screening of regulation procedures also including good practice examples can be used as a powerful communication tool towards raising awareness and influencing the behaviour of policy- and decision makers at a local scale.

K. Zosseder (TUM) proposes to perform a shift of paradigm towards subsurface spatial planning. It should be treated as important as surface spatial planning, as the use of the underground is expected to be intensified in future, especially below urban areas (author’s note). He also concludes that the research community is convinced, that future regulation measures in urban- or densely settled area needs to be integrative, e.g. on district on a district or quarter level, and should not just focus on individual use. GBA fully supports this opinion and is currently working on an integrative management concept in the framework of GeoPLASMA-CE. The main question is who will be responsible for integrative management and planning of use K. Zosseder

proposes to "…install a "district energy manager" for municipalities or regional administrations…". Based on the experiences in the city of Vienna, GBA proposes to include prioritization of use at public purpose or on public interest toward private use in urban areas to facilitate the management of shallow geothermal energy on a district level. With regard to the use of shallow aquifers, the threshold of small- and large scale units can be defined by the energy content available in the groundwater below a land property.

G. Goetzl (LP) also proposes to gather the management and respectively regulation process rather as circle process than as a single linear process. The corner stones of management circle are given by: resource- and conflict maps at a local to regional level (decision making support for authorities and planners) – licensing with mandatory impact assessment for large scale units – monitoring (environmental and operational) – feedback into local to regional scale plans. This approach will be showcased for the pilot area Vienna in GeoPLASMA-CE.

The second main aspect of the break-out group at the workshops addresses regulation measures to include shallow geothermal in energy supply strategies. On a national level, activities should support the inclusion of shallow geothermal energy in national renewable strategies and action plans like NREAPs. This technology is still hardly visible in such documents, as already highlighted by B. Sanner (Regeocities) during the Knowledge Exchange Workshop on including shallow energy in energy planning strategies, which took place in Munich on September 12, 2017. On a local scale, K. Zosseder (TUM) proposes to set measures to change the behaviour on (large scale, author's note) construction works. Regulations should support an early stage consideration of energy supply concepts in planning large scale buildings.

Data policy and e-government

The break out-group at the workshop highlighted the following topics related to data policy and e-government:

- Registration of use and status reporting, need of harmonized templates
- Operational monitoring
- Definition of data to be collected (which, when?)

The participants of the workshop agree that a harmonized data-collection system would be favourable for Europe. Collected operational data could help to facilitate and improve procedures and lead to a higher planning reliability. A data collection would as well provide a powerful tool for energy planning. For a good realisation of an e-government, data security and data privacy are of upmost importance. Closely related to data collection is data generation. Therefore, requirements of monitoring must be established. Unfortunately, a mandatory monitoring does not exist in most countries.

LfuLG mentions the importance of monitoring to verify simulation of use, which is a standard procedure in many countries for estimating resources and possible conflicts at the licensing procedure. LP sees monitoring related to verification of simulations as an important aspect of updating resource- and conflict maps.

PGI-NRI proposes to establish uniform schemes for assessing and characterizing geothermal installations in Europe. Such schemes should also include monitoring of use and environmental monitoring. PGI-NRI proposes to establish a working group at the European Geological Surveys organization (EuroGeoSurveys) to establish standards and templates for unified assessment and classification schemes.

In the moment, data privacy restrictions still hinder the assessment of existing use. The data privacy rules are quite heterogeneous in the countries presented at the workshop. This may as well be an important issue for harmonizing the legal framework in Europe.

Two participants (GBA and PGI-NRI) highlighted the importance of online submission systems, which should be implemented by authorities. Linked to web based information systems, e-government systems for licensing, communication to authorities and reporting of the operational status and monitoring data can be a powerful tool to reduce the complexity and duration of licensing procedures, enable harmonized standards for reporting resources and monitoring data and support the communication between users and authorities.

POLITO concludes that "A common European data collection system is a win-win situation, as it provides useful information for authorities, technicians and private investors". GBA adds that the benefits of collecting and interpreting operational data has to be better communicated to the responsible authorities. At the same time, effective measures for guaranteeing data privacy rights need to be considered.

Incentives

The biggest financial barrier of shallow geothermal energy is given by high investment costs. The, in turn, distinctively lower operational costs are not that familiar to potential investors. For that reason, incentives should aim at reducing investment barriers by CAPEX and low awareness.

During the break-out group session, incentive measures were separated into (1) financial and (2) non-financial ones.

Considering financial incentives, the participant proposed to consider both, subsidies for applying a desired technology and taxes for applying a non-desired technology (like fossil fuels). In the statements to the workshop all partners agree that financial incentives, especially subsidies and funding, are the best way to foster geothermal energy. LfULG mentions, that financial incentive measures are still inevitable in society as economic aspects are dominating most investment decisions made. LPA remarks that financial incentives should aim at creating competitiveness of shallow geothermal toward cheaper but dirtier technologies and should periodically be re-evaluated based on the market impacts. LP also proposes to consider not just taxes on GHG emissions. In urban areas, cooling of buildings gains greater importance. On the same time, waste heat impairs the problem of urban heat islands. At waste heat tax on conventional, air chillers based cooling systems could be a powerful instrument to support the use of shallow geothermal energy, especially closed loop systems, for cooling and seasonal (waste-) heat storage.

As non-financial incentives partners agree that to raise the public awareness with information material and direct communication by consultation, events and trainings is an important measure. Furthermore, the feasibility of shallow geothermal use at a large scale, also considering cooling or seasonal heat storage, should be demonstrated by pilots. In that context, public investments, either by financial funding or by direct investments are needed to enlarge the visibility of the technology.

Simplification

The outcomes of the break-out group at the workshops were more focusing on knowledge gaps, prejudgements of the general public and research gaps. In addition, the previously concept of a "one-stop shop" strategy was discussed as well.

Concerning the simplification of regulations, the risk of under-regulation and decrease of quality and loss of confidence by investors and users was highlighted once more. Still, the majority of the participants believe that regulation procedures in most of the participating countries are currently to complex and that a one-stop shop strategy should be implemented for licensing and management by authorities.

Concerning transfer of knowledge from experts to investors, PGI-NRI highlights the importance of web services including e-government linked to information and datasets showing resources and possible conflicts of use. geoENERGIE adds that one-stop shop strategies should include uniform web services, which should be used by applicants and authorities. GBA remarks, that web services could base on a 2 level strategy: a

simplified public access level focusing on interpreted data and an expert level, requiring registration, to gain access to non-interpreted data. However, to avoid over-interpretation of datasets displayed at web services as well as their related spatial resolution, GBA proposes to limit the scale of resolution by just presenting discrete datasets (discretization of the spatial resolution by raster data and numerical discretization by applying data classes only).

Aside of one-stop shop strategies, GeoZS also supports the idea of respond time limitations for authorities during the licensing procedures, which automatically leads to a permission. Such concepts have already been implemented in some countries like Austria.

ANNEX 1

MINUTES OF THE KNOWLEDGE EXCHANGE WORKSHOP ON LEGAL REGQIUREMENTS, PROCEDURES AND POLICIES IN SALZBURG

GeoPLASMA-CE

Minutes of the Joint GRETA/GeoPLASMA-CE knowledge exchange workshop on legal requirements, procedures and policies

Compiled by Gregor Götzl, Doris Rupprecht and Magdalena Bottig on 20.12.2017

Date, Time November 8th 2017, 9:00 – 12:30

Location Hotel NH Salzburg City
Franz-Josef Straße 26, A-5020 Salzburg, Austria

Concern

The international expert workshop of the Interreg projects GeoPLASMA-CE & GRETA focuses on the current legal frame and policies on shallow geothermal use in Central Europe and the Alpine region.
The discussion topics are the adequacy of current procedures and policies, the identification of gaps and elaboration of solutions for enabling efficient governance solutions on the use of shallow geothermal energy for heating, cooling and seasonal heat storage.

This workshop addresses public authorities and community administrations, energy planners, research teams and the interested public.

Participants - Project teams from GeoPLASMA-CE and GRETA

PP-Acronym	Name		*PP-Acronym*	Name
GBA	Rupprecht Doris, Steiner Cornelia, Goetzl Gregor, Bottig Magdalena, Hoyer Stefan		*GEOZS*	Joerg Prestor, Simona Pestotnik, Dusan Rajver, Mitja Janza, Matjaz Klasinc,
POLITO	Alessandro Casasso, Simone della Valentina, Matteo Rivoire		*Regione Lombardia*	Francesca Messina, Ilaria Stringa
TUM	Kai Zosseder, Fabian Böttcher, Christine Haas		*CGS*	Jan Holecek
ARPA VdA	Pietro Capodaglio, Alessandro Baietto		*GeoENERGIE*	Rüdiger Grimm
BRGM	Charles Maragna, Fanny Branchu		*Uni Basel*	Peter Huggenberger
PGI - NRI	Malgorzata Ziolkowska-Kozdroj, Wieslaw Kozdroj		*LFULG*	Martina Heiermann, Peter Riedel
AGH UST Krakow	Marek Hajto		*EURAC*	Pietro Zambelli, Valentina D´Alonzo
SGUDS	Radovan Cermak			

External participants

Name	*Affiliation*
Edith Haslinger	AIT
Andrzej Lazecki	Deputy Director – The Department of Municipal Services, Municipal Office of Krakow

Topics tackled and links to deliverables and outputs	*A.T2.4 Elaboration of quality standards for planning, construction and monitoring of geothermal sites* • *D.T2.4.1 Summary of national legal requirements, current policies and regulations of shallow geothermal use* • *D.T2.4.3 Knowledge exchange workshop on legal requirements, procedures and policies*

Agenda

1. 09:00 – 10:30: Presentation of current results:
    - Welcome address and introduction (Gregor Goetzl, Kai Zosseder)
    - GRETA (Joerg Prestor, GeoZS)
    - GeoPLASMA-CE (Doris Rupprecht, GBA)
    - Prior projects dealing with regulations of SGS (Doris Rupprecht, GBA)

2. 11:00 – 12:00: Workshops – elaboration of topics and discussion in small groups

3. 12:00 – 13:00: Final discussion

Outcomes

1. Presentation of current results

Introduction

Lead Partners from both projects (Kai Zosseder for GRETA and Gregor Goetzl for GeoPLASMA-CE) gave a short introduction on their projects and the importance of legal regulations to foster the use of SGES and for the implementation of SGES into energy plans. The two following presentations showed experiences of the projects (Joerg Prestor for GRETA and Doris Rupprecht for GeoPLASMA-CE). The last talk covered comparative studies of previous projects (Doris Rupprecht).

Current results of the GRETA project – status of work in WP2 (legal requirements) and outlook

The presentation of Joerg Prestor on legal regulations included a short comparison of the authorization procedures in the GRETA partner countries. Austria was mentioned as good practice example due to the simple procedure including only one authority and one application form. He also highlighted differences between partner countries in reference to installation and operation. For example, Vale d´Aosta (Italy) was mentioned, as the only region were the reinjection of water into the aquifer is prohibited. The presentation included also explanations of criteria like distance to buildings/neighbouring rights or temperature ranges for reinjection in the partner countries.

Current results of the GeoPLASMA project – status of work in WPT2 (legal requirements) and outlook

Doris Rupprecht presented the results of the questionnaire (D.T2.4.1 – Summary of national requirements, current policies and regulations of shallow geothermal use) used for the data collection about legal regulations in the GeoPLASMA-CE partner countries. The applied scheme is similar to the GRETA project. Both projects use flow charts as an instrument to visualize authorization procedures. The questions related to single topics like installation and operation criteria are similar to GRETA and to other projects like ReGeoCities. This should help to make comparisons between these projects and to expand the understanding of the different legal requirements related to shallow geothermal use in Europe.

The following presentation by Doris Rupprecht provided an overview of the licencing processes of all GeoPLASMA-CE countries and a comparison with the EU directive for renewable energies. A first result of the collected data analysis is the identification of major differences. The example given covered Slovakia where the legal procedures starts with the licencing of the drilling. This step doesn´t require any information about shallow geothermal energy systems (SGES). The completed borehole is afterwards reclassified as SGES in a 2nd step. This kind of licencing builds an exception within the GeoPLASMA-CE countries. Concerning the EU directive for renewable energies (2009/28/EC), six measures are given from the EU to be implemented into national administrative procedures. These measures shall be applied to reduce administrative burden and therefore help to foster renewable energies. A screening of these measures within the GeoPLASMA-CE countries shows that no country is fulfilling all of them.

After the presentations, partners discussed mainly the presented outcomes from the comparison of existing legal regulations within the partner countries with the EU-directive. It is sometimes difficult to state whether EU-directives are implemented or not - the example from Saxony shows that the procedures can be interpreted as one-stop shop as well as 2-step procedure. The fact that the EU-directive is not fully implemented into most licencing procedures demonstrates that the relevance of renewables is still very low.

Prior projects dealing with regulations of SGES

Two already completed projects dealing with the regulation of SGES were presented with the aim to gain ideas for further outcomes of the GeoPLASMA-CE and as well GRETA project.

- REGEOCITIES: The project aimed to integrate shallow geothermal energy at local and regional level.
- Dissertation of S. Haehnlein, 2013, with the title *"Oberflächennahe Geothermie – Nachhaltigkeit und rechtliche Situation"* (Shallow geothermal energy - Sustainability and legal situation).

Both projects worked with a similar data collection basis as GeoPLASMA-CE and GRETA, outcomes are two slightly different approaches for the handling of SGES. Haehlein presents a more precautionary principle for the handling of SGES, where sustainability and the awareness of risks in absence of proof are superficial. She summarizes her results in a 6-parted scheme for the assessment and planning of SGES. ReGeoCities developed a simplified regulation procedure and promoted best practices for single criteria. The outcomes can be interpreted as a risk-based and reacting policy.

2. Workshop – elaboration of topics and discussion in breakout groups

Discussion

Summary

The participants agreed that the heterogeneity of the current legal framework in Central European and Alpine space countries is a limiting factor for the fostering of SGES.

The most important questions arising from the presentations were:

- What can we learn from each other?
- Is there a need for harmonization?
- What can be learned from previous initiatives?
- How can GeoPLASMA-CE and GRETA support efficient and sustainable governance measures on a local, regional and international level?
- Which institutions should be integrated in the regulation?

To solve these questions, breakout groups were build to discuss on the main topics for legal requirements. The outcomes of these discussions were summarized at flip chart posters, which were later presented by the speakers of the groups.

Break out group discussions

In a first step, the participants summarized the main points from the presentations. Out of this list (Figure 1), single points were selected for small group discussions. In total, five groups á six persons were formed.

The five chosen points and the group-hosts were:

- **Harmonization** (host: Peter Huggenberger, University of Basel)
- **Simplification** (host: Alessandro Casasso, POLITO)
- **Incentive** (host: Joerg Prestor, GeoZS)
- **Data policy** (host: Pietro Zambelli, EURAC)
- **Regulation** (host: Wieslaw Kozdroj, PGI – NRI)

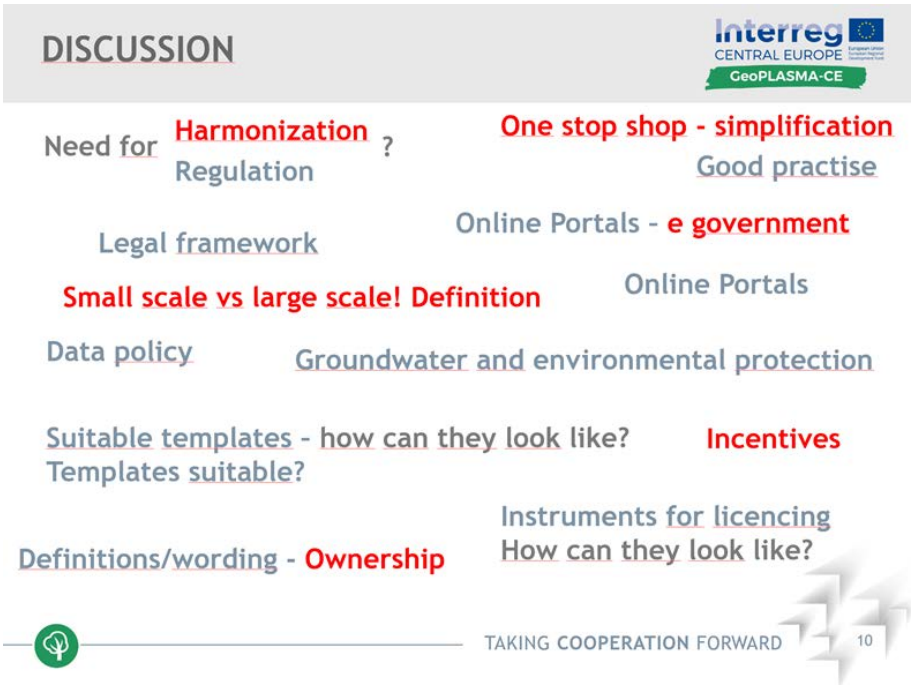


Figure 1: Important topics concerning legal situation and licencing in Europe elaborated from the GRETA and GeoPLASMA-CE presentations.

After forming small working groups, each group started a 30 minutes discussion on the issued topic. Aim was elaborating important goals for the selected topics.

Presentation of breakout groups outcomes

Each host presented the outcomes of the small group discussion. Data were presented as posters (see Figure 2).

Pietro Zambelli presented the topic **"Data policy (ideal e-government system for NSGE)"**. The main outcomes were:

- The registration of existing and new installations as well as their operational status (running/decommissioned) should be mandatory.
- Guidelines or templates for the registration of SGES should be available both online and on personal level at the competent authority.
- Information gained through licencing procedures should be used to enable a harmonized data collection. Important criteria to register are the size, type, location and status of the installation as well as the installation date. This data collection can also provide an information base for monitoring.
- There should be minimum requirements for monitoring of SGE systems by the user of the installation. Monitoring should be an easy procedure and include only a selection of parameters (not too many).
- Collected data about SGE installations will partly depict sensitive information. The question, if data is publishable or not, must be handled very carefully. It is suggested that at least metadata should be available to the public.
- As providing data means additional effort for applicants and operators, it is suggested to create a win-win situation with e.g. subsidies.

Peter Huggenberger form the University Basel and his group worked out the topic **"Harmonization"**. Talking about harmonization the first questions were: "What should we harmonize?", "What can we harmonize at all?" and "To what extent should we harmonize procedures?" The break out-group therefore presented a few keywords that should be considered regarding this topic.

- There is a need for harmonized **definitions** of systems and system sizes?
- Harmonization and **simplification** of authorization processes must be combined in one step.
- A hierarchy of **regulations** has to be determined.
- A possible instrument for an EU wide harmonization of legal constraints could be **guidelines**.

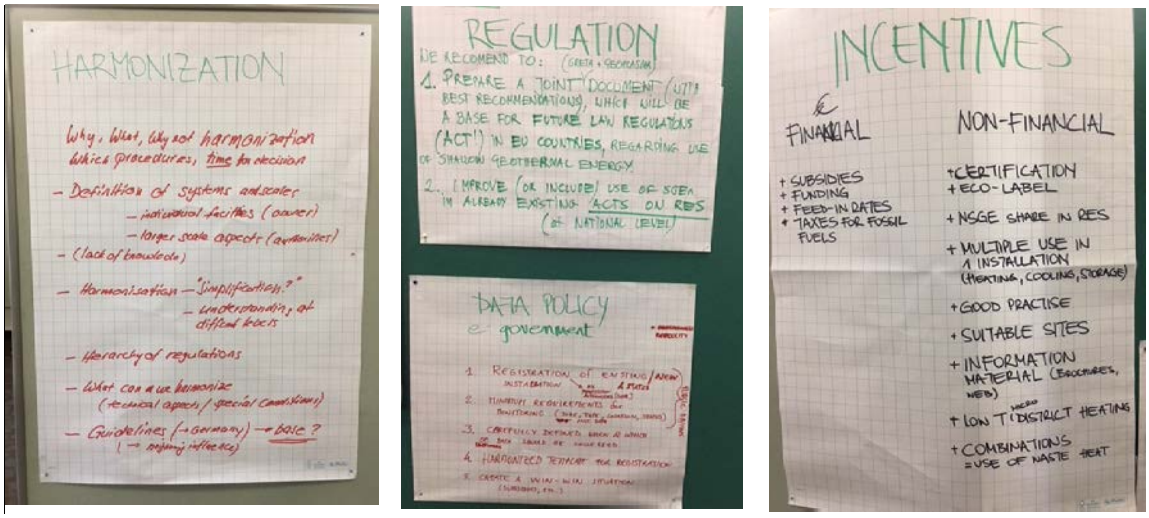
Joerg Prestor presented results for the topic: **"Incentives"**. The breakout group presented two types of incentives. The first group are financial incentives, which work as well for users, operators, installers (e.g. subsidies, funding) and general incentives to foster the use of geothermal energy (e.g. feed-in rates, taxes for fossil fuels). The second group are non-financial incentives that work on drivers levels. Examples given are:

- Introduction of a certification, e.g. an eco-label, especially attractive for the tourism and industry sector.
- To promote good practices and suitable sites as incentive for new customers and city planners.
- Education of installers, users and the public, e.g. by spreading information material.
- Pointing out the advantage of this technology for the possibility of multiple use in one installation - heating, cooling and storage.
- Display the advantages of low temperature district heating
- Display the advantages of possible combinations with other systems like the combination with the use of waste heat.

Wieslaw Kozdroj presented recommendations for the topic **"Regulation"**. The breakout group recommends preparing a joint document that will be a base for future law regulations in EU countries, regarding the use of SGE. A second idea is to improve (or include) the use of SGE in already existing acts on RES (at national level).

Alessandro Casasso presented the topic **"Simplification"**. The group focused on four points that were identified as important during their discussion:

- Work against the lack of understanding of SGE technologies and make clear definitions. The group stated two examples from practice. First, the misunderstanding of borehole heat exchangers as deep-water wells and second, that groundwater heat pumps always work as consumptive wells.
- Encourage research focused on components and not on GSHP systems as a whole.
- Point out the relevance of open data for designer and installers, like existing SGE systems and neighbouring rights. An open data policy will help to prevent violating foreign rights.
- To implement well-trained staff in combination with one-stop-shop procedures would mean major simplification.



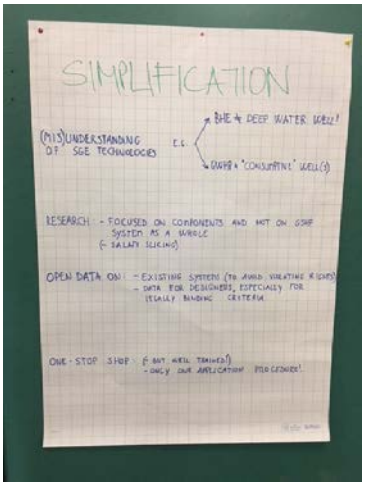


Figure 2: Output of the small group workshop for the topics

Harmonization, Regulation, Data Policy and Incentives

3. Final discussion

Summary

After the presentations, partners agreed on the importance of monitoring and that monitoring data should ideally be sent to the competent authority automatically (e.g. data loggers could be installed in HPs per default). Furthermore, harmonized templates for operational monitoring data are considered to be important. All partners agree that there should be one-stop (BUT well trained) and only one application procedure.

The final discussion started with the question: “What are the next steps for reviewing and compiling quality standards on current policies and regulations?” Partners agreed to start with a summary of the regulative aspects.

The preferable preparation of a joint summarizing document of the projects GeoPLASMA-CE and GRETA on future law regulations in EU countries was dismissed, as this task would clearly go beyond the scope of the two projects. However, the participants of the workshop agreed that harmonized and clear regulations in the EU would have a great impact for fostering an efficient and sustainable use of shallow geothermal energy in Europe. The best way to encourage member states to optimize, or at least modernize legislation of SGE use would be to elaborate an EU directive on shallow geothermal energy use.

Beside legal regulation aspects, an important instrument to foster the use of SGE is given by the integration into spatial energy planning. To get on with this topic regulations for the implementation should be elaborated.

Overall, the GRETA team mentions that the aim should be to promote ways to combine SGE with other renewable energy sources. This would also display the full range of possibilities of renewables and underlining the applicability (e.g. possibility of cooling) of SGES.

Since there was not enough time for the discussion and some questions remained open, it was decided that partners write statements concerning the topics in the workshop. The statements and the minutes will represent the main part of the GeoPLASMA-CE deliverable *D.T2.4.3 Knowledge exchange workshop on legal requirements, procedures and policies.*

ANNEX 2

PARTNER STATEMENTS TO THE KNOWLEDGE EXCHANGE WORKSHOP

Involved partners from GeoPLASMA-CE and GRETA:

The GeoPLASMA-CE-Team

Number	Partner name	Country	Abbreviation	Role
LP*	Geological Survey of Austria	AT	GBA	LP
003	geoENERGIE Konzept GmbH	DE	geoEnergie	PP
004	Saxon State Office for Environment, Agriculture and Geology	DE	LfULG	PP
005	Czech Geological Survey	CZ	CGS	PP
006	State Geological Institute of Dionýz Štúr	SK	SGIDS	PP
007*	Geological Survey of Slovenia	SI	GeoZS	PP
008	Polish Geological Institute - National Research Institute	PL	PGI-NRI	PP
011	University Basel and State Geology	CH	Uni Basel	PP

* Partner is involved in both projects

The GRETA-Team

Number	Partner name	Country	Abbreviation	Role
LP	Technical University Munich	DE	TUM	LP
002	ARPA Valle d´Aosta	IT	ARPA	PP
003*	Geological Survey of Austria	AT	GBA	PP
004*	Geological Survey of Slovenia	SI	GeoZS	PP
005	French Geological Survey	FR	BRGM	PP
006	Polytechnic University of Turin	IT	POLITO	PP

* Partner is involved in both projects

1. HARMONIZATION

Break-out-group head: Peter Huggenberger

Content of the poster presentation:

Why, what and why not harmonization?

Which procedures? Time for decision?

- Definition of systems and scales
    - Individual facilities (owners)
    - Larger scale aspects (authorities)
- Lack of knowledge
- Harmonisation – "Simplification" (understandings at different levels)
- Hierarchy of regulations
- What can we harmonize (technical aspects, special conditions)
- Guidelines → BASE? (e.g. neighbouring influence)

Statements from GeoPLASMA-CE team members

GBA:

Harmonization is needed for many topics in the field of geothermal energy like regulation of technical details, monitoring or data policy. On the other hand, the EU with the Renewable Energy Directive (2009/28/EC on the promotion of the use of energy from renewable sources, OJ L 140, 5.6.2009) also calls for a harmonization of the administration process to reduce the administrative burden.

Previous studies, GRETA and GeoPLASMA show big differences in handling geothermal energy in European countries. When talking here about harmonization, a detailed knowledge about regulation and handling of geothermal energy about more countries is needed.

In general, country comparisons will help to identify good practices and gaps, which are both crucial elements for the elaboration of advices, workflows, regulations and controlling mechanisms (operating and installation criteria).

LfULG:

In our opinion, harmonization of technical quality standards should be given priority. High quality standards aid gaining consumer trust and thus market penetration while incompetent execution and inferior materials at dumping prices will be prevented.

Integral to harmonized technical standards are clear definitions of technical and legal terms.

PGI-NRI:

In different EU countries there is a great need for similar, coordinated actions to oversee renewable energy use regarding their better, sustainable way of development. The purpose of this supervision is to control processes of geothermal heat pump installation, which should take place without disturbing the natural environment. To achieve this goal, harmonization of decision-making processes, legal regulations and methods of monitoring in this area should be sought.

CGS:

Harmonisation of monitoring and evaluation of procedures is necessary for comparability of the obtained data/results, however the strict supra-national regulation without the knowledge of the background can harmful. There should be a gradual convergent evolution of the procedures based on best practices and experiences. The first step is the comparison of the state of art of the workflow, legislative and controlling criteria in the individual countries in EU.

GeoZS:

Harmonization should not mean inducing additional changes, but above all, to make the procedures easier to learn and to implement, to make them adaptable to similar objectives in varying situations and to support a joint sense of ownership of decisions and actions (GRETA Deliverable D.2.2.1). In each country, geothermal installations are regulated by different legislations on different levels. Harmonization of procedures is therefore not simply. However, for technical issues higher level of harmonization could be achieved.

geoENERGIE:

In our opinion, it is not possible to harmonize the licencing procedures in all partner countries, because every country has its own hierarchy of regulations. However, what we can do is to give recommendations that deal for example with the area between shallow geothermal systems to minimize neighbouring influence effects. We can create an advice paper for all partner-countries so that they have the same knowledge about shallow geothermal systems.

SGIDS:

By the work so far done in GeoPLASMA project there are differences in shallow geothermal energy sector having source in incorporating water and energy sector.

Harmonization can be done on more levels, though probably reasonable attitude is with respect to the nationally used and historical background of the policy rules, data management and standards. In our opinion, it can be done as a framework (similar attitude as Water Framework Directive).

Monitoring common rules can be stipulated – rules for independent monitoring of the natural thresholds for temperature, groundwater – done by independent institution.

Clear definition is needed – what do we understand under the shallow geothermal energy and what is “separating rule” between deep geothermal structures and how this difference should be reflected in regulation (resulted in easier access to the public, less administration, easier – if any - permitting process).

Statements from the GRETA-Team

Head of the Greta lead partner TUM Kai Zosseder:

In my opinion, the question “What can we harmonize?” is essential. Because by harmonization of regulations, the interpretation of the regulations from the administration side could be less flexible and individual decisions, respectively permissions, are not possible any more. Because of various geological situations, which can occur, a “harmonized” handling of the regulations can be problematic. Especially the water protection aspects would be handled in a conservative way. So there is a concern, that harmonization will lead to less permissions for SGE-systems, because the administration will be on the safe side with their decisions. This should be taken into account. Water protection regulations in the different countries are quite heterogeneous and normally there are the main basis for regulations. To change water permission regulations in the countries may be not helpful. So simplification of regulations instead of harmonization would help more to understand and consider the regulations from planners and the public.

Peter Huggenberger, Lead of break out group during the Knowledge Exchange Workshop and contact person for GRETA-PP 011 – Uni Basel:

Harmonization means, that we need tools to satisfy environmental and safety aspects and to consider relevant standards to guarantee good quality.

Procedures have to be determined by the individual countries. The hierarchy of legislation is in each country different. Example from Switzerland see below.

Guidelines as quality assurance systems should be set-up by the different countries, and an exchange of experience would be helpful.

As you can see, a possibility to set-up a quality assurance system for borehole heat exchanger was defined for Switzerland. It includes guidelines for drilling companies to ensure that the building owners provide correct advice, construct the structures in an environmentally friendly manner, install the state-of-the-art probes, comply with safety regulations and take account of water and groundwater protection.

The quality assurance system honours those drilling companies with the FWS label for borehole heat exchanger drilling companies, which undertake to consider a number of relevant standards, guidelines and recommendations. On the other hand, it is based on applicable laws and regulations, directives and standards and ensures that they are complied with (controlled quality).

There are a set of laws and regulations related to shallow geothermal energy (all available on websites):

- • Environmental Protection Act (USG), Clean Air Ordinance and cantonal and municipal noise protection regulations
- • Water Protection Act (GSchG) and cantonal implementation regulations • Water Protection Ordinance (GSchV)
- • sia 118, General Conditions for Construction
- • sia 384/6, geothermal probes (2010)
- • sia 431, drainage of construction sites (1997)
- • VSS SN 640893, temporary signalling on major and minor roads
- • FOEN Practical Assistance, Heat Utilization from Soil and Subsoil (2009)

- • FOEN, Environmental Protection Guidelines (2004)

The quality assurance system aims to achieve a high level of quality in the construction and use of borehole heat exchanger systems and to guarantee it for the future. Drilling companies, which are carriers of the label, guarantee

- • A high customer benefit through competent advice
- • Careful handling of our environment A prior art insert using high quality materials
- • AS high level of safety and health protection

Scope of the quality assurance:

The quality assurance refers to the activity of the drilling company. This includes all drilling and other construction work that is necessary for the introduction of geothermal probes. Excluded are all non-terrestrial works for geothermal plants.

The quality standard is determined in accordance with the applicable regulations, recommendations and guidelines.

Further requirements are the responsibility of the responsible licensing and supervisory authorities.

POLITO:

In order to boost the European NSGE market, harmonization in European legislation is the first essential step. Common definitions of NSGE systems and their scale aspects are also important, as the differences between private and industrial installations should be highlighted. GRETA and GeoPLASMA analysed the legislation in the different countries providing guidelines and identified good practices and gaps about the technical aspects of NSGE installations. Harmonization is strictly connected to simplification and together they can fill the lack of knowledge typical of a single country approach.

ARPA:

Harmonization is a required process necessary to foster geothermal energy. It should affect both the regulation procedures and the guidelines contents. However, it is important to remark that not all aspects of regulations can be affected by harmonization. Local constraints, motivated by specific hazards or by special conditions, affecting a territory must “survive” to the harmonization process.

2. REGULATION

Break-out-group head: Wieslaw Kozdroj

Poster presentation:

We recommend to: (GRETA + GeoPLASMA-CE)

1. Prepare a joint document (with best recommendations) which will be a base for future law regulations (ACT) in EU countries, regarding use of shallow geothermal energy
2. Improve (or include) use of shallow geothermal energy in already existing act on renewable energy systems (at national level).

Statements from GeoPLASMA-CE team members

GBA:

Regulation is the most important topic concerning the use of geothermal energy. This part controls all other topics like data policy, monitoring, installation and operation of shallow geothermal energy systems. The GBA does think that all countries need a legal regulation for geothermal systems. The extend of this legal regulation differs from country to country and is behind the scope of this study. The aim here should be to prepare a proposal for a harmonized regulation document for Europe. Regulations should concern in any case the technical part of geothermal systems (installation and operational criteria). See also the statement for HARMONIZATION and the comment to the workshop below.

LfULG:

Goodwill permitting, the geological survey may issue non-binding recommendations to authorities at district and/or municipal level.

We have neither the authorization nor the qualification to draft national or EU regulation.

In this context it would be advantageous to evaluate the response to the “Recommendation guidelines for a common European regulatory framework” submitted by the ReGeoCities project.

PGI-NRI:

Unified, consistent in the content and mechanisms of the procedure, legal regulations concerning the use of shallow geothermal energy should be applied in all EU Member States. Harmonization of regulations should take place on the way of preparing by the international body of experts (under the new research project?) model guidelines, which should then be included in the form of a special EU Directive. Under this directive, the law in the individual Member States should be adapted.

CGS:

The regulation is the important instrument for management and development of shallow geothermal energy, but regulations on the centralized level cannot suit to every situation. The regulatory power should be leaved on the national level; however, the supranational recommendations for regulation should be given.

The harmonised monitoring should be required on the supranational level for the purposes of the comparison and monitoring of development.

GeoZS:

Regulation framework and objectives on EU level are well defined but their implementation to local level is too week. This should be improved by better definition of objectives (energy and environmental) on the local level and the progress should be more strictly monitored with relevant indicators. Local energy plans should be concrete and realistic as much as possible and thus provide the reliable feedback for the state strategy. Regulation could be then more effectively focused and directed, and less bureaucratic.

geoENERGIE:

We do not have the power to create any kind of regulations. We can only train or teach the authorities at district and/or municipal level about shallow geothermal energy use, and the advantages and problems with it.

SGIDS:

On regulation level, harmonization is feasible only as a framework. Guidelines can be set to maintain good quality of the water (temperature of ground water as quality measure). But as described earlier the regulations (Legal Acts) are incorporated in wider scheme and are interconnected to other nation legal documents that respect historical background and the way the state is managed.

Though the document (guidelines) which might be a base for improvement of the legal regulation is desirable. Comparison of other legal schemes with kind of SWOT analysis can be asset for all the countries.

Statements from the GRETA-Team

Head of the Greta lead partner TUM Kai Zosseder:

As I took part in the discussion of this group two to three points of discussion turned out.

First, the improvement of the existing regulations and their handling and descriptions and of the application processes. This includes, among others, changing in regulations, like in Germany limitations of drilling depths, or certificates for drillers and so on.

Second, the integration of SGE-planning, or in general Renewable Energy Systems, in the planning of construction work must be improved. The planning of the energy system for a building must be done in the very first stage of the construction planning and must be considered with a high priority. This must be changed in the regulations for building planning. The requirement for a changing in this direction is, that renewables, respectively SGE-systems, must be more considered in national/regional energy strategies.

Third, considerations about regulation for coming implementation scenarios in the future must be started. The underground will be used more intensively in the future. Hence the underground must be managed in the same way as the planning at the surface is managed. Also there is, more or less, a common sense in the SGE-community, that a very efficient use of SGE-systems is possible by planning on a district level (because there you can connect different demands (seasonal) and therewith increase the efficiency of the

installations). But who could be responsible for the energy planning on a district level? This must be clarified to make sure a high efficient use. To install a “district energy manager” for municipalities or regional administrations could be considered by the politician side.

POLITO:

GRETA and GeoPLASMA aim to provide tools for public authorities and politicians in order to efficiently integrate NSGE in local and regional energy planning.

ARPA:

Regulation and procedures for authorizing NSGE systems should be as much clear, accessible and understandable as possible in order to guarantee their diffusion and growth over the territory. Small- and big-size geothermal systems should be authorized following different procedures. The time required for authorization is the fundamental parameter. It should be always clear in advance which is the period required by the authorities for the authorization of a geothermal system.

3. DATA POLICY / e-government

Break-out-group head: Pietro Zambelli

Poster presentation:

1. Registration of existing/new installations and status by authorities (local)
2. Minimum requirements for monitoring (Size, type, location, status, installation date)
3. Carefully defined “When & Which” data should be collected.
4. Harmonized template for registration

Create a win-win situation (subsidies, etc.)

Statements from GeoPLASMA-CE team members

GBA:

An e-government system for applications and the collection of operational data should be mandatory for geothermal energy installations. Gained data can help to ensure a sustainable use of geothermal energy and can prevent user conflicts by e.g. controlling temperature changes. The collection of harmonized data in the countries guarantees EU wide comparability and therefore trans-border evaluations.

LfULG:

Data security and data privacy are of utmost importance.

Monitoring would be highly desirable since verification of simulations would achieve planning reliability and thus consumer trust.

PGI-NRI:

EU member states should introduce a unified system of mode and method of data collection for geothermal heat pumps. The scheme of such a database should be agreed by a group of experts - preferably by geological surveys of individual countries (e.g. special committee within EuroGeoSurveys?). In a similar way, an e-government system should be introduced to submit applications, obtain permits for GHPs, etc., adapted to the applicable administrative procedures in individual countries.

CGS:

The monitoring of shallow geothermal energy systems (SGE) does not exist in many countries. The reporting and collecting of data about the SGE installations should be mandatory for all EU countries. This is a basic prerequisite for further management steps. The collection of harmonized data guarantees the comparability and trans-border evaluations. Expert groups should give the guidelines for data collection.

GeoZS:

It should be clearly defined what is the purpose of data provided from users to authorities, how these data will be evaluated and how is the accessibility of these data (privacy policy) regulated. The data should be used for public services to facilitate procedures and saving costs for new interventions and investments.

SGIDS:

Registration of the existing installations would be a good tool to have an overview for stakeholders on installed capacities and possible interactions. This has to be done with respect to the data privacy and security. The project can give an ideal “state of art” picture how such scheme could look like.

Statements from the GRETA-Team

Head of the Greta lead partner TUM Kai Zosseder:

Regarding the data policy of course, a lack of data and limitation to the access to data is a problem in practise. Therefor requirements for monitoring could help to collect reliable data for the assessment and quality check for installations. But an “overregulation” for installations with increasing costs should be avoided.

The data policy with the main focus to data security and with strong limitations to open access data must be improved to simplify the planning processes.

POLITO:

A common European data collection system is a win-win situation, as it provides useful information for authorities, technicians and private investors. Regione Lombardia is a virtuous example of application of an open-data system about NSGE plants. This helped Lombardia to become the first Italian region for NSGE installations.

ARPA:

Updated online database should be available both for authorities both for public. Close and open loop systems are to be registered on the database and updated. Database are useful also in the perspective of energy planning.

4. INCENTIVES

Break-out-group head: Joerg Prestor

Poster presentation:

Financial incentives:

- Subsidies
- Funding
- Feed-in rates
- Taxes for fossil fuel

Non-financial incentives

- Certifications and eco-labelling
- Share of shallow geothermal energy in the renewables
- Multiple use of one installation (heating, cooling, storage)
- Good practise
- Suitable sites
- Information material (brochures, WEB)
- Low temperature district heating
- Combinations (e.g. use of waste heat)

Statements from GeoPLASMA-CE team members

GBA:

All mentioned incentives are good instruments to foster geothermal energy. Financial incentives, weather from authorities or private initiatives, are the most powerful tool to foster geothermal energy. As a quite expensive technology compared with fossil fuels or even other renewables, financial support guarantees competitiveness. In particular, information material, as a non-financial incentive, to the public or technicians as well as authorities seems to be a very effective incentive. It serves as education as well as advertisement.

LfULG:

End users as well as planning authorities require financial incentives and laws. In our society, idealism and soft incentives are not valued nearly as much as economics. In order to promote SGE market share, market viability is the crux of the matter. A supportive legal environment and public information help to achieve market introduction, but in the long run, they will not suffice if the economics are not right when the end user (decision maker) is doing the sums.

PGI-NRI:

Renewable energy sources still require financial support from the state for their wider dissemination and use. Incentives are particularly necessary in case the poorer social groups are also encouraged to use them. It is also important that geothermal heat pumps should be preferred in the subsidy systems aimed for heat-source exchange-programs in housing sector. For example, there is no such differentiation in Poland, where the amount of subsidies for exchanging a coal furnace for a more efficient coal or a gas boiler is the same as for more expensive GHP installation.

CGS:

Despite shallow geothermal energy itself is cheap, the installation costs are relatively high and the financial incentives are necessary for the expansion of the SGE. The overall knowledge about the SGE is quite low in public. SGE has to be actively promoted in the incentives as another option to well-known photovoltaics and wind energy.

GeoZS:

The cost-benefit of NSGE installations is highly advantageous comparing to conventional systems and is also favourable comparing to other renewables. However, due to the high initial cost (investment), financial incentives are the most important. Financial incentives granted depending on the efficiency (e.g. feed-in tariff) are significantly in favour of NSGE. Important non-financial incentives are easy access to official information about administrative procedures, shallow geothermal potential, constraints and subsidies.

geoENERGIE:

We can provide recommendations for funding and/ or subsidies. In some partner countries, this is already implemented so we can show the advantages and disadvantages and show what would be the best option from our point of view.

On the other hand, we can look for best practise examples and show them to the authorities and interested people as reference systems. We need to inform the people more about the topic of shallow geothermal use.

SGIDS:

The financial support is what matters the most. The support of the public awareness via green energy responsibility is nice, but if there is high cost of the installation, it is not reflected. The basic calculation of the financial return would help the decision-making.

Other point that hinders the development of the sector is that other renewable energy systems (RES) are administratively easy. No permissions for solar or photovoltaics. Advantages in comparison to other RES should be emphasised, e.g. cooling, independent source from weather condition, like sunshine or wind conditions.

Statements from the GRETA-Team

Head of the Greta lead partner TUM Kai Zosseder:

In a lot of discussion within the renewable energy community a common sense was stated, that “GHG-emissions” must be expensive. That should help to change the focus for installation of the public to the renewable sector. Therefor taxes for fossil fuels or the emissions of GHG are more reasonable than incentives for renewables. Also in some countries there exist still incentives for new installations of fossil fuel systems (oil/gas heating systems), because of there are slightly more effective compare to old existing systems. This incentive strategy must be changed and more focused on renewable systems.

POLITO:

Financial incentives supporting NSGE installation are essential to overcome the high initial cost of this technology. Geothermal heat pumps allow an optimal thermal comfort providing both heating and cooling combined with low-temperature distribution systems (i.e. radiant floor). Furthermore, the public awareness of the environmental benefits of this low-emission technology is a great incentive to foster NSGE diffusion. Germany is an example of this consciousness, as in German people choose to install this plants for environmental reason even if the economic return of the investment is longer than in other countries.

ARPA:

In general, NSGE installations are believed to have payback periods (the time to recover the costs of installation from energy expense savings) dependent upon several factors, such as: electric rates, savings from not purchasing alternative heating sources, such as oil or natural gas, and the value of available incentives. Financial incentives could assist in overcoming the high initial cost barrier perceived to hobble the NSGE installation market.

5. SIMPLIFICATION

Break-out-group head: Alessandro Casasso

Poster presentation:

- (Mis-)understanding of geothermal technologies
  - Closed loop ≠ Deep water well
  - Open loop ≠ Consumptive well
- Research: Focused on components and not on the geothermal system as a whole (Salami slicing)
- Open data on:
  - Existing systems (to avoid violating rights)
  - Data for designers, especially for legally binding criteria
- One-stop shop: Well-trained and only one application procedure!

Statements from GeoPLASMA-CE team members

GBA:

Simplifications of regulation processes and requirements are a good tool to foster geothermal energy, but have to be executed carefully. Too much simplification bears the risks of under-regulation. In general, it should be the aim to simplify licencing procedures for applicants as one-stop-shop. The execution and requirements should be the same for all systems. Requirements concerning the operation and installation should be fitted to the installation by the competent authority through an evaluation process.

LfULG:

Having one authority responsible for the application process (one-stop shop) is important. However, processes for open loop and closed loop installations have to remain separate since they pose different risks with regards to drilling and operation of the installation.

PGI-NRI:

The simplification of procedures and the organization of definitions regarding shallow geothermal applications should be linked to the harmonization of legal regulations and the creation of e-governance for GHPs in the EU Member States. Informational internet portals promoting shallow geothermal energy and containing open geological data sources for the development of GHPs installation projects should also support the introduction of e-government.

CGS:

The simplification of the preparation and approval procedure is good idea, but some minimal requirements will still remain. Too much simplification has the limitation that it cannot solve/regulate diverse conditions.

At least the simplification should consist of existence of one-stop-shop. Today no unified approval procedure is existing in many countries and the applicant has often face to requirements of several offices.

GeoZS:

Simplifications can be achieved by known techniques: One stop shop, online application, maximum time limit for procedures, automatic permission after deadline, facilitated procedures for small scale producers and identification of geographical sites. These techniques shall be adapted to local conditions and constantly improving by experiences and good practices.

geoENERGIE:

In our opinion, one need one platform and responsible authority where all data is stored (on-stop shop). It is important to have one single place where you apply for permission and get answers if you have questions to the permission.

SGIDS:

Simplification has to be done with respect to the control over the regulation and monitoring of the resources. One stop shop would be nice but has to be done with respect to the rules that have been enforced so far.

The energy withdrawn for underground is not charged (to my knowledge) in any of the project country. Probably we should start as a good example with the “easier regulation” process for closed loop systems (along with no groundwater pumping and reinjection rules) how to make it as one-stop-shop.

Statements from the GRETA-Team

Head of the Greta lead partner TUM Kai Zosseder:

Please see the comments on harmonization and on regulations. The comments there are covering similar aspects mentioned here.

POLITO:

Today, the NSGE systems diffusion is often obstructed by long and unclear administrative procedures. Simplification is required in order to boost this technology. Public authorities to reduce approval time should adopt the one-stop-shop technique. The research in this field can help identify general issues and provide sustainable solutions, avoiding focusing on restricted aspects.

ARPA:

Simplification deals with a clearer and more transparent authorization procedures. One unique application procedure is required in order to reduce the time required for approval.

6. ADDITIONAL COMMENTS TO THE WORKSHOP

Statements from GeoPLASMA-CE team members

GBA:

Concluding the joint workshop, the main messages were:

- Harmonized law regulations for the authorization of SGS are needed in Europe to
  - Ensure the sustainable exploitation of this source of energy
  - Simplify the authorization process
- A joint regulation document is desirable, but cannot be accomplished within the projects GRETA and GeoPLASMA because
  - It is not foreseen in the AF to elaborate such a document
  - Input from many more countries across Europe is needed
  - This document should be elaborated- and consequently broadly accepted in the geothermal community, including many more partners.

What can the project teams do to set a starting point for such a joint document?

- Reach a **consensus about** the outline of **a joint regulation document** – suggestions for a starting document by GBA:
  - Descriptive document with recommendations for regulations (licencing processes incl. data policy and the handling of single parameters), ideas for simplifications and incentives.
  - Use this document in both projects for data collection, compilation and comparison. Data evaluation will show differences in the project countries but also general gaps, e.g. missing regulations for the ownership of geothermal energy.
- As a **basis for the joint document**, both projects provide compiled information including descriptions of:
  - Relevant criteria for the authorization/installation process
  - Handling of authorization processes in the project countries
  - Data ranges for relevant parameters
  - Licencing habits within the partner countries
- The document shall include joint statements from project partners on the following topics:
  - The importance of selected criteria concerning the installation and operation of shallow geothermal systems
  - A proposal of good practise handling of these criteria
  - A proposal for the regulation of this criteria

GBA as project lead for GeoPLASMA-CE and partner in GRETA feels as intermediate between these projects, both aiming at fostering the use of shallow geothermal energy. That is why, GBA has drafted a document as

basis for a future joint regulation document. This draft is currently under review by GeoZS as GRETA WP2 lead on legal regulations.

PGI-NRI:

The presented above issues of unification of legal regulations and e-management initially discussed in the Greta and GeoPlasma projects should be continued within the framework of a new EU project, with the participation of all (majority?) EU Member States, incl. geological surveys, specialized European agencies, e.g. EHPA and RHC and national geothermal associations. Professional lawyers should also be involved in the work of such a project to ensure that the proposed legislative changes will comply with the existing applicable law, including other related fields of science and the economy.

SGIDS:

Some recommendations on regulation and monitoring level that would result from GRETA could be incorporated in GeoPLASMA.

Statements from the GRETA-Team

POLITO:

All the analysed aspects regarding NSGE are strictly connected. The diffusion of NSGE in Europe is based on successful application of harmonised and simplified regulations supported by a good incentive scheme and open-data systems. The joint GRETA and GeoPLASMA effort for a low carbon European space follows this path.

ANNEX 3

ATTENDANCE LIST

List of Participants - 08/11/2017
Project Start: 15th December 2015

List of participants

GRETA – Geoplasma-CE workshop

08/11/2017
NH Hotel City Salzburg

No.	Name	Institution	Country	Signature
1	Stefan HOYER	GBA	AT	
2	DORIS RUPPRECHT	GBA	AT	
3	Jan Holiček	CGS	CZ	
4	Konstanze Zschocke	geoENERGIE	D	
5	Cornelia Steiner	GBA	AT	
6	Rüdiger Giese	geoENERGIE	D	
7	MARAGNA Charles	BRGM	France	
8	Fabian Böttcher	TUM	DE	
9	Christine Haas	TUM	DE	
10	Fanny BRANCHU	BRGM	F	
11	Peter Huggenberger	UNI Basel	CH	
12	PIETRO CAPODAGLIO	ARPA VDA	I	

GRETA is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme.
Send us an email at contact@greta-alpinespace.eu and see more about GRETA at www.alpine-space.eu/projects/greta.

GRETA - GEOPLASMA WORKSHOP

13	PIETRO ZAMBELLI	EURAC	IT	
14	VALENTINA D'ALONZO	EURAC	IT	
15	Francesca Messina	Regione Lombardia	IT	
16	WIESŁAW KOZDRÓJ	PGI-NRI	PL	
17	MAŁGORZATA JÓŹKOWSKA-KOZDRÓJ	PGI - NRI	PL	
18	EDITH HASLINGER	AIT	AT	
19	MITJA JANŽA	GeoZS	SI	
20	MATJAŽ KLASINC	GeoZS	SI	
21	RADOVAN ČERNÁK	ŠGÚDS	SK	
22.	SIMONA PESTOTNIK	GeoZS	SI	
23.	DUŠAN RAJVER	GeoZS	SI	
24.	MARTINA HEIGERMANN	LfULG	D	
25	PETER PIEDEL	- " -	D	
26	Kai Zosseder	TUM	D	
27	JOŽA PRESTOR	GeoZS	SI	
28	CASASSO ALESSANDRO	POLITO	I	
29	SIMONE DELLA VALENTINA	POLITO	I	
30	MATTEO RIVOIRE	POLITO	I	
31	ILARIA STRUNGA	REGIONE LOMBARDIA (GDP)	I	
32	BOTTIG Magdalena	GBA	AT	
33	BAIGTTO Alessandro	ARPA VALLE D'AOSTA (GDP)	I	

GRETA is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme. See more about GRETA at www.alpine-space.eu/projects/greta.

List of Participants - 08/11/2017
Project Start: 15th December 2015

List of participants

GRETA – Geoplasma-CE workshop

08/11/2017
NH Hotel City Salzburg

No.	Name	Institution	Country	Signature
~~34~~	~~ALESSANDRO CARASSO~~	~~POLITECNICO DI TORINO~~	~~ITALY~~	~~Alessandro Carasso~~ Doppelt
35	Gregor Götzl	GBA	AUSTRIA	
36	ANDRZEJ ŁAZECKI	MUNICIPAL OFFICE OF KRAKÓW	POLAND	
37	Marek HAJTO	AGH UST Kraków (PP09)	POLAND	

GRETA is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme.
Send us an email at contact@greta-alpinespace.eu and see more about GRETA at www.alpine-space.eu/projects/greta.

Annex 4

PRESENTATIONS OF THE KNOWLEDGE EXCHANGE WORKSHOP

GRETA midterm conference, Salzburg, November 08, 2017

D.T2.4.3: Knowledge exchange workshop on legal requirements, procedures and policies

GeoPlasma-CE, Geological Survey of Austria (GBA), Doris Rupprecht

A.T2.4 – DELIVERABLES

Deliverable D.T2.4.1

Summary of national legal requirements, current policies and regulations of shallow geothermal use

Deliverable D.T2.4.2

Catalogue of reviewed quality standards, current policies and regulations

Deliverable D.T2.4.3 - Knowledge exchange workshop on legal requirements, procedures and policies

Minutes of the knowledge exchange workshop concerning adequacy of current policies and legal implications of new strategies. This expert workshop addresses project team members of GRETA and previous projects (ReGeoCities).

SCHEDULE OF THE WORKSHOP

09:10 -09:40

The GRETA project

Joerg Prestor

09:35 – 10:10

The GeoPLASMA-CE project

Doris Rupprecht

10:10 – 10:30

Coffee break

10:30- 10:45

What else?

Short introduction to other projects and work

from 10:45

DISCUSSION

Geologische Bundesanstalt

GeoZS
Geološki zavod
Slovenije

CZECH
GEOLOGICAL
SURVEY

AGH
AGH University of Science
and Technology

geoENERGIE
Konzept

LANDESAMT FÜR UMWELT,
LANDWIRTSCHAFT
UND GEOLOGIE

Freistaat
SACHSEN

GiGa
infosystems

Bundesverband
Geothermie

City of
Ljubljana

GRETA / GeoPlasma_CE - JOINT WORKSHOP
FOR KNOWLEDGE EXCHANGE ON
LEGAL REQUIREMENTS, PROCEDURES AND POLICIES

Interreg
Alpine Space

EUROPEAN UNION

Greta

EUROPEAN REGIONAL DEVELOPMENT FUND

Current results for contribution to the GRETA project‘s output: „Harmonized guidelines of legal and technological procedures“

8. 11. 2017, J. Prestor, GeoZS

November 8th 2017, 9:00 – 13:00,
Hotel NH Salzburg City, Franz-Josef Straße 26, A-5020 Salzburg, Austria

The GRETA project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme.

NSGE regulations in Alpine countries - content

1) Legal and environmental constraints
2) Comparison of levels of regulations
3) Different procedures and theirs concepts
4) Understanding different risks
5) Comparison of criteria and criteria values in regulations
6) Facilitation of procedures – good practices
7) Feedback and development of regulation
8) Basic premise for harmonization

GRETA PROJECT WORKING STRUCTURE

GRETA Work packages (WP)

1) Legal framework constraints – WP2
2) Technical/environmental framework – WP3
3) Geological/climatic parameters – WP4
4) Economic and financial constraints - WP5

Main inputs from partners to WP2

Different steps in the procedures and flow charts presented in a transnational comparable version.

Good practices of procedures and supporting information to facilitate procedures.

Special geological conditions and criteria to avoid environmental risks.

Parameters for feedback of risks for NSGE installations.

1) Legal and environmental constraints

1) Constraints for NSGE project/design
WHAT IS OR HAS TO BE REGULATED?

- Water & Nature protection
- Natural risk zones
- Artesian aquifers
- Shallow groundwater
- Perched groundwater
- Gas occurrences
- Multiple aquifers
- Karst

(3) Special areas
(2) Special geological conditions

(4) Public services

- Objectives
- Subsidies
- Insurance
- Certification
- Reporting
- Registers

(1) Implementing NSGE application

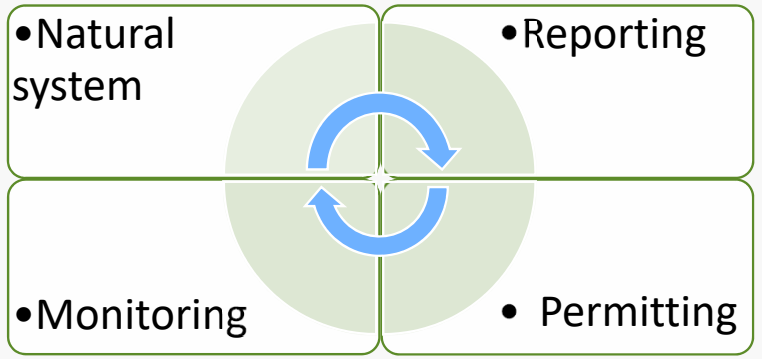
(5) Permitting and charging procedures

INTERVENTIONS

- Drilling
- Minimum distances
- Heat / water displacement
- Reinjection
- Substances in use
- Monitoring
- Abandonment

- Declaration
- Consent
- Permit
- Fee
- Royalty
- Concession

Development of regulation



Aims of regulation

+ sustainable utilization of the resources,
+ legal certainty and
+ equal opportunity

See more at www.alpine-space.eu/projects/**greta**

Constraints

LEGAL CONSTRAINTS
Regulations of:
employment
safety
planning & building
environment
etc.

TECHNICAL CONSTRAINTS

construction tolerances
practicality of standards
practicality of building methods
completing construction activities,
space required for builders work
coordination of services
site access routes
etc.

Constraints

= conditions, agencies or forces that impede progress towards an objective or goal.

Environmental constraints

hazardous materials
air pollution, noise
vibration, traffic
plants and wildlife
special geological features
mass / energy displacement
minimum distances

DESIGN CONSTRAINTS

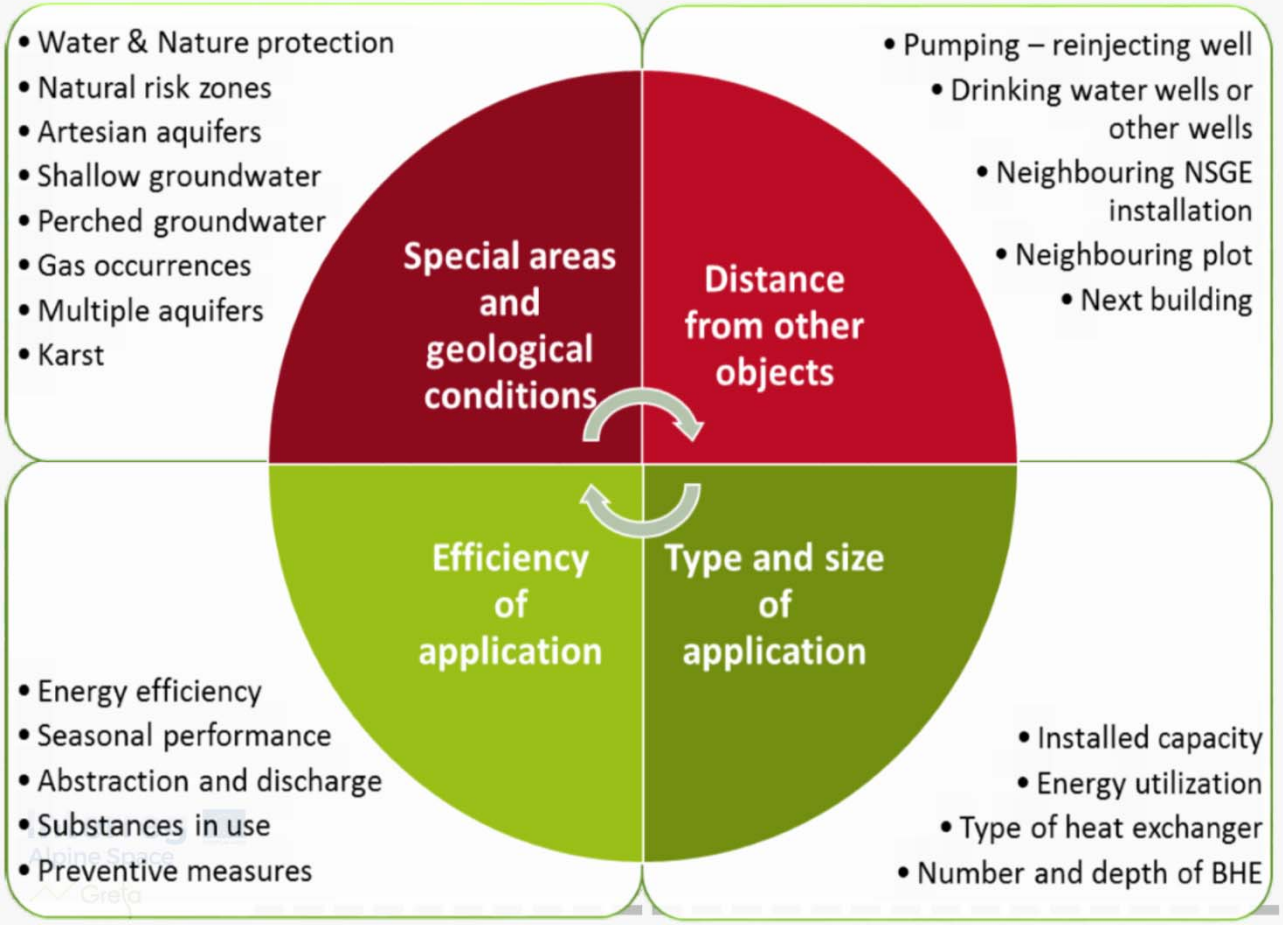
all factors that limit the ***range of potential design solutions****.*
Some of these constraints become apparent as the design progresses.

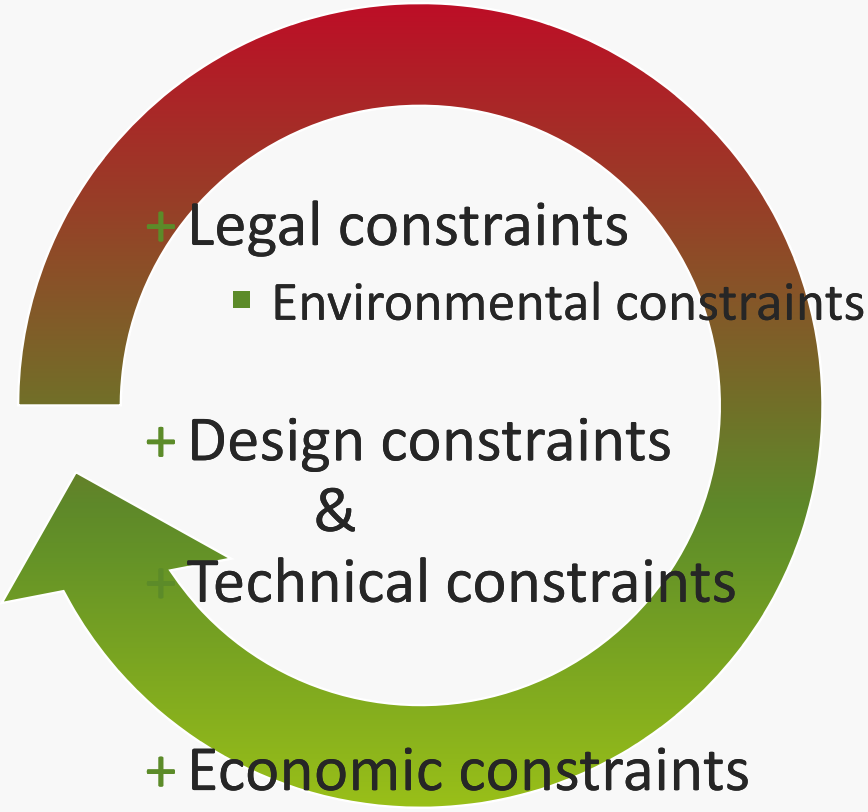
ECONOMIC CONSTRAINTS

project budget
allocation of resources

Interreg Alpine Space Greta

Progress of NSGE project





See more at www.alpine-space.eu/projects/**greta**

2) Comparison of levels of regulations

2) Comparison of levels of regulations
Distribution of regulative procedures between authorities

GRETA project case studies. N – number of administrative entities involved in procedures, F – entry point for submission.

	N		F		F		F		F
AUSTRIA	3	Federal state government - Dep. Water agency	y	Local Department of the water agency	y	Federal Ministry of Agriculture, Forestry, Envir. and Water Management			
FRANCE	1	DREAL - Directions Régionales de L'environnement, de L'aménagement et du Logement	y	Agence de l'eau		Mairies		Expert agréé	
GERMANY - BAVARIA	4	Bavarian Environmental Agency	y	Local authority LRA Oberallgäu	y	Water management office (WWA Kempten)		PSW - Private surveyor of water management	
ITALY - AOSTA	3	Servizio Geologico (Well drilling)	y	Regione Autonoma Valle Aosta (Water discharge)	y	Municipality	y		
SLOVENIA	4	DRSV – national Slovenian Water Agency	y	DRSV-regional Slovenian Water Agency	y	Ministry of Infrastructure (MZI)		Eco Fund	y

2) Comparison of levels of regulations
Distribution of regulative procedures between authorities

Austria

- The submission is exclusively carried out by the water agencies.
- Possible interactions with other entities are also carried out by the water agency.
- Documents submitted at the local water agencies are also forwarded to the federal state government water agencies for a second proof.
- Submission procedures in Austria are similar in all national states.
- There are no differences in the submission
  - between the *different NSGE installations* and
  - between *notification and permitting* procedure.
- Information is easy to find and all water agencies provide telephone consultation.

Germany

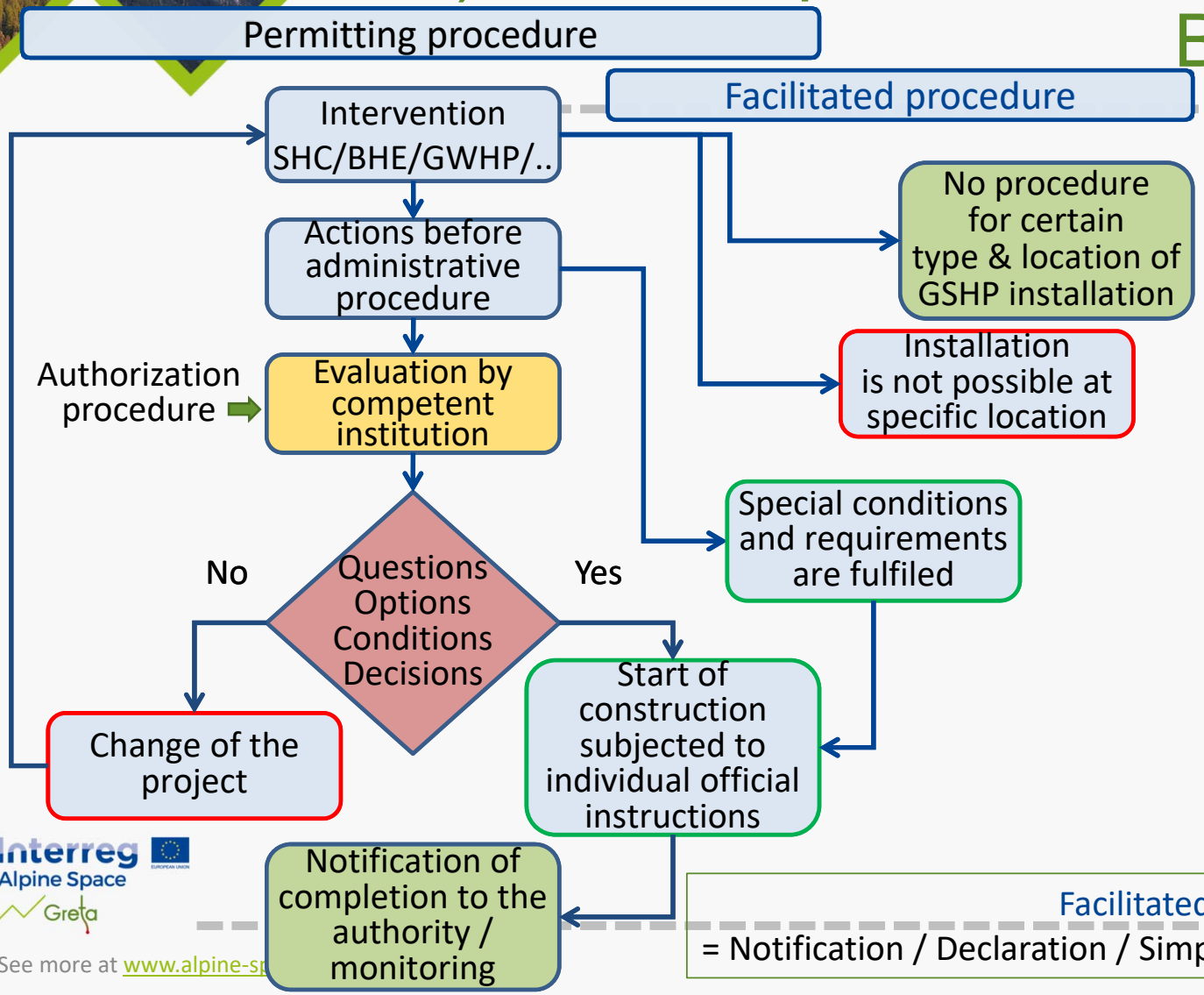
- The application form together with a report from a private authorized expert must be submited to the local administration, which evaluates the application.
- Responsible Water and/or Mining agencies are involved In special situations.
- The mining agency is informed by the local administration, if necessary.
- The decision for permission is given by the local administrations.

3) Different procedures and theirs concepts

3) Different procedures and theirs concepts BASIC CONCEPTS

Decision	Explication
Not allowed	Authorization cannot be granted, even under case specific obligations.
Conditionally allowed	Further procedure for case by case decision is foreseen. The authorization could require “case specific obligations” or even be refused, depending on the outcome of impact assessment or risk assessment procedures.
Allowed under special obligations	The installation is admitted if predifined special obligations are provided.
Allowed	The installation is allowed. Authorization would be granted under “standard obligations”.

3) Different procedures and theirs concepts
BASIC CONCEPTS



Basic concept

+ Precautionary principle

vs

+ Risk based approach

Facilitated procedure

= knowing special conditions and requirements

+ **Special areas**
+ **Special geological conditions**
+ **Minimum distances**
+ **Mass & heat displacement**

Facilitated procedure

= Notification / Declaration / Simplified procedure / Evidenced use ...

3) Different procedures and theirs concepts BASIC CONCEPTS

Permitting / Authorization procedure vs Facilitated / simplified procedure

Procedures / Actions	Permitting procedure	Simplified notification procedure
Building /construction negotiations with neighbours	YES	NO
Appointed time from submission till decision	NOT SPECIFIED	2 months at the most
Building and operating requirements by the water agency	mandatory	self-obligating

Essential criteria:
„Minimum distance“ and „Mass & heat displacement (flow rates & temperature difference)“ criteria

3) Different procedures and theirs concepts BASIC CONCEPTS

French good practice

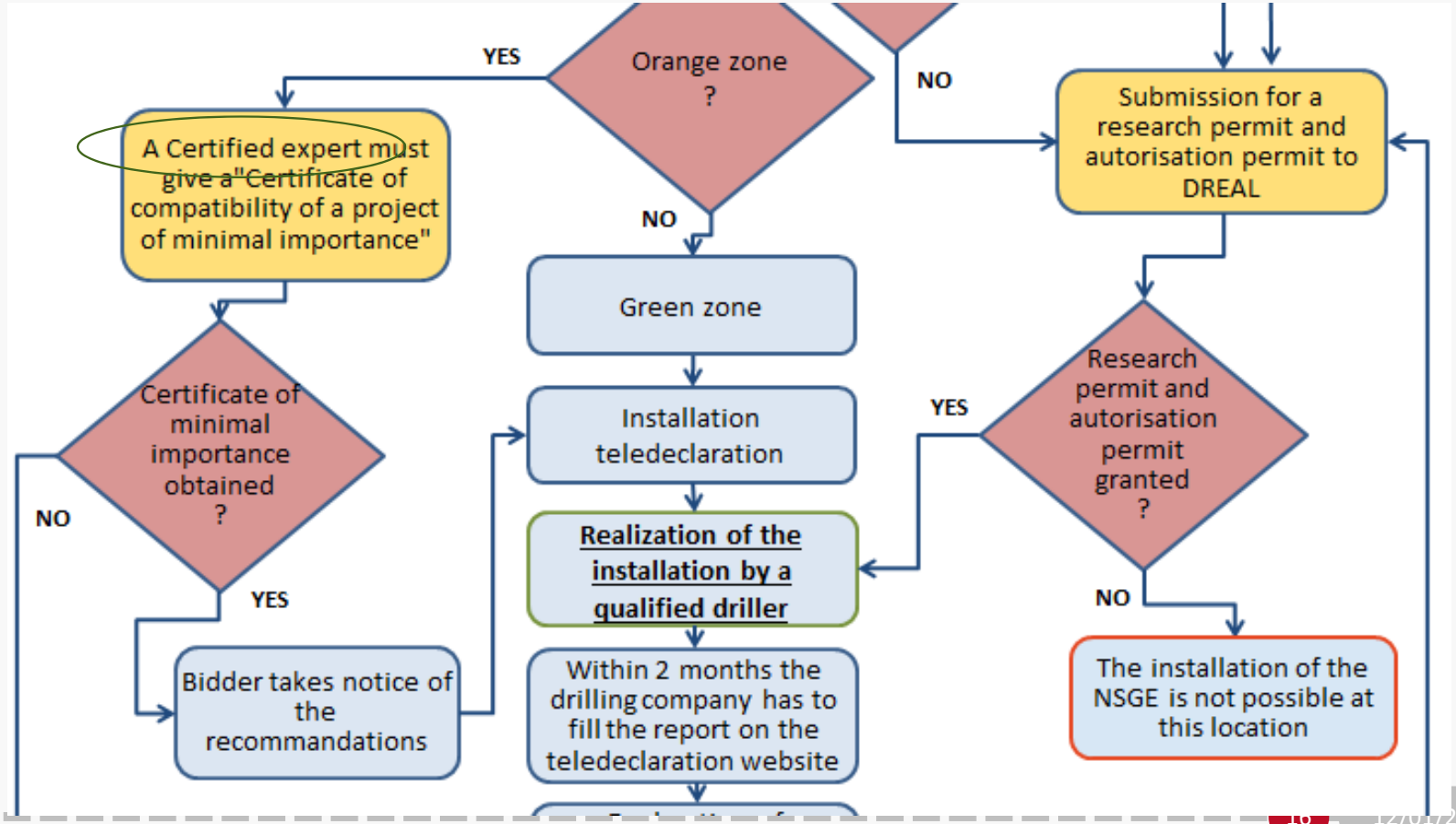
More complex and variable criteria concerning special geological conditions are elaborated by certain algorithm to arrange territory in three different classes of risk (**GREEN, ORANGE AND RED**)

	Permitting procedure	Simplified declaration procedure
GREEN		**YES**
ORANGE		YES but the bidder is required to **provide from an expert a "certificate of compatibility" for simplified declaration**
RED	YES geothermal project has to be subject of **authorization procedure**	

„**Special geological conditions**“ and „**Special areas**“ – essential criteria

3) Different procedures and theirs concepts BASIC CONCEPTS

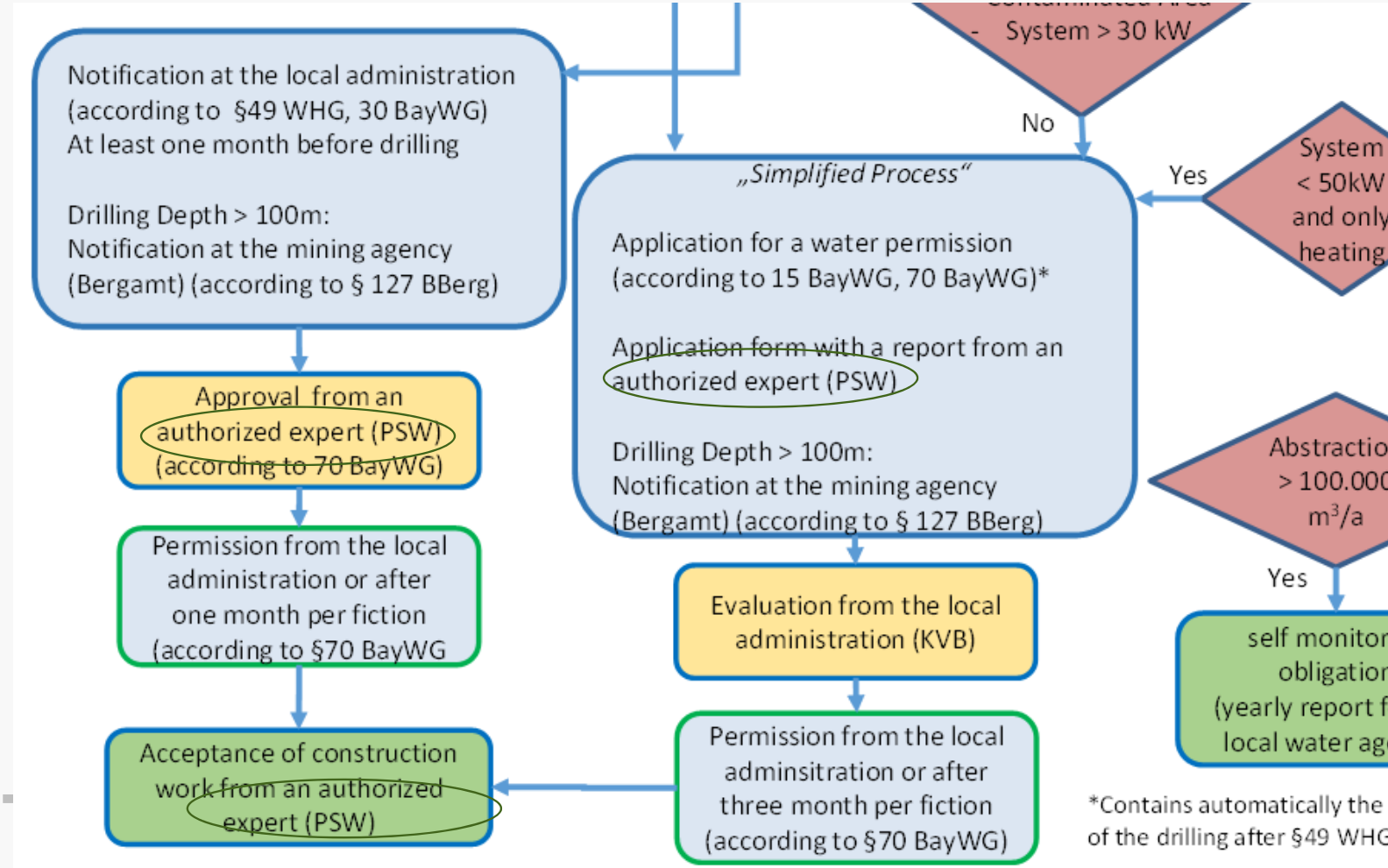
The role of „Certified expert“ in the simplified procedure (France)



See more at www.alpine-space.eu/projects/**greta**

3) Different procedures and theirs concepts
BASIC CONCEPTS

The role of „Authorized expert“ in the simplified procedure (Bavaria)



Interreg Alpine Space Greta

See more at www.alpine-space.eu/projects/**greta**

3) Different procedures and theirs concepts

SIX TECHNIQUES FOR FACILITATION OF ADMINISTRATIVE PROCEDURES

Abstract from Table 2: State of play of the availability of facilitated administrative procedures for RES utilization in EU Member States in 2014 (source: Öko-Institut) (European Commission 2017, p. 12).

Facilitation 2014	1) One stop shop	2) Online application	3) Maximum time limit for procedures	4) Automatic permission after deadline	5) Facilitated procedures for small scale producers	6) Identification of geographical site
Austria	x	✓	x	x	✓	x
Germany	✓	✓	✓	✓	✓	✓
France	✓	✓	✓	x	✓	✓
Italy	✓	✓	✓	x	✓	x
Slovenia	x	x	x	x	x	x

1 One stop shop
2 Online application
3 Maximum time limit for procedures
4 Automatic permission after deadline
5 Facilitated procedures for small scale producers
6 Identification of geographical site suitability

SPECIFIC CRITERIA are needed
mass & heat displacement
special areas & geological conditions

See more at

3) Different procedures and theirs concepts

RANGES OF CRITERIA VALUES FOR „*FACILITATED PROCEDURES*“

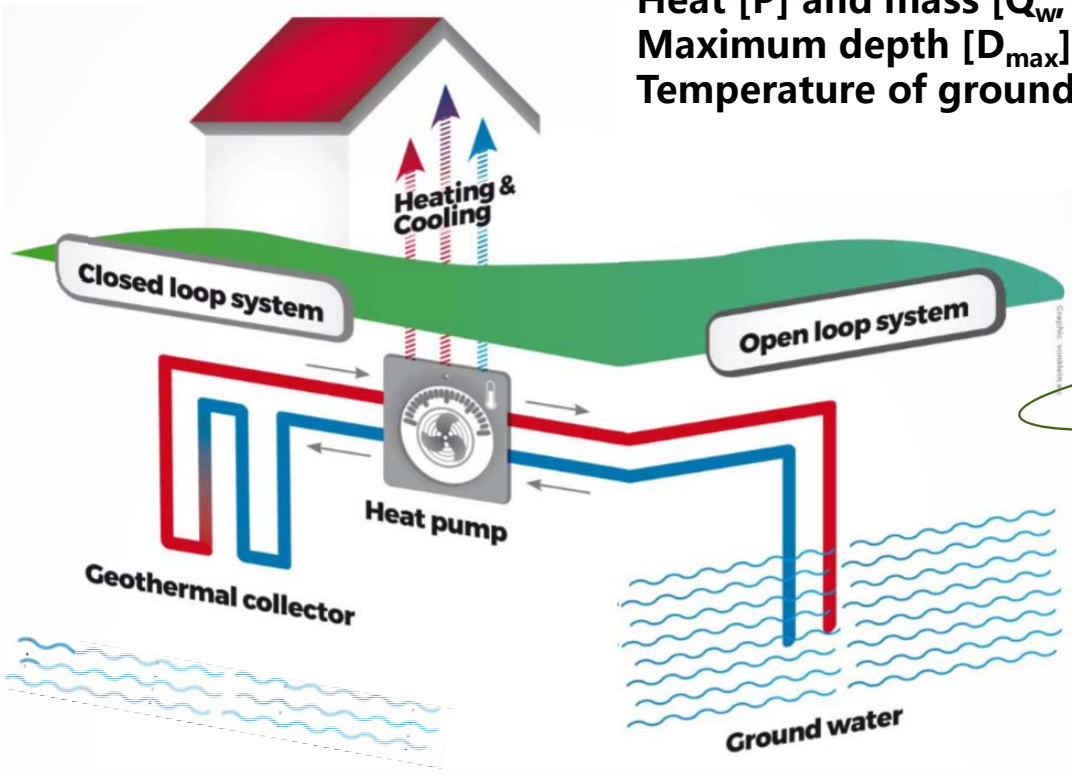
Criteria for „FACILITATED PROCEDURES"

Heat [P] and mass [Q_w, $Q_{w\text{-reinj.}}$] displacement
Maximum depth [D_{max}]
Temperature of groundwater [T_w]

P {<30, <50, <500} kW

D_{max} {<30, <150, <200, <300} m

D_{max} = above {GWL, GWL+1 m}



P {<16, <50, <500 kW

Q_w {<18, <80} m^3/h

$Q_{w\text{-reinj.}}$ {0, 100} % reinjected

T_w {<20, <25} °C

D_{max} {<30, <200} m

Variety of criteria values for „small scale producers“ is not significantly reflecting that impacts are decisive

dT, $T_{max, min}$ for BHE & SHC are not directly used as criteria for facilitated procedures

4) Understanding different risks

4) Understanding different risks
SPECIAL AREAS

SPECIAL AREAS	SOURCE OF REGULATIONS
1. Drinking water protection areas	I. Regulations for the protection areas of water resources intended for human consumption
2. Riparian, waterside and coastal land	II. Regulations of the water management and management schemes & Objectives and provisions of the water management plans
3. Nature protected areas for water dependent ecosystems	
4. Contaminated sites	
5. Protection areas of other water uses (mineral, thermal, process water,…)	
6. Areas of interaction with other installations and water rights	
7. Areas of permanent or temporary impact on water regime or status	
8. Flood and erosion areas	III. Natural hazard prevention plans / natural risk zones
9. Landslide areas	
10. Areas designated for underground storage facilities for gas, oil or chemicals	IV. Mining rights, mineral resources management plans

There are 10 special areas identified in 4 different sectors documents.

SHC (depth < 10 m) and energy geostructures

BHE

GWHP

Take notice of :
i) objectives and provisions of the water management and management plans (SDAGE),
ii) regulations of the water management and management schemes (SAGE)
iii) natural hazard prevention plans (town halls)
iv) regulations for the protection areas of water withdrawal points intended for human consumption (town halls)
v) regulations for the protection of underground storage facilities for gas, oil or chemicals instituted under Book II of the Mining Code (town halls or DREAL)
vi) provisions of the departmental health regulations regarding the taking of water intended for human consumption

Ac
ad

The r
admi
the si
(France

Special areas have to be checked in the very first stage of the project, before simplified procedure (France)

NO PROCEDURE

NO

Red zone ?

YES

< 80 m^3h^{-1}; Reinjection in the same aquifer ?

YES

NO

YES

P < 500 kW D < 200 m ?

YES

NO

YES

Orange zone

NO

4) Understanding different risks
SPECIAL GEOLOGICAL CONDITIONS

SPECIAL GEOLOGICAL CONDITIONS	POSSIBLE RISKS – short descriptions
1 Artesian/confined aquifers	- Potential higher value for future consumption could be diminished by pumping. - Reinjecting could be problematic.
2 Very shallow water table	- Foundation conditions of neighbouring constructions could be impacted by pumping. - Reinjecting could be problematic.
3 Perched groundwater layers	- Lower groundwater could be contaminated in the case of leakage along drillings or inadequately sealed borehole.
4 Two or multiple aquifer layers	- Change of availability/quality of the groundwater or stability of the ground could be provoked by leakage along drillings between aquifers.
5 Mineral water resources	- Potential higher value for human consumption could be diminished. - Corrosion or deposition of minerals in the installation could be provoked.
6 Thermal water resources	- Potential use of thermal groundwater of higher value could be diminished.
7 Gas occurrences	- Mineral resources potential of higher importance could be diminished. - Injuries/damage could be provoked during drilling works (health, explosion).
8 Unstable ground: landslide, compressible soil, cavities, salts and evaporites	- Ground heat exchangers could be damaged by: land movement (shearing stress or compression), subsidence or collapse or an uplift of the surface (consolidation or erosion of deposited material, dissolution or swelling).
9 Contaminated soil	- Deeper ground could be contaminated by mobilization of contaminants from the surface.
10 Karst area	- Destination of eventual contamination during drilling or operation could be unknown. - Drilling could not be completed/successful because of hardly predictable conditions.
11 Salt water intrusion	- Change of availability/quality of the groundwater could be provoked by pumping.
12 Permafrost	- Foundation conditions could be impacted by temperature change.

4) Understanding different risks
SPECIAL GEOLOGICAL CONDITIONS

Tyrolian example of good practice for explanations of risks

There are practical explanations available about :

+ Neighbouring rights
+ Multiple aquifers
+ Carbonate karstic rocks
+ Evaporites (Salt)
+ Sulphate karst (gypsum and anhydrite)
+ Gas occurrence
+ Landslides
+ Boulder-covert land
+ Pits and mining areas
+ Contaminated sites

(Seehauser & al., 2016)

Suisse example for recomendation for specific obligations in special geological conditions

+ *Drinking water protection areas - wider zone (DWPA III)*
+ *Artesian aquifers*
+ *Perched ground-water*
+ *Two or more aquifer layers*
+ *Mineral water resources*
+ *Gas occurrence*
+ *Unstable ground*
+ *Contaminated soil*
+ *Karst area or Areas of insufficiently known ground characteristic*

(OFEV 2009, OEWAV 2007, OFEFP 2004)

4) Understanding different risks
DISTANCE FROM OTHER OBJECTS

DISTANCE FROM OTHER OBJECTS	AIM
1 Minimum distance to installations	
a. next building,	- Preventing unfavourable change of foundation ground, stability and energy efficiency.
b. drinking water well,	- Preventing any risk and impact during construction, installation and operation to water quality and its characteristics.
c. other uses wells	- Preventing significant impacts during construction, installation and operation to water quality and characteristics.
d. other public installations	- Ensuring undisturbed operation, maintenance activities and interventions.
2 Minimum distance between neighbouring NSGE installations	
a. heat exchanger or	- Preventing significant **temperature difference** and reduction of the **heat exchange capacity**.
b. groundwater well	- Preventing significant **drop of groundwater level** and temperature difference that would reduce the heat exchange capacity.
3 Minimum distance to neighbouring plot (property line)	- To enable or to give an opportunity to make/enhance the adequate capacity installation on the neighbouring plot.
4 Minimum distance between pumping and reinjection site	- Preventing break-through (short circuit), so that the changed **temperature of reinjected water** would affect the pumped water.

Some of „minimum distances“ are related directly to „heat & water displacement“ parameters.

4) Understanding different risks TEMPERATURE DIFFERENCE

TEMPERATURE DIFFERENCE		AIMS (ENVIRONMENTAL ISSUES)
1 Open loop - GWHP Temperature difference of reinjected water = difference between abstracted and reinjected groundwater water = difference between supply and return temperature or the abstraction well and the injection well	ΔT (T_A-T_I)	Preventing technical problems during continuous operation and keeping the maximum efficiency.
a, b. - absolute allowed minimum and maximum temperature of the reinjected groundwater	T_{min} T_{max}	Limiting the stress to groundwater and aquifer. Limiting the possibility of change of geochemical conditions.
c. accepted ΔT between disturbed and ambient undisturbed temperature of groundwater	ΔT_{amb}	Limiting the extent of impact. Enabling other uses and giving opportunity to other services.
2 Closed loop - GCHP Temperature drop of heat carrier fluid = difference between entry and exit of the heat exchanger = difference at the entry and exit of heat pump	ΔT (T_{EN}-T_{EX})	
a. absolute allowed T_{min} of heat carrier fluid - peak load, average, base load	T_{min}	
b. absolute allowed T_{max} of heat carrier fluid	T_{max}	
c. accepted ΔT between disturbed and ambient undisturbed temperature of the ground	ΔT_{amb}	

Potential risks*:
Impact on biocenosis (microbial biodiversity)
Chemical respond to water-solid interaction processes
Thermal interference between installations

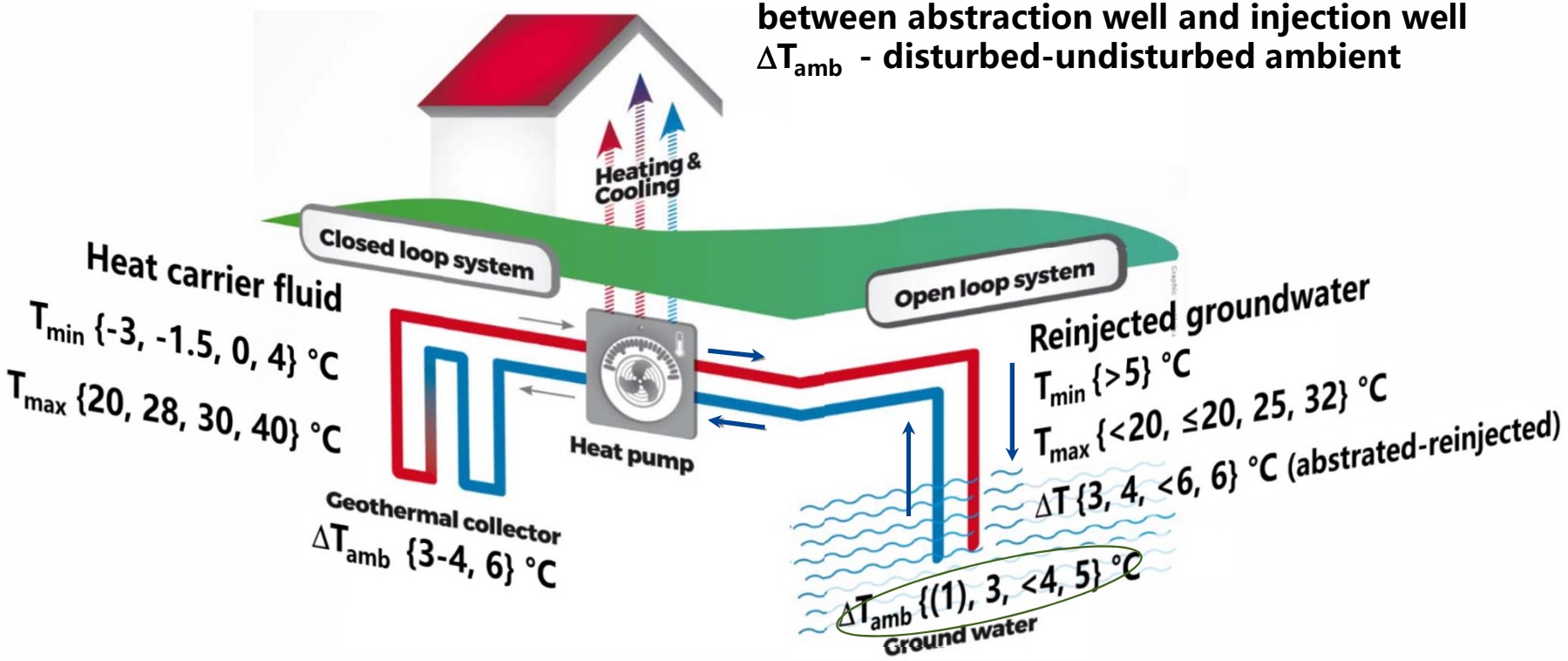
*García-Gil et al., 2015

5) Comparison of criteria and criteria values in regulations

5) Comparison of criteria and criteria values in regulations: TEMPERATURE

Criteria for „TEMPERATURE DIFFERENCE"

ΔT – between entry and exit of heat exchanger or between abstraction well and injection well
ΔT_{amb} - disturbed-undisturbed ambient

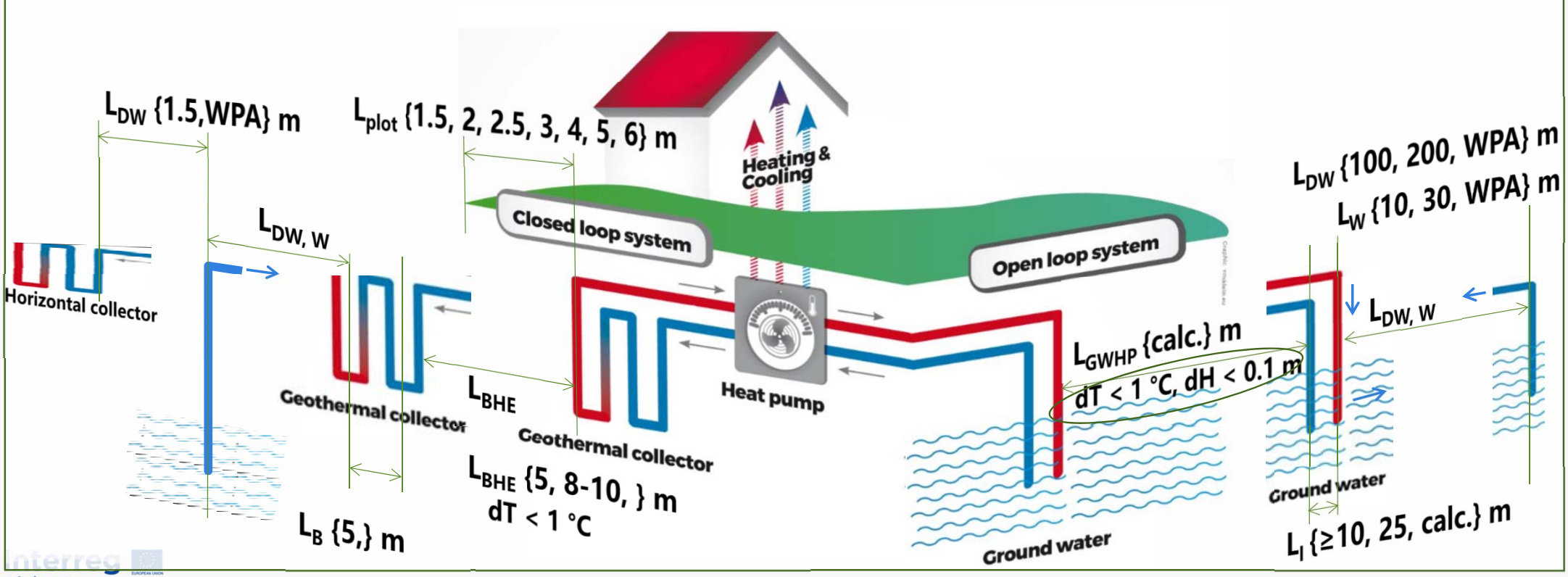


5) Comparison of criteria and criteria values in regulations: TEMPERATURE

TEMPERATURE		EXAMPLES OF SPECIFIC AND CHARACTERISTIC PROVISIONS
Open loop - GWHP **Temperature difference of reinjected water**	ΔT	
a, b. - absolute allowed minimum and maximum temperature of reinjected groundwater	T_{min} T_{max}	
c. accepted ΔT between disturbed and ambient undisturbed temperature of groundwater	ΔT_{amb}	a) > 1 °C → active role in the permitting procedure granted to pre-existing users (A – Vienna) b) < 4 °C at 200 m from reinjection well (F) c) 3 °C after mixing; can be more locally restricted to the injection well (100 m) (CH)
Closed loop - GCHP **Temperature drop of heat carrier fluid**	ΔT	
a. absolute allowed T_{min} of heat carrier fluid	T_{min}	a) 4 °C if the heat carried fluid is pure water (I) b) -1.5 °C average minimal T of heat carrier fluid not allowed falling below defined boundary in 50 y of operation (CH) c) 0 °C in baseload, -3 °C in peak load (D)
b. absolute allowed T_{max} of heat carrier fluid	T_{max}	a) 40 °C if demonstrated that the structural function of the energy piles is not compromised (I)
c. accepted ΔT between disturbed and ambient undisturbed temperature of the ground	ΔT_{amb}	

5) Comparison of criteria and criteria values in regulations: MINIMUM DISTANCES

Criteria for „MINIMUM DISTANCES"



5) Comparison of criteria and criteria values in regulations: MINIMUM DISTANCES

MINIMUM DISTANCES		EXAMPLES OF SPECIFIC AND CHARACTERISTIC PROVISIONS
1. Minimum distance to installations		
a. next building	L_{nb}	
b. drinking water well	L_{DW}	No specific distances, it depends on the individual hydrogeological conditions (CH). 30 m downstream and > 200 m upstream of drinking water sources captured (I-Bolzano).
c. other uses wells	L_W	It is not allowed to impact other users ; no specific distances are provided (CH).
d. other public installations	L_{pi}	Same as above
2. Minimum distance between neighboring NSGE installations		
a. heat exchanger or	L_{BHE}	Preexisting rights are not allowed to be affected. Critical legislative key value limiting influence of existing use: dT < 1 °C, dH < 0.1 m. (A)
b. groundwater well	L_{GWHP}	Individual, large enough so that they don't interact (based on hydrogeological investigations/simulations) (CH).
3. Minimum distance to neighboring plot (property line)	L_{plot}	L > 6 m, less if the neighbour agrees (I-Bolzano). In general 2.5 m (to guarantee minimum distance between two individual heat exchangers (CH).
4. Minimum distance between pumping and reinjection site	L_I	Estimation of minimum distance between production and reinjection well based on analytic assumptions and numerical modelling. (A)

6) Facilitation of procedures – good practices

6) Facilitation of procedures – good practices:

+ Public awareness potential = availability of official information:
  1. instructions for the administrative procedure in steps
  2. explanations in which cases NSGE would not be allowed
  3. explanations what are/could be special conditions for NSGE design
  4. appointed time from the submission till the decision
  5. recommendations for the economic efficiency of NSGE systems
  6. explanations what are the incentives and how to apply for subsidies
  7. presentations of NSGE potential to applicants (in form of maps, geological and geothermal information, databases, presentation of good practice cases,…)
  8. officially recommended sites/links for additional information
  9. different official sources containing contradicting information

6) Facilitation of procedures – good practices: INFORMATION PORTAL

Installation of Ground source heat pumps systems

Short explanation of NSGE and GSHP

Link on existing **Report about NSGE potential of the community**:
-Recommendations to design
-Viewer & database

Links to:
Local energy concept, Sustainable Energy & Climate Action Plan

Administrative procedure for GSHP installation

Very short explanation of procedure

Existing restirctions

Step by step getting the authorization

A. Initial steps - prelim. inquiry
1.What has to checked
2.Link to information source
3.Contact point for add. questions

B. Application form for author.
4.Permitting auth. -entry point
5.Appointed time submission-decision
6.Link to application form
7.What will be checked by auth.
8.Possible special obligations or condition that could be required

Start of construction
9.Minimum time to announce the start, receiving specific conditions
10.List of certified/Q label drillers

End of construction
11.Obligations about report: content, data, surveillance, authority, time frame

General information (Legal bases)

Preclusions / disclaimers

Deposition of excavated and waste materials

Links to relevant **legislative documents** / rules / requiremets on national and local level:
-water protection,
-geothermal energy,
-contaminated sites,
-environmental protect.

Further information

-**Energy concept**
-Links to energy data sources

Proffessional asociations in the field of HP

Incentives:
- promotion of NSGE objectives,
- programs (especially efficient energy use, ...)

Subsidies: (links where and how to apply for subsidies

CH - Genève: *http://ge.ch/geologie/sous-sol/geo*

7) Feedback and development of regulation

7) Feedback and development of regulation

Principles*		Development	Action - feedback
+ Sustainable utilization of the resources	+ Energetically balanced system	+ Meet current needs without compromising the ability to address future needs.	+ Specifying minimum distances
+ Legal certainty	+ Certainty of stakeholders investments	+ Provide safety: creating the conditions that the legal consequences are predictable.	+ Specifying risks, special conditions and requirements
+ Equal opportunity	+ Fair exploitation of the resources	+ Avoid monopolization, overcoming the "first come, first served" policy.	+ Optimizing mass & heat displacement

*García-Gil et al., 2015

See more at www.alpine-space.eu/projects/greta

8) Basic premise for harmonization

8) Basic premise for harmonization

- Harmonization does not mean inducing additional changes to different practices, but above all:
  - to make the procedures easier to learn and to implement,
  - to make them adaptable to similar objectives in varying situations and
  - to support a joint sense of ownership of decisions and actions.

- Understanding specialties of procedures and recognizing good practices is a foundation stone for harmonization activities.

8) Basic premise for harmonization

+ Easily accessible and updated information of „special areas“ on the site
+ Clear explanation of risks in „special geological conditions“
+ Practical measures and solutions for „special geological conditions“
+ Tools and methods for optimization of „heat & water displacement“
+ Incentives to avoid monopolization and overcome „first come, first served“ policy

8) Basic premise for harmonization

+ Evidence of all ground heat exchangers (location, depth/area, …) is important

+ Criteria for abandonment of installation are needed (after use / after life time / in which cases)

+ ΔT, $T_{max, min}$ are not used directly as criteria for facilitated procedures - maybe in future development

A good practice*

Effective and successful:	•Has strategic relevance in achieving a specific objective. •Successfully adopted; positive impact on indiv. & communities.
Environmentally, economically and socially sustainable:	•Meets current needs without compromising the ability to address future needs.
Scientifically based definition:	•Shows how actors, men and women, involved in the process, were able to improve their livelihoods.
Technically feasible:	•It is easy to learn and to implement.
Inherently participatory:	•Uses participatory approaches as they support a joint sense of ownership of decisions and actions.
Replicable and adaptable:	•Has the potential for replication and should therefore be adaptable to similar objectives in varying situations.
Reducing risks:	•Contributes to risk reduction for resilience.

*adapted after FAO – UNESCO (http://www.fao.org/3/a-as547e.pdf%0D)

Final slide

PP	Project partner	Contact (name, e-mail)	
1	TUM	Kai Zosseder Fabian Böttcher Marcellus Schulze (LfU)	 Kai.Zosseder@tum.de Fabian.Boettcher@tum.de
2	ARPA VdA	Pietro Capodaglio	P.Capodaglio@arpa.vda.it
3	GBA	Magdalena Bottig Doris Rupprecht	Magdalena.Bottig@geologie.ac.at Doris.Rupprecht@geologie.ac.at
4	GeoZS	Joerg Prestor Simona Pestotnik	Joerg.Prestor@GEO-ZS.SI Simona.Pestotnik@geo-zs.si
5	BRGM	Charles Maragna Jean-Claude Martin Pierre Durst	C.Maragna@brgm.fr JC.Martin@brgm.fr P.Durst@brgm.fr
6	POLITO	Alessandro Casasso	Alessandro.Casasso@polito.it
7	EURAC	Pietro Zambelli Roberto Vaccaro	Pietro.Zambelli@eurac.edu Roberto.Vaccaro@eurac.edu
8	Triple S-GmbH		
9	INDURA	James Gilbert	j.gilbert@indura.fr
10	CA		
11	Uni Basel	Peter Huggenberger	peter.huggenberger@unibas.ch
12	RL	Francesco Spinolo Marta Padoan Alessandro Baietto	francesco_spinolo@regione.lombardia.it marta.padoan@hotmail.it baietto@gdpconsultants.eu

Interreg Alpine Space Greta

See more at www.alpine-space.eu/projects/**greta**

Thank you for your attention!

GRETA midterm conference, Salzburg, November 08, 2017

A.T4.2: Elaboration of quality standards for planning, construction and monitoring geothermal sites

GeoPlasma-CE, Geological Survey of Austria (GBA), Doris Rupprecht

A.T2.4 – DELIVERABLES

Deliverable D.T2.4.1

Summary of national legal requirements, current policies and regulations of shallow geothermal use

Deliverable D.T2.4.2

Catalogue of reviewed quality standards, current policies and regulations

Deliverable D.T2.4.3

Knowledge exchange workshop on legal requirements, procedures and policies

A.T2.4 – DELIVERABLES

Deliverable D.T2.4.1 - Summary of national legal requirements, current policies and regulations of shallow geothermal use

The summary considers all aspects of licensing and management of shallow geothermal use including management of environmental impact. Results from D.T2.4.3 will be adapted for valorisation of results from previous studies (e.g. GRETA) for the pilot areas

Deliverable D.T2.4.2 - Catalogue of reviewed quality standards, current policies and regulations

The results of D.T2.4.2 will be evaluated at a comparative analysis with involvement of local stakeholders. This results in a catalogue (English language) of quality standards, national regulations and current policies including identified deficiencies.

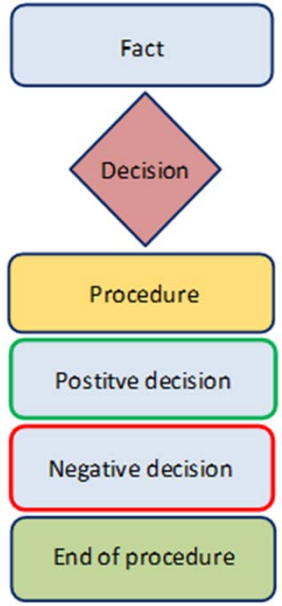
Deliverable D.T2.4.3 - Knowledge exchange workshop on legal requirements, procedures and policies

Minutes of the knowledge exchange workshop concerning adequacy of current policies and legal implications of new strategies. This expert workshop addresses project team members of GRETA and previous projects (ReGeoCities).

CONTENT

D.T2.4.1 - QUESTIONNAIRE

- Topic area A: Legal regulations/Licensing procedures
  - Definitions
  - Regulation of SGES in national, regional and local scale and the documents
  - Licencing procedures and the executing authorities
  - Licencing documents
  - Monitoring of SGES
  - Liquidations procedures



- Topic B: Flow charts for licensing procedures in the pilot area

D.T2.4.1 - QUESTIONNAIRE

- Topic area C: Special geological and geographical conditions which can limit the installation of shallow geothermal energy systems

Special geological conditons and endangered zones

- Artesian aquifers
- Very shallow water table where reinjection can be problematic
- Perched groundwater layers
- Two or multiple aquifer layers
- Mineral water resources
- Thermal water resources
- Gas occurences
- Mining areas
- Evaporates
- Swellable rocks
- Karst area
- Flood and erosion area
- Landslide area
- Costal zone

Areas of public interest

- Water protections zone
- Nature protected ecosystem area
- Contaminated soil

SGES allowed under special obligations or conditionally allowed
SGES not allowed
SGES not regulated
No topic in this country

Figures: NREAP-AT, 2010

D.T2.4.1 - QUESTIONNAIRE

- Topic area D: Regulation elements for the installations, implementation and operation of shallow geothermal energy systems

Operation criteria valid for all systems

- Drilling below groundwater table allowed
- Minimum distance to neighbouring wells
- Groundwater investigation necessary
- Certification for drilling companies needed
- Numerical simulations required

Operation criteria valid for open loop systems

- Minimum distance between pumping and reinjection site
- Temperature difference between extracted and reinjected water
- Absolute allowed temperature range of reinjected water
- Allowed temperature change to other installations

Operation criteria valid for closed loop systems

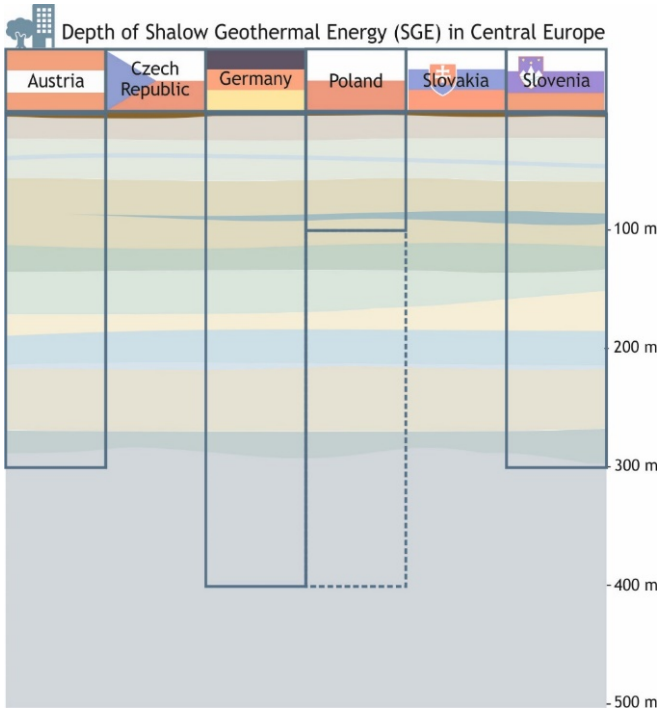
- Minimum distance to other heat exchangers of the same installation
- Target value for the average initial and input temperature of the heat carrier fluid
- Regulations for the backfilling of BHE
- Leakage test of ground loop and refrigerant tubing required
- Borehole drilling report
- Taking core samples required
- Thermal response test required

	No regluation
	National/regional/local regulation

Figures: NREAP-AT, 2010

DEFINITION OF SGES

“Geothermal energy is the energy stored in the form of heat beneath the surface of solid earth used for heating and cooling“



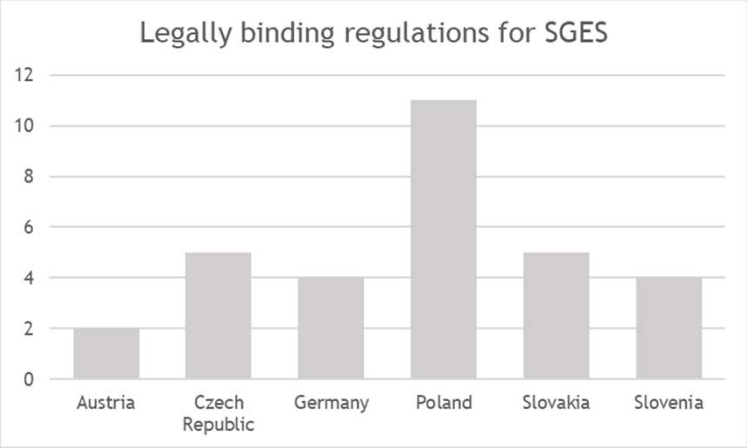
Shallow geothermal energy:
Definition after depth in all countries

Range from 100 – 400 m.

NO definition of the ownership of geothermal energy!

LEGAL FRAMEWORK

Document	Partner countries
Water act	SI, SK, PL, DE, CZ, AT
Mining act	SI, PL, DE, AT (if depth > 300 m, not applicable for SGES)
Construction act	SI, PL, CZ
Geological act	SK, DE, CZ
Environmental protection act	PL
Act on support of renewable resources	SK, PL
Law on spatial planning	PL
Decree on water protection area (local level)	SI, SK, DE, CZ, AT
Decree on flood areas (local level)	SK, CZ
Land use local regulations	PL

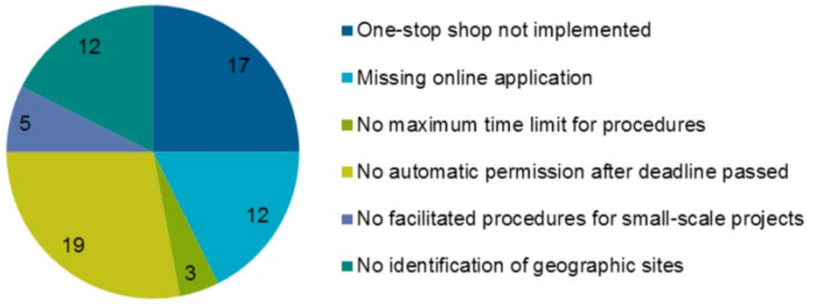


- Main instruments: Water act for open loop systems and Mining act or Geological act for drilling works
- Environmental protection

- All countries have guidelines and standards – not legally binding

Renewable Energy Directive 2009/28/EG

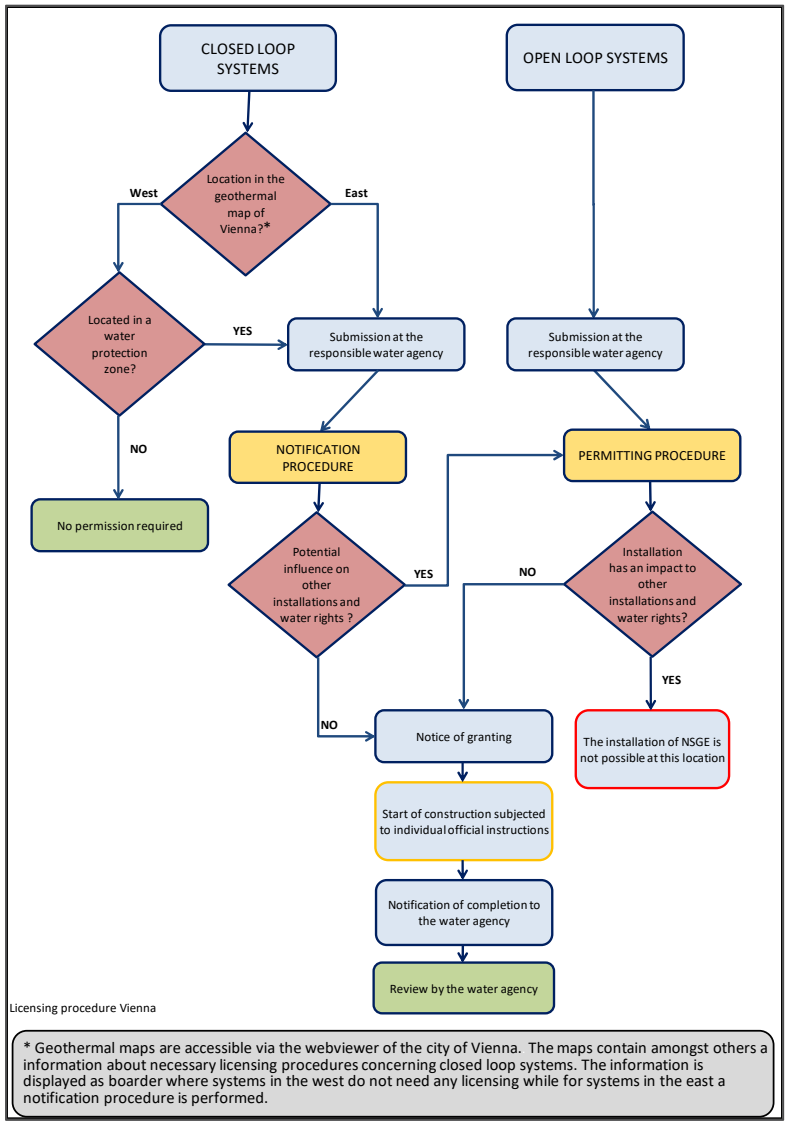
- **Reducing administrative burden**



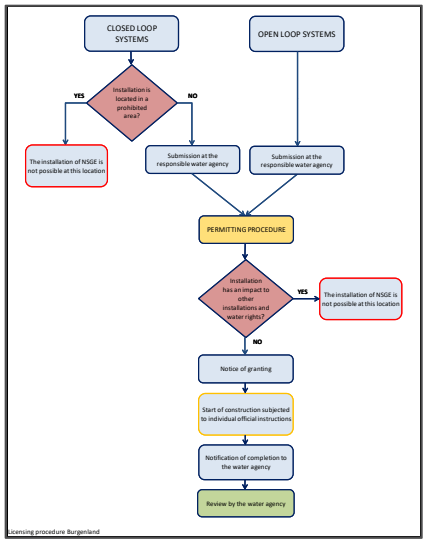
out of 28

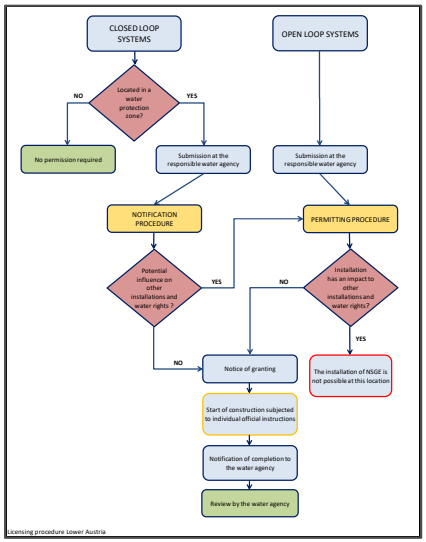
- One-stop shop → single administrative body
- Online application
- Maximum time limit for procedures
- Automatic permission after deadline passed
- Facilitated procedures for small-scale projects
- Identification of geographic sites → indicate locations suitable for exploitation of renewables

FLOW CHARTS - AUSTRIA



* Geothermal maps are accessible via the webviewer of the city of Vienna. The maps contain amongst others a information about necessary licensing procedures concerning closed loop systems. The information is displayed as boarder where systems in the west do not need any licensing while for systems in the east a notification procedure is performed.

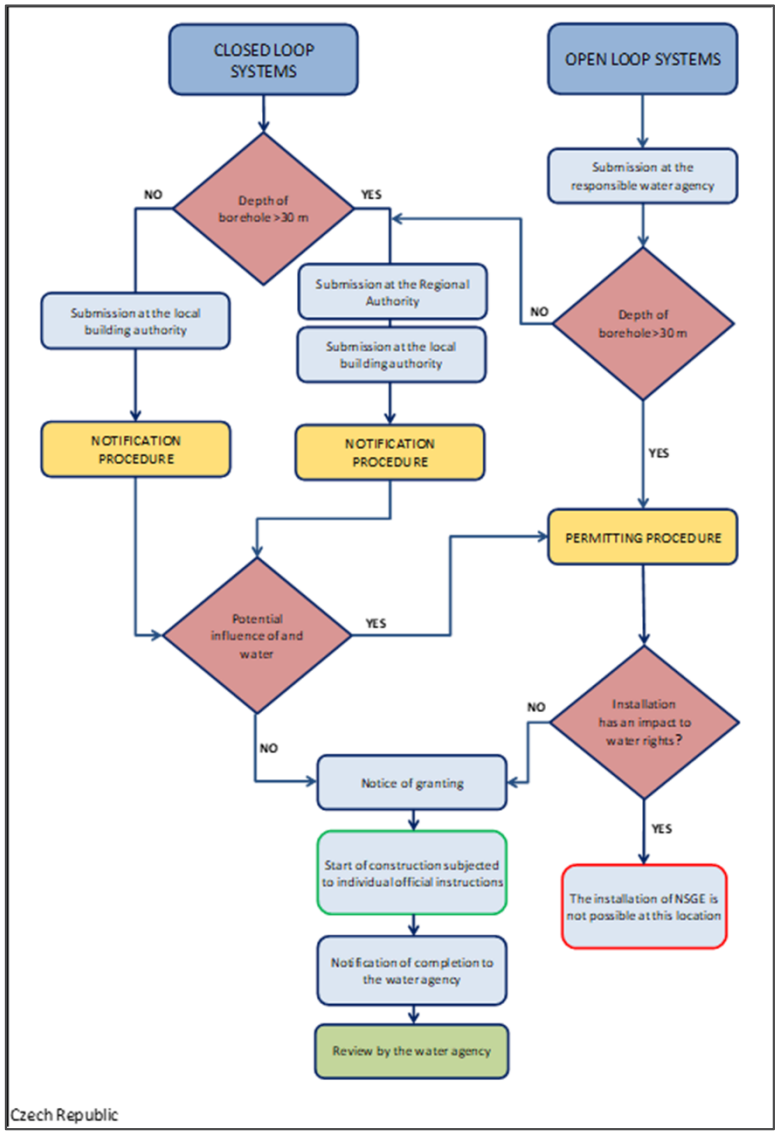




- One-stop shop
- Online application (– via email)

- Maximum time limit for procedures (3 month)
- Automatic permission after deadline passed
- Facilitated procedures for small-scale projects
  → for closed loop systems!

FLOW CHARTS – CZECH REPUBLIC

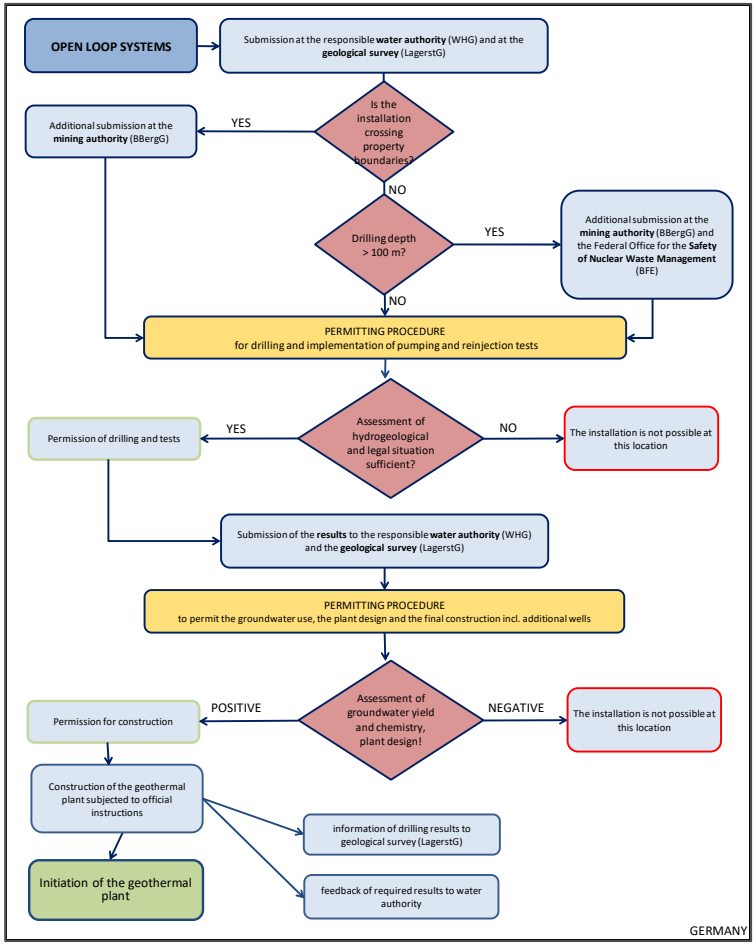


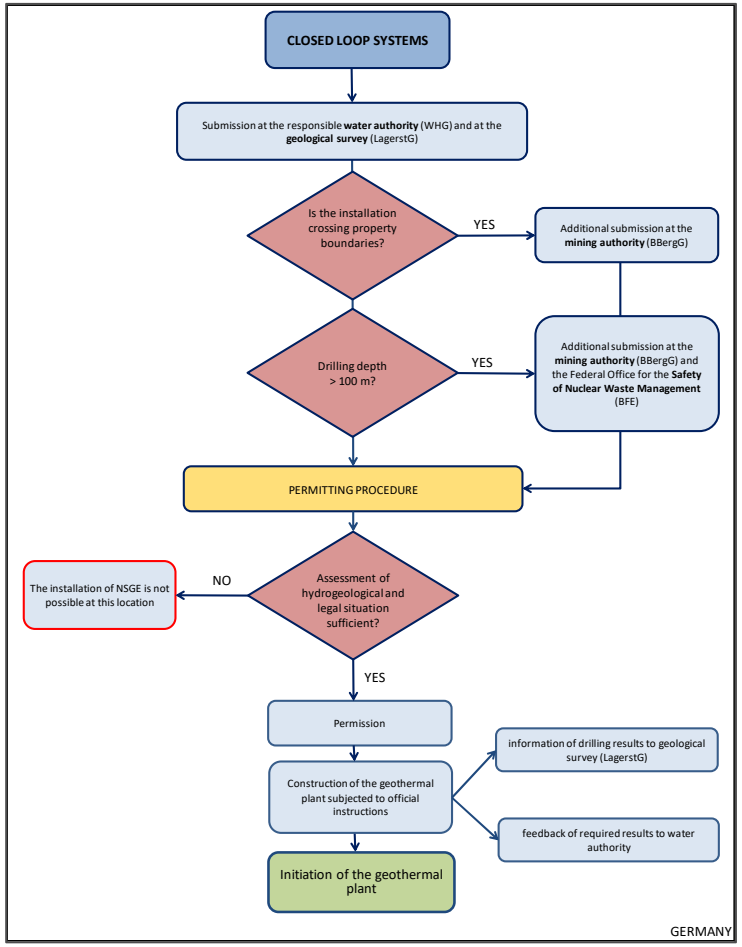
- One-stop shop for facilitated procedure

- Online application
- Maximum time limit for procedures
- Automatic permission after deadline passed

- Facilitated procedures for small-scale projects for closed loop systems

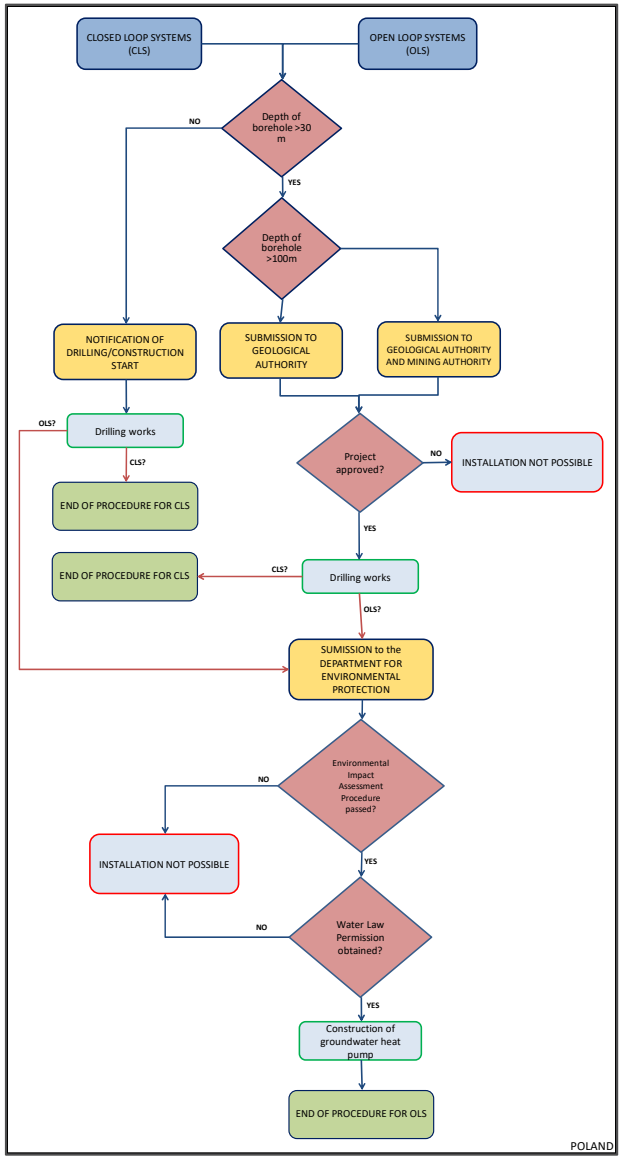
FLOW CHARTS - GERMANY





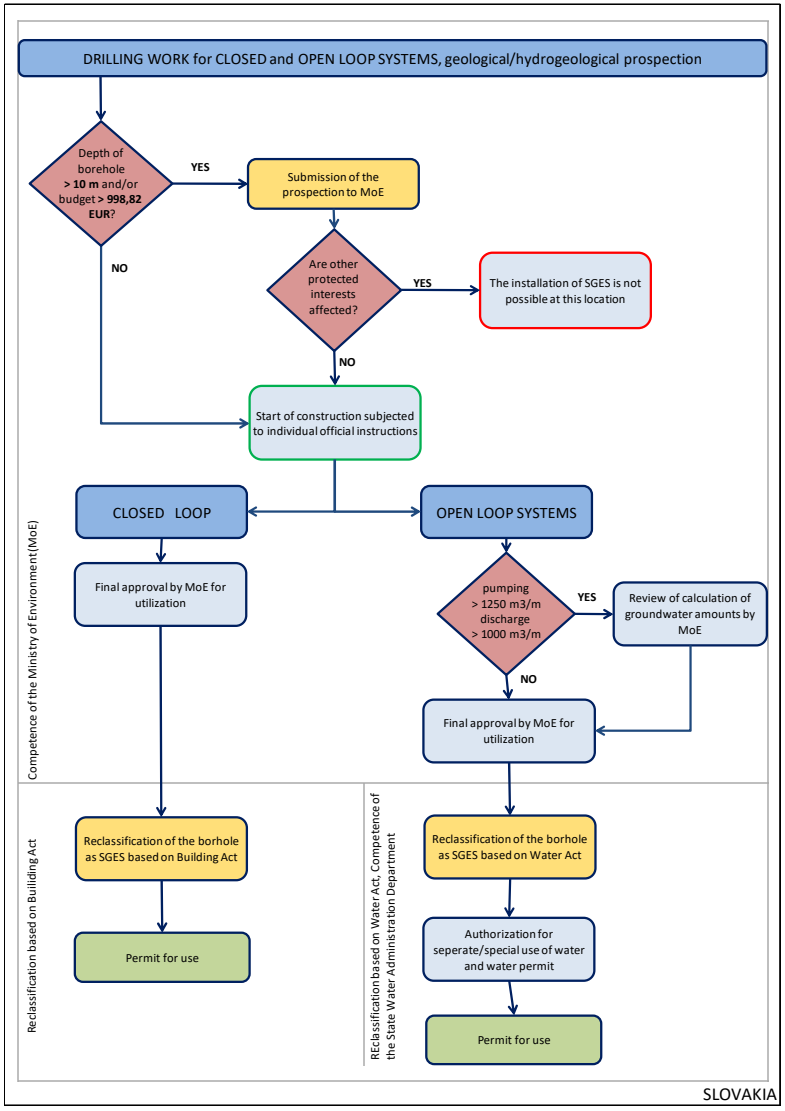
- One-stop shop
- Online application
- Maximum time limit for procedures
- Automatic permission after deadline passed
- Facilitated procedures for small-scale projects

FLOW CHARTS - POLAND



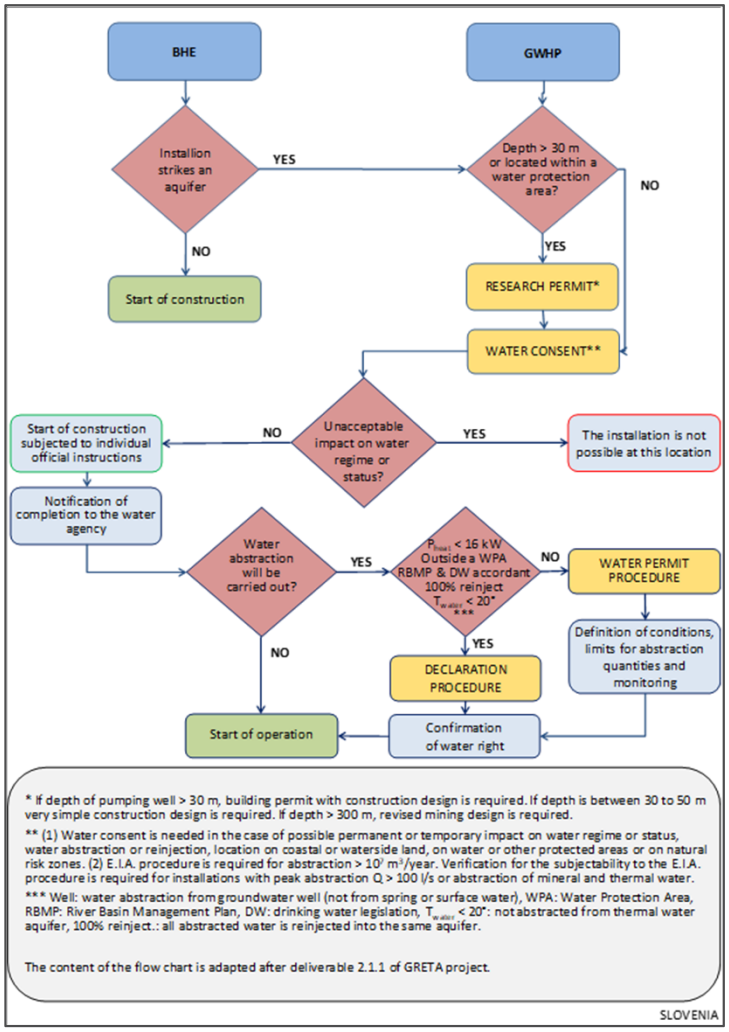
- One-stop shop for facilitated procedures
- Online application
- Maximum time limit for procedures – 30 days
- Automatic permission after deadline passed
- Facilitated procedures for small-scale projects for closed loop systems

FLOW CHARTS - SLOVAKIA



- One-stop shop
- Online application
- Maximum time limit for procedures
- Automatic permission after deadline passed
- Facilitated procedures for small-scale projects

FLOW CHARTS - SLOVENIA



- One-stop shop
- Online application
- Maximum time limit for procedures
- Automatic permission after deadline passed
- Facilitated procedures for small-scale projects for closed loop systems

LICENCING PROCEDURES

Country	Entity 1	Entity 2	Entity 3	Entity 4
Austria	Local and national water authorities			
Czech Republic	Local building authority	Local water protection authority	Mining authority	
Germany	Water authority	Geological survey	Mining authority	Federal office for the safety of nuclear waste management
Poland	District head responsible for mining and geological laws	Mining authority	Department of environmental protection	State district sanitary inspector
Slovakia	Ministry of Environment (MoE)	State water administration department of environmental care/ District environmental office	Building authority	
Slovenia	State and local water protection authority	Local building authority		

- Water
- Building
- Mining
- Environmental

Installation		Austria	Czech Republic	Germany	Poland	Slovakia	Slovenia
Open loop	Active	1	3	4	3	2	3
	Passive	1		2	1		
	Total steps	**2**	**3**	**6**	**4**	**2**	**3**
Closed loop	Active	1	2	3	2	2	2
	Passive	1		1			
	Total steps	**2**	**2**	**4**	**2**	**2**	**2**

LICENCING PROCEDURES

	One Stop Shop	Online application	Maximum time limit for procedures	Automatic permission after deadline	Facilitated procedures for small scale producers	Identification of geographical sites
Austria	absent	existing	absent	absent	existing	absent
Belgium	existing	partly existing	existing	no information	existing	partly existing
Bulgaria	existing	existing	existing	existing	absent	existing
Cyprus	absent	absent	existing	absent	existing	existing
Czech Republic	absent	existing	existing	absent	existing	existing
Germany	existing	existing	existing	existing	existing	existing
Denmark	partly existing	existing	existing	existing	existing	existing
Estonia	absent	existing	existing	existing	absent	absent
Greece	existing	existing	existing	absent	existing	existing
Spain	absent	absent	existing	absent	existing	absent
Finland	absent	absent	absent	absent	existing	existing
France	existing	existing	existing	absent	existing	existing
Hungary	absent	existing	existing	absent	existing	existing
Croatia	absent	absent	existing	no information	existing	partly existing
Ireland	absent	existing	existing	absent	existing	existing
Italy	existing	absent	existing	absent	existing	absent
Lithuania	absent	existing	existing	existing	existing	no information
Luxembourg	existing	existing	existing	absent	no information	existing
Latvia	absent	absent	existing	absent	absent	absent
Malta	existing	existing	existing	absent	existing	existing
The Netherlands	existing	existing	existing	existing	existing	existing
Poland	absent	absent	existing	absent	existing	absent
Portugal	absent	existing	existing	absent	existing	existing
Romania	absent	absent	existing	absent	absent	absent
Slovenia	absent	absent	absent	absent	absent	absent
Slovakia	absent	absent	existing	absent	existing	absent
Sweden	existing	existing	existing	existing	no information	existing
United Kingdom	existing	absent	existing	absent	existing	absent

EU Study 2014 for renewable energies

Results GeoPLASMA-CE especially for SGES

	One Stop Shop	Online application	Maximum time limit for procedures	Automatic permission after deadline	Facilitated procedures for small scale producers
Austria	existing	existing	partly existing	partly existing	partly existing
Belgium	existing	partly existing	existing	no information	existing
Bulgaria	existing	existing	existing	existing	absent
Cyprus	absent	absent	existing	absent	existing
Czech Republic	partly existing	absent	absent	absent	partly existing
Germany	absent	existing	absent	absent	absent
Denmark	partly existing	existing	existing	existing	existing
Estonia	absent	existing	existing	existing	absent
Greece	existing	existing	existing	absent	existing
Spain	absent	absent	existing	absent	existing
Finland	absent	absent	absent	absent	existing
France	existing	existing	existing	absent	existing
Hungary	absent	existing	existing	absent	existing
Croatia	absent	absent	existing	no information	existing
Ireland	absent	existing	existing	absent	existing
Italy	existing	absent	existing	absent	existing
Lithuania	absent	existing	existing	existing	existing
Luxembourg	existing	existing	existing	absent	no information
Latvia	absent	absent	existing	absent	absent
Malta	existing	existing	existing	absent	existing
The Netherlands	existing	existing	existing	existing	existing
Poland	partly existing	absent	existing	existing	partly existing
Portugal	absent	existing	existing	absent	existing
Romania	absent	absent	existing	absent	absent
Slovenia	absent	existing	absent	absent	partly existing
Slovakia	absent	absent	absent	absent	absent
Sweden	existing	existing	existing	existing	no information
United Kingdom	existing	absent	existing	absent	existing

Monitoring

No GeoPLASMA-CE partner country has any regulations concerning the monitoring of closed loop systems.

For open loop systems there are different handlings. Only **Germany** has no regulations or requirements for the monitoring of open loop systems. In **Slovenia** the monitoring of the quantity of abstracted water is obligatory (Water Act No. 67/2002).

For **Poland**, **Austria**, **Slovakia** and **Czech Republic** there is no legal requirement of monitoring heat pump installations itself. The order for monitoring depends on the installation and is then stated in the water permission.

Liquidation procedures

Liquidation procedures are only obligatory in **Slovenia**. The legal regulations are rules in criteria for the designation of a water protection zone. **Germany** includes the regulation and requirements for the liquidation in the permission documents and demands a notification to the responsible water authority. The process is regulated in a guideline. **Austria** has a guideline that describes the liquidation, but no instrument which demands it. In **Slovakia** boreholes not used after prospection-works, require liquidation. But no legal or methodical document that solves liquidation. **Czech** Republic and **Poland** have no regulations concerning the liquidation of SGES.

INSTALLATION CRITERIA

Regulation element	GeoPLASMA-CE Partner country					
	Austria	Czech Republic	Germany	Poland	Slovakia	Slovenia
Artesian aquifers						
Very shallow water table where reinjection can be problematic						
Perched groundwater layers						
Two or multiple aquifer layers						
Mineral water resources						
Thermal water resources						
Gas occurences						
Mining areas						
Contaminated soil						
Evaporites (e.g. NaCl, gipsum)						
Swellable rocks (e.g anhydrite, clay)						
Karst area						
Water protection area						
Nature protected ecosystem area						
Flood and erosion areas						
Landslide areas						
Costal zones						

LEGEND
SGES allowed under special obligations or conditionally allowed
SGES not allowed
SGES not regulated
No topic in this country

Single installation criteria

Regulations are mostly on a regional or local scale
2 countries have national regulations

- Not one criteria treated the same in all countries
- 6 criteria include all 3 options

IMPLEMENTATION CRITERIA

Regulation element	GeoPLASMA-CE Partner country					
	Austria	Czech Republic	Germany	Poland	Slovakia	Slovenia
Drilling below groundwater table allowed						
Minimum distance to neighboring plot [m]						
Minimum distance to buildings [m]						
Minimum distance neighboring wells [m]						
Minimum distance to neighboring closed loop systems [m]						
Groundwater investigations necessary (Hydrochemistry)						
Certification for drilling companies needed						
Certification for planners or installers needed						
Numerical simulations required						
Minimum distance between pumping and reinjection site [m]						
Reinjection of used groundwater						
Temperature difference between extracted and reinjected water [°C, K]						
Absolute allowed temperature range of the reinjected water [°C]						

Regulation element	GeoPLASMA-CE Partner country					
	Austria	Czech Republic	Germany	Poland	Slovakia	Slovenia
Allowed temperature change [°C]						
Accepted drawdown [cm]						
Pumping test obligatory						
Minimum distance to other heat exchangers of the same installation [m]						
Target value for the average inital and input temperature of the heat carrier fluid [°C]						
Regulations for heat carrier fluid type						
Regulations for refrigerant type						
Regulations for the backfilling of BHE						
Leakage test of ground loop and refrigerant tubing required						
Borehole drilling report required						
Taking core samples required						
Thermal response test required						
Calculation of drilling depth required						

No regluation | Nation/regional/local regulation

Implementation criteria

- Regulations are mostly on a regional or local scale
- Regulations are rarely legally binding → most of them seen as recommendations
- Only one treated the same in all countries

SUMMARY

Definition after **depth** (100-400 m). No definition of the ownership of geothermal energy!

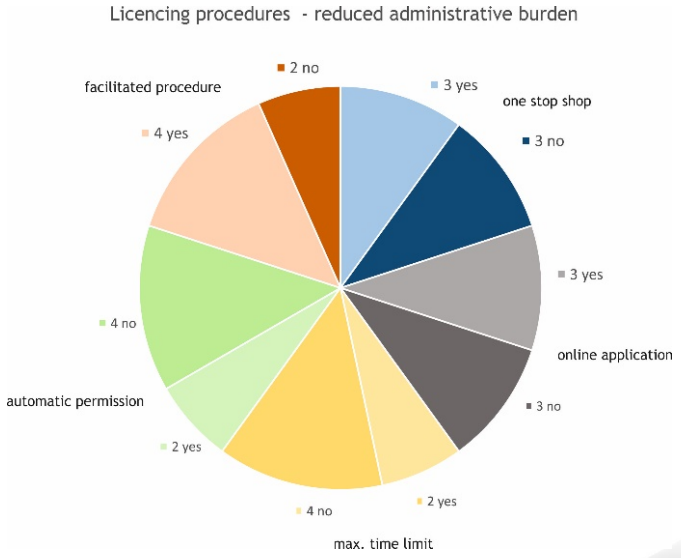
Main legal instrument: **WATER ACT, MINING ACT**

No regulation of geothermal heat as energy! → Legal regulations deal with building rules and water and environmental protection

Licencing procedures: big **differences** between countries! EU directive not fulfilled.

Installation and implementation criteria

- No legal regulations in all countries
- If present, mostly recommended in guidelines
- Big **differences** between partner countries



Need for harmonization?
Need for regulation?

→ Discussion after coffee break!

Geologische Bundesanstalt

GeoZS
Geološki zavod
Slovenije

CZECH GEOLOGICAL SURVEY

AGH
AGH University of Science and Technology

geoENERGIE Konzept

LANDESAMT FÜR UMWELT,
LANDWIRTSCHAFT
UND GEOLOGIE

Freistaat
SACHSEN

GiGa infosystems

Bundesverband Geothermie

City of Ljubljana

GRETA midterm conference, Salzburg, November 08, 2017

D.T2.4.3: Knowledge exchange workshop on legal requirements, procedures and policies – What else?

GeoPlasma-CE, Geological Survey of Austria (GBA), Doris Rupprecht

SCHEDULE OF THE WORKSHOP

10:30- 10:45

What else?

Short introduction to other projects and work – ReGeoCities

Dissertation of Stefanie Hähnlein

from 10:45

DISCUSSION

ReGeoCities

Analysis of SGES in 10 countries

→ Identification of barriers
→ Development of tool

Simplified regulation

- Allows better quantification
- Basis for improving energy planning

→ Development of regulatory guideline and support tools

LEGISLATION

- Definitions (applied to national/regional/local level) are important for understanding!
- Geothermal energy, geothermal heat, geothermal water and OWNERSHIP of geothermal energy
- Important to allow identification of responsible authority

LOCAL SCALE

Provide information on

- Geology/hydrogeology (aquifer characteristics)
- System size - drilling depth etc.
- Safe distances
- Acceptable temperature changes

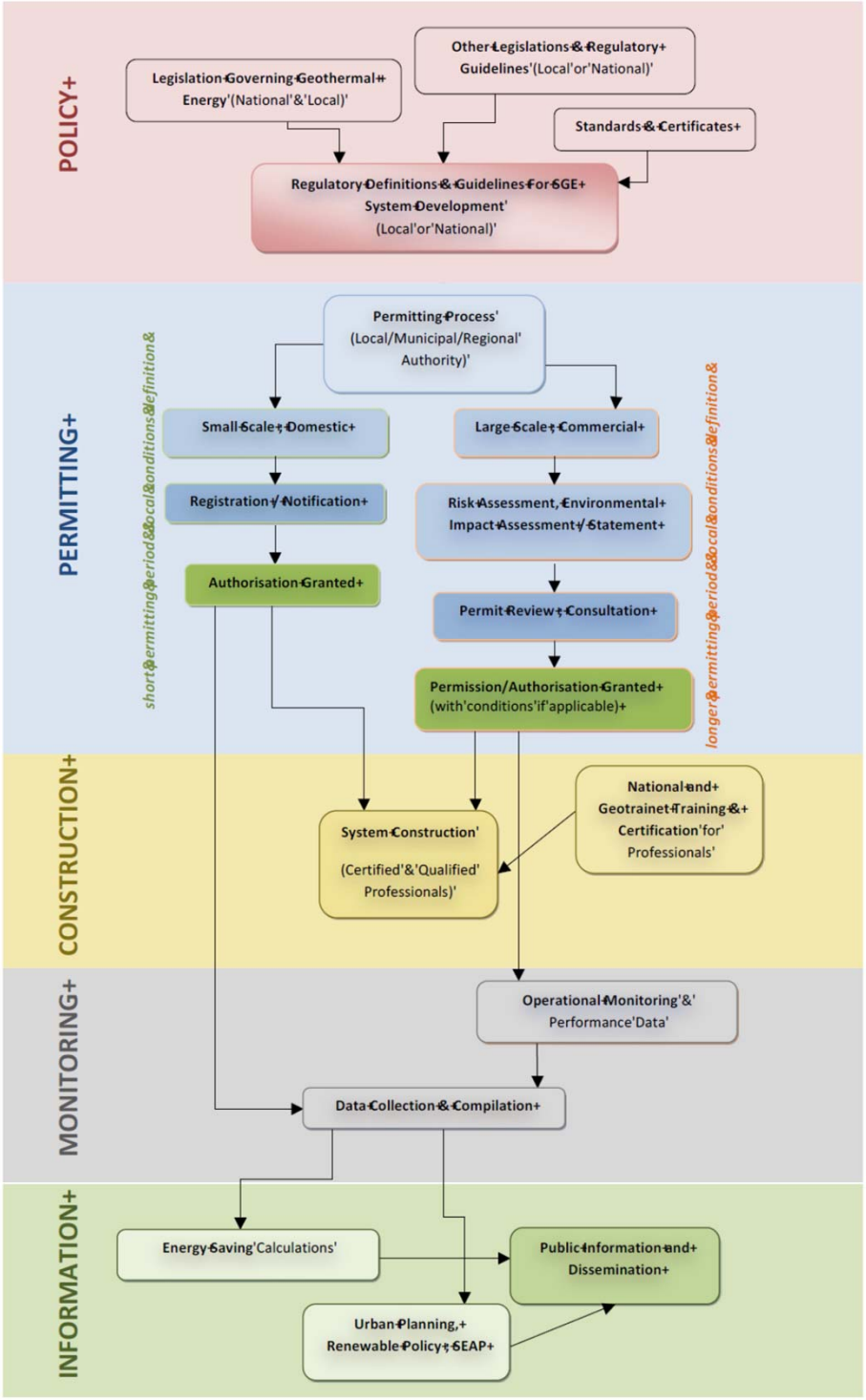
MONITORING

- Based on system size and environment.
- Small systems: maintenance program
- Large systems: programme that acquires detailed operational data.
- Clear guidelines by permitting authority
- Costs should not have no long term impact

ReGeoCities

PERMITTING AND LICENCING PROCESS

- Applications for both open loop and closed loop systems – single applications
- Online application: facilitated procedure
- Short permitting/licencing
- Permitting for open loop systems with respect to abstraction of groundwater
- Notification and permitting of drilling
- Distinguish between small and large scale
- Small scale: facilitated procedure
- Large scale: evaluation of subsurface conditions and environmental impacts



DISSERTATION S. HÄHNLEIN

Dissertation Stefanie Hähnlein, Tübingen 2013

"Shallow geothermal energy – Sustainability and legal situation"

- Coold plumes in groundwater for ground source heat pump systems
- International legal status of the use of shallow geothermal energy
- SGES – current legal situation in Germay
- Sustainability and policy for the thermal use of shallow geothermal energy

DISSERTATION S. HÄHNLEIN

„International legal status of the use of shallow geothermal energy“

- 60 countries worldwide
- Extremely heterogeneous outcome
- National and legally binding regulations only in few countries
- Only few countries have guidelines
- Wide range of regulations for distances or temperatures

Criteria for a sustainable thermal use of groundwater.

Criterion	Purpose
Technical accurate drilling and installation	Guarantee of operation Protection of groundwater as a resource for drinking water
Backfilling	Avoid leakage of hazardous materials (e.g. heat carrier fluid, drilling fluid, secondary contaminants such as oil of vehicles, drilling apparatus, etc.) Avoid changes in groundwater ecology Avoid hydraulic contacts between different aquifer systems
Minimum distances	Avoid accumulation of temperature changes Avoid interaction with other shallow geothermal systems Avoid influence on other technical systems (drinking water wells, water pipes, neighboring ground)
Temperature thresholds	Avoid changes in groundwater ecology Guarantee of operation

Regulations often empirically defined than scientifically evaluated!

S. HÄHNLEIN

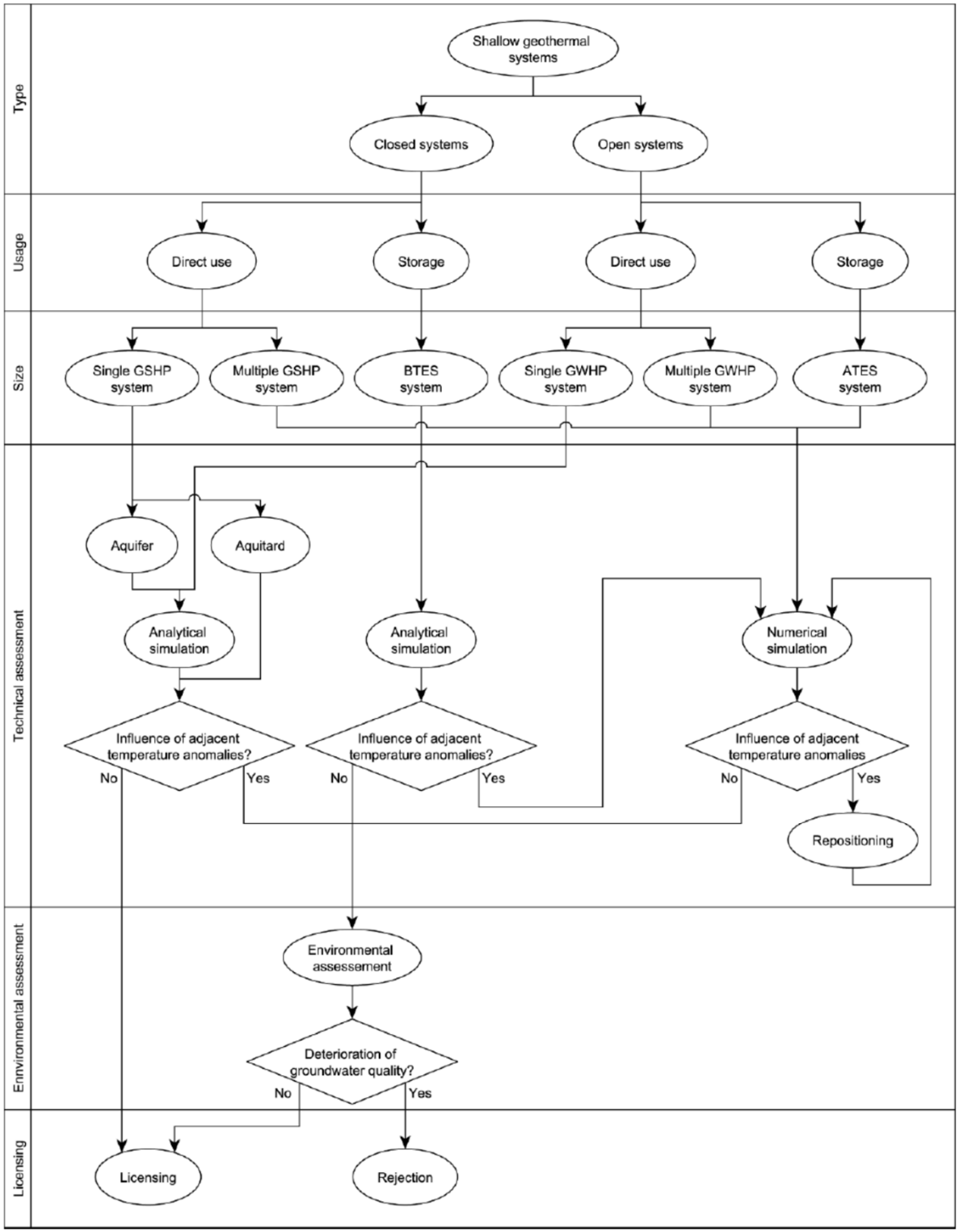
„Sustainability and policy for the thermal use of shallow geothermal energy“

General and international policy for evaluating or planning sustainable geothermal systems.

Type
Usage
Size
Technical assessment
Environmental assessment

Licencing

- Drilling notice
- Site plan with the location of the planned systems
- Dimensions of the planned systems
- Results of technical assessment
- Outcome of environmental assessment



DISS. S. HÄHNLEIN

„Sustainability and policy for the thermal use of shallow geothermal energy“

Licencing

- Drilling notice
- Site plan with the location of the planned systems
- Dimensions of the planned systems
- Results of technical assessment
- Outcome of environmental assessment

Focus on sustainability!!!
Work with a precautionary principle!

- Check location → protected areas
- Authority evaluates the provided results of technical and environmental assessment

- Monitoring should be performed

DISCUSSION

Need for **Harmonization** ?
Regulation

One stop shop - simplification

Good practise

Online Portals – **e government**

Legal framework

Small scale vs large scale! Definition

Online Portals

Data policy

Groundwater and environmental protection

Suitable templates – how can they look like?
Templates suitable?

Incentives

Instruments for licencing
How can they look like?

Definitions/wording - **Ownership**

Geologische Bundesanstalt

GeoZS
Geološki zavod
Slovenije

CZECH GEOLOGICAL SURVEY

AGH
AGH University of Science and Technology

geoENERGIE Konzept

LANDESAMT FÜR UMWELT,
LANDWIRTSCHAFT
UND GEOLOGIE

Freistaat
SACHSEN

GiGa infosystems

Bundesverband Geothermie

City of Ljubljana