



Geothermal ERA NET Joint Activity

Tuning EGIP for Target Users
EGIP Web Survey Results

January 2016

Geothermal ERA NET

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WP 4

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Executive summary

This report describes the main insight and outcome that could be gathered from the web survey that was set up in the frame of a Joint Activity (JA) performed within Geothermal ERA-NET project. The main aims of this JA are as follows: *i)* to define the principal groups of stakeholder (SH) interested in the implementation of a European Geothermal Information Platform (EGIP), *ii)* identify where will EGIP add the most value –or meet requirements of SHs, *iii)* assess the EGIP interest and necessity, and rank priorities of implementation of EGIP, *iv)* strengthen the shared understanding or awareness of SHs on some available portals. Having these points covered is an important part of the requirement gathering for EGIP.

Altogether 385 SH were invited to complete the questionnaire of the web survey. The origin of the SH lies in the six geothermal ERA-NET nations participating in this JA plus a few trans-national organisations. 130 SH answered to this invitation by completing the survey, which corresponds to 34% of the invited stakeholders.

Most relevant findings:

- The most important and most interested SH groups are Industry, Administration/Regulation and Academia.
- High to very high interest was raised by aspects about *hydrothermal settings, assessment of geothermal potentials, research and innovation* and *investment/demonstration projects*. Also aspects illuminating *power generation* and *direct use of heat* often were considered as very interesting by many SHs.
- *Hydrothermal settings* raised considerably more interest than *petrothermal settings* (although the latter showed a bipolar distribution of interest, so there is still a relatively large stakeholder group with a very high interest).
- *Simple visual access* to the data and information with *download functionality* was considered of very high importance.
- *Specific data and information for specialists* was seen as more important than *general information* for laymen and education purpose.
- A large group of SH recognised the importance of *harmonization* of geothermal datasets, although most SH did not know *INSPIRE*.
- Raw data: *well logs, geophysical surveys* and *production data* are all considered to be of very high importance.
- Interpreted data: *Temperature maps, geological information, surface heat flow maps, interpreted seismic lines* and *socio-economic data* are seen as important or very important interpreted datasets by most SHs.
- Documents: *Best practice and guidelines* documents are by far the most important documents EGIP should provide, followed by *relevant laws* and *geothermal national roadmaps*. Other document types ranked lower.

The web survey showed a good general perception of the EGIP concepts by the SHs.

The results of the survey allow a prioritization of the contents that should be implemented in an EGIP. Some of the identified SH priorities fall clearly within the vicinity of national platforms and responsibilities. This allows a further focus on the topics that must be treated on a trans-national level like EGIP. This is important to prevent that a future EGIP just duplicates national platforms.

1 Introduction

1.1 Background survey

The organisation and sharing of geothermal data was identified by the Geothermal ERA-NET partner countries to play an important role in facilitating geothermal energy development in Europe and hence its effective realization is indispensable. This was specifically mentioned in the EU Commission Call [Topic ENERGY.2011.10.2-2, FP7-ERANET-2011-RTD] which led to the current GEO ERA-NET Project (a European FP7 coordination project).

The Work Package 3 (WP3) of the current Geothermal ERA-NET project is dedicated to the preliminary work for implementing *a European Geothermal Information Platform* (EGIP). The idea of a Platform, which represents an evolution with respect to the originally proposed European Geothermal Database, derived by three main observations: 1) European geothermal databases and geothermal data mapping had been already proposed in other context (e.g. EERA-JPGE, ThermoGIS, GEOELEC) as organization of underground data and taking advantage of modern information systems; 2) most national data require a national organization and management; 3) a realistic trans-national activity is mostly focused on harmonizing data, defining international standards for geothermal data format in compliance with and enabling further INSPIRE rules, and implementing a data centre able to harvest data from national data centres, avoiding duplication of efforts and guaranteeing immediate update, in line with national update. The concept behind EGIP is also to follow up, compose and support the product of national and international geothermal information providers, often of high quality but none providing a complete set of European geothermal information.

When implemented, EGIP, as envisaged in the actual documents, should provide access to electronic information, technical and non-technical data and documents in the geothermal field in an integrated, combined and harmonized way including: legal and regulatory aspects, policies, measures, institutions, research projects and any relevant technical data (for further information on EGIP and Geothermal ERA-NET follow the link <http://egip.igg.cnr.it> and www.geothermaleranet.eu respectively). Its overarching goal is to facilitate geothermal energy development, make the geothermal community stronger and eventually attract companies/industry in geothermal energy.

A small portion of EGIP (the EGIP pilot project) has been implemented, as the result of the first completed Joint Activity performed by some of the countries participating to the Geothermal ERA-NET, and is running since September 2014 (<http://egip.igg.cnr.it>). The main objective was to prove the effectiveness and efficiency of EGIP concepts.

Considering that structuring of all information is a huge task and a step-by-step implementation is envisaged, before proposing and possibly launching EGIP as a project funded by a trans-national Joint Call, it is necessary to further clarify what are 1) the main audience and 2) the added values of EGIP with respect to what is already available at national and international level. A main need is also to 3) rank the priorities of geothermal information meant to be catalogued, therefore defining a short- and a medium-term plan for the EGIP development.

In order to achieve these clarifications, a second Joint Activity (JA) for EGIP has been then established, aimed at performing a further and more reliable and credible analysis of the boundary conditions for the complete implementation of such Geothermal Information Platform at European level, including the evaluation of possible joint calls for its complete realization.

In order to achieve this, a web survey in the form of a questionnaire has been set up to identify and assess the needs of the stakeholders and the requirements for a potential EGIP. Obtaining feedback from stakeholders is important to review process of the European Geothermal Information Platform (EGIP) and is the key for the optimization of its creation for effective use of potential target groups. These are in line with the required feasibility study for EGIP. Among the countries participating in the JA and considering a broad choice of geothermal stakeholders (SHs), the questionnaire was aimed to:

- i. identify who will benefit from using EGIP,
- ii. identify SH needs and requirements and their priorities
- iii. assess the interest in and necessity of EGIP
- iv. strengthen the shared understanding or awareness of SHs on some available portals.

From a technical point of view, designing and conducting the survey as a kind of questionnaire is *sine qua non* since it can fall in the category of requirements elicitation as a practice of collecting the requirements of a system and/or product from users, customers and other stakeholders. This is also well-known as "requirement gathering". Among various practices for requirements elicitation, one is a reliable survey/questionnaire.

Based on the results and interpretation of the survey, the experience with the EGIP pilot and the feasibility study, further steps towards implementing EGIP are suggested in Section 4, in the form of joint call proposals that can be further developed at a later stage.

1.2 Survey description

The survey, for a total of 26 questions, was designed in 3 sections each with its own target in order to achieve the goals of the survey.

Part 1 was dedicated to retrieve information on the respondent institution (i.e., institution activities, institution interests, institution belonging group) in 5 questions. This part is important since it provides the necessary information about the type of stakeholders.

Part 2 was dedicated to assess the feeling of the respondent institution to some general concept regarding EGIP. This was aimed to check whether the concept of EGIP was understood or rather considered too business oriented or too technical, in order to achieve an increased shared understanding.

- In this part question #6 asked directly to express the importance (from 1 to 5 where 5 = very interested; 4 = interested; 3 = rather interested; 2 = not very interested; 1 = not interested) of a list of capabilities/features that EGIP should provide.
- After that 3 questions were aimed to evaluate what kind of dataset and/or information EGIP should provide. This part surveyed also the level of awareness of the respondent institutions on INSPIRE directive.
- Eventually question #16 investigated the knowledge of the most important web tools on geothermal or related. In each part of the survey the links to relevant portals has been included. Also relevant descriptions have been added. These were important to avoid getting approval for any potential obtained requirements without a shared understanding of them.

Part 3, which was optional, was intended for the analysis of the EGIP pilot experience. In this final part the intention has been to get the opinion and feedback of the respondents mainly on the EGIP pilot functionalities, data/information provided and usability of the web platform set up.

The summary result report of the survey is provided as an attachment in appendix A of this report.

1.3 Stakeholder description

The JA consortium planned to spread the web survey among their countries, which are geographically distributed, trying to reach as much different group of geothermal SHs as possible. To such aim each JA partner made a survey at national level to define a list of National stakeholders and suggested the reference of very important trans-national stakeholders. The survey reached about 400 SHs, and was answered by 130 of them, with a success rate of over 30%. In table 1 the number of the invited SHs and received surveys is shown

Table 1 Survey coverage

Country	Submitted	Survey completed	Feedback [%]
Switzerland	84	48	57%
Italy	59	27	46%
Slovenia	26	4	15%
Hungary	3	2	67%
Iceland	76	28	37%
France	119	9	8%
Trans-national stakeholders	18	12	67%
Total	385	130	34%

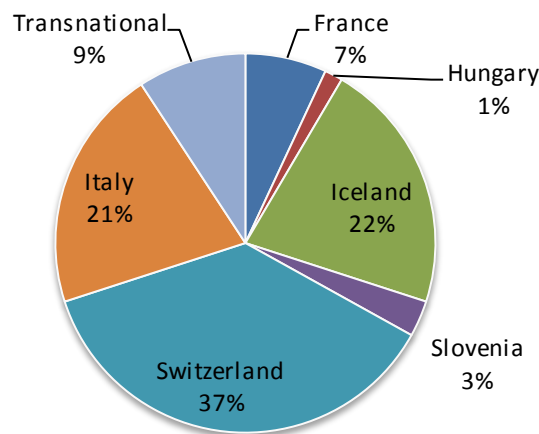


Figure 1: Origin of survey responders

Roughly 40% of completed surveys come from Swiss SHs, which form the biggest national group. Italy and Iceland follow with about 20% each, and the trans-national SH group ranks about 10%. The remaining 10% are shared between France, Slovenia and Hungary SH groups.

The feedback varies considerably, but with over 30% the overall feedback is satisfying. The low feedback in some countries might be an indication, that the SH have all the tools they need on a national level and therefore showed little interest in the survey. Indeed, this has likely been the main reason for partner countries in the Geothermal ERA-NET Consortium to be not part of this EGIP

JA. Some informal feedback from Slovenian SHs (mostly industry) also indicates a general distrust towards data collection and publication and a fatigue of filling out surveys. Phrases like “industrial espionage”, “EU bothering the professionals”, “surveys are staged with prewritten conclusions” were received. Such a closed-up industry, which does not see the economic potential of shared data will naturally be hesitant to fill out such surveys.

Both national and trans-national stakeholders belong to different groups of geothermal sector such as experts, project developers, industry, research and consultants.

2 Results and possible interpretations

Question 1 asked for basic information about the responder's identity. The interpretation of this question was conducted in section 1.3 of this report.

For the analysis of the results and in order to illustrate them better, various forms of graphical depiction were created. All should be self-explanatory except Graph X,Y, Z,..... Those show an averaged rating of the various options asked. The amount of hits a rating category (1 – 5) received for a specific sub-question was multiplied by its rating number (1 – 5). This number was summed up for all rating categories and divided again by the number of responders. This allows a quick comparison of interest the various options of a certain question raised.

It should be noted that not all participants answered all questions. Therefore, the total number of responders is varying from question to question.



Question 2: Potential user groups

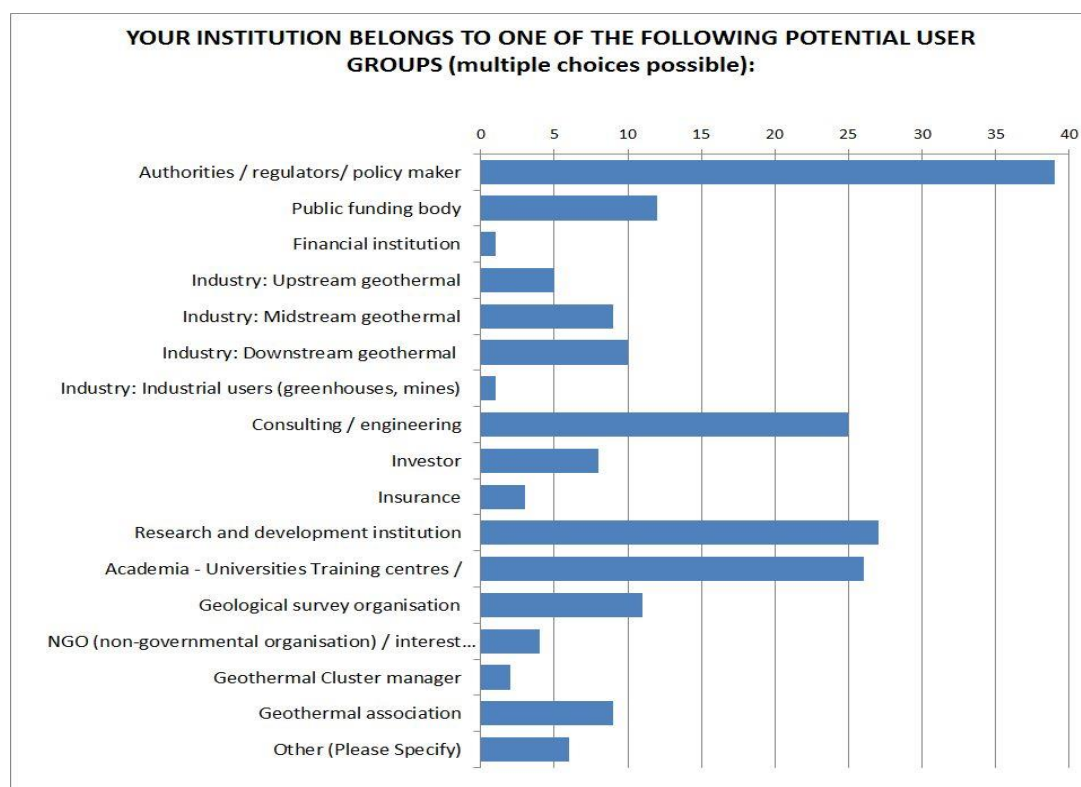


Figure 2 Potential user groups, number of hits per category

Number of responders: 123

Description:

The **biggest stakeholder groups** are

- *authorities/regulators,*
- *the project developers* (sum of all industry and consulting), and in particular *consulting*
- *academia / research* sector.
- *Finances and Insurance* as well as *NGOs* are only poorly represented.

The open ended responses were mostly illuminating additional aspects to the primary field of engagement of the stakeholder (see Appendix A).

Question 3: Domains of activity

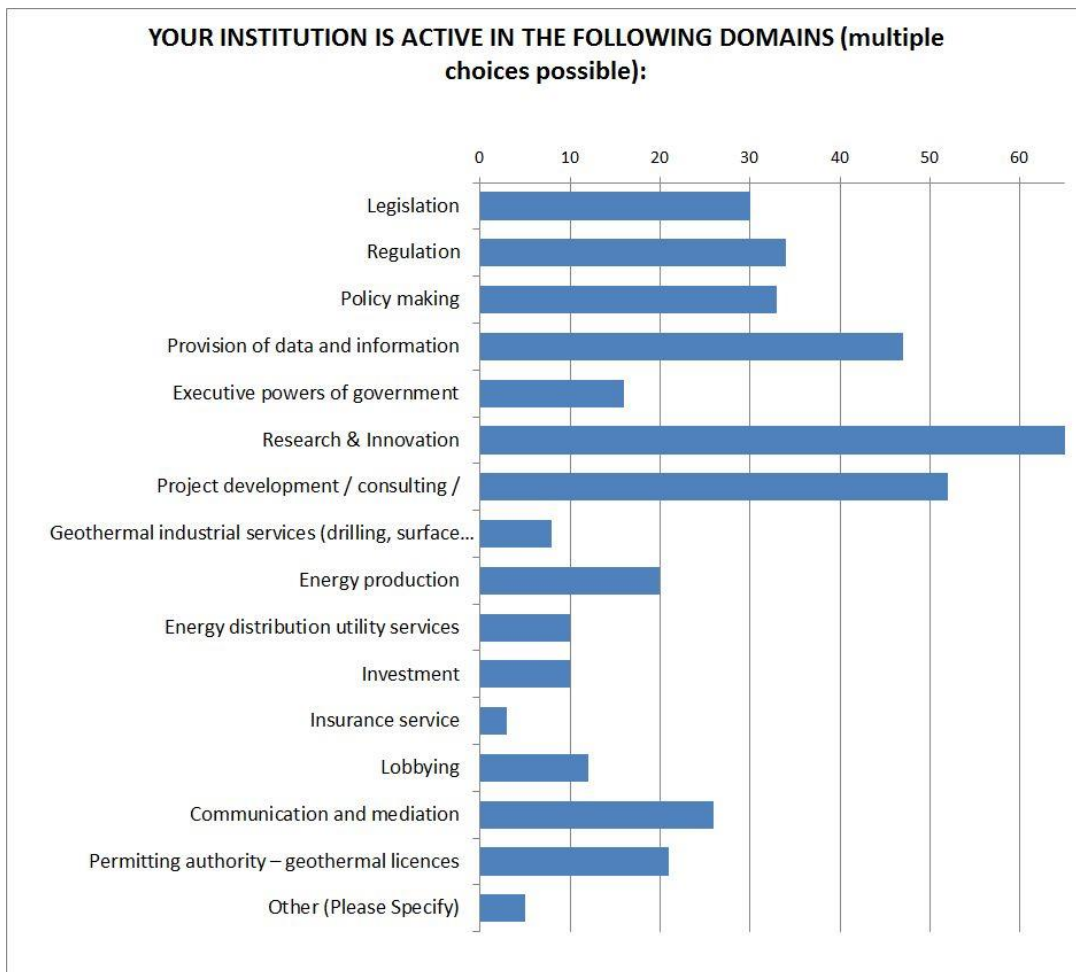


Figure 3 Domains of activity, number of hits per category

Number of responders: 123

Description:

Most stakeholders are active in the following fields:

- *administration / regulatory side of geothermal energy.*
- *research and development*
- *information and communication.*
- *project developers*

The remaining domains of activity are only of minor interest for the participating stakeholders.

Possible Interpretation:

Three domains obtained over 40% of hits, which suggests that a considerable number of stakeholders are active in more than one domain. This shows the wide range of information EGIP should cover to satisfy a single user group.

Question 4 and 5: Aspects of geothermal energy

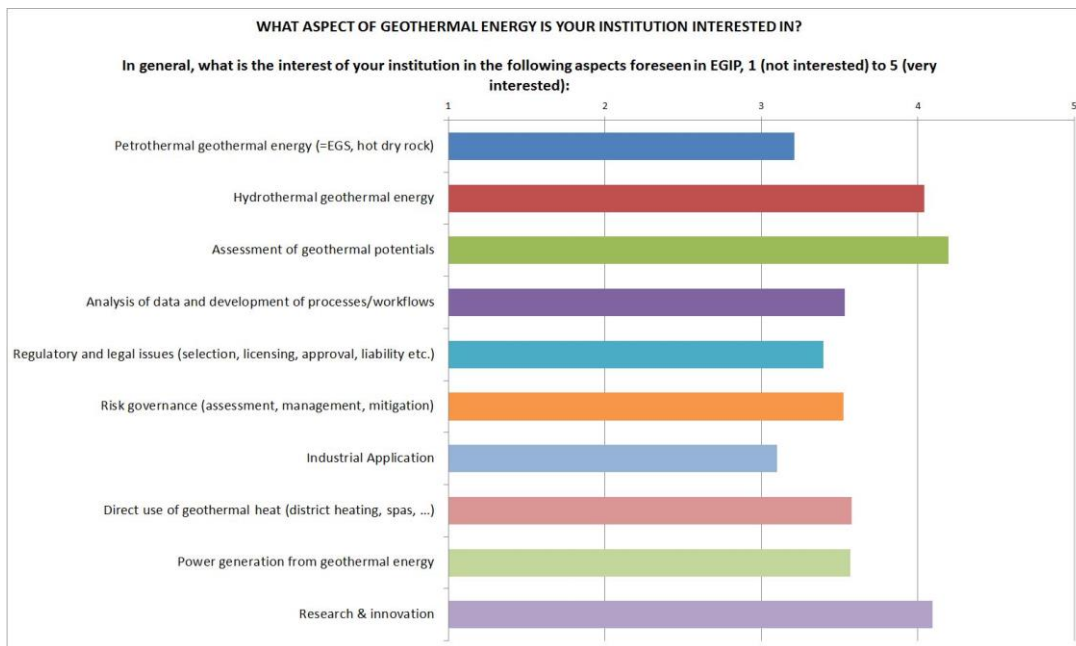


Figure 4 Most interesting aspects, summary plot, averaged rating of each aspect

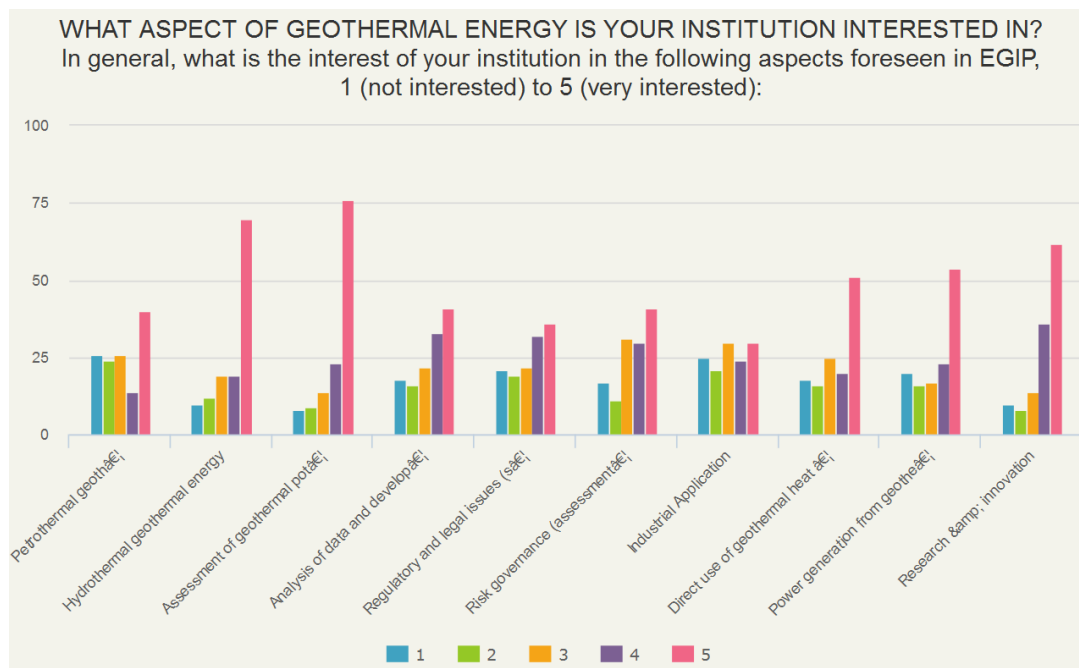


Figure 5 Most interesting aspects, detailed rating

Number of responders: 117

Description:

The averages of all aspects lie more or less in the range of 3 to 4 (rather interested to interested). No aspect was clearly and definitely dipping into the range of “not interesting”. The aspect that raised the least interest was “*industrial application*”. Furthermore, there is significantly more interest in “*hydrothermal energy*” than in “*petrothermal energy*”. Direct uses of heat and power generation get a similar score. The detailed score of

the various aspects (Figure 5) gives an even clearer indication of which aspects generate most interest. The results allow a prioritisation of the aspects:

- **Top priority:** Assessment of geothermal potentials, hydrothermal energy, research and innovation.
- **Second priority:** Data analysis and development of processes/workflows, risk governance, direct use of geothermal heat, power generation.
- **Third priority:** regulatory aspects, petrothermal energy, industrial application.

In the open text option the following additional aspects were mentioned (also see Appendix A): shallow, low temperature geothermal energy (3 times), exploration economics (once), geology and tectonics of resource area (once), R&D in ORC machines (once), corrosion in geothermal wells (once), concrete for geothermal wells (once), research programming for geothermal energy (once).

Possible interpretation:

The equally distributed rating suggests that there exist interest in most of the suggested aspects for EGIP. This indicates that the considered content purposed in EGIP fit quite well the stakeholder requirements. Industrial application turned out to be of minor interest to the stakeholder. This might have to do with the somewhat vague meaning of “industrial application” or that everybody involved in geothermal energy knows enough about the industrial applications and does not need additional information on that.

Question 6 and 7: Where should EGIP add value?



Figure 6 Added value, summary plot, averaged rating of each benefit

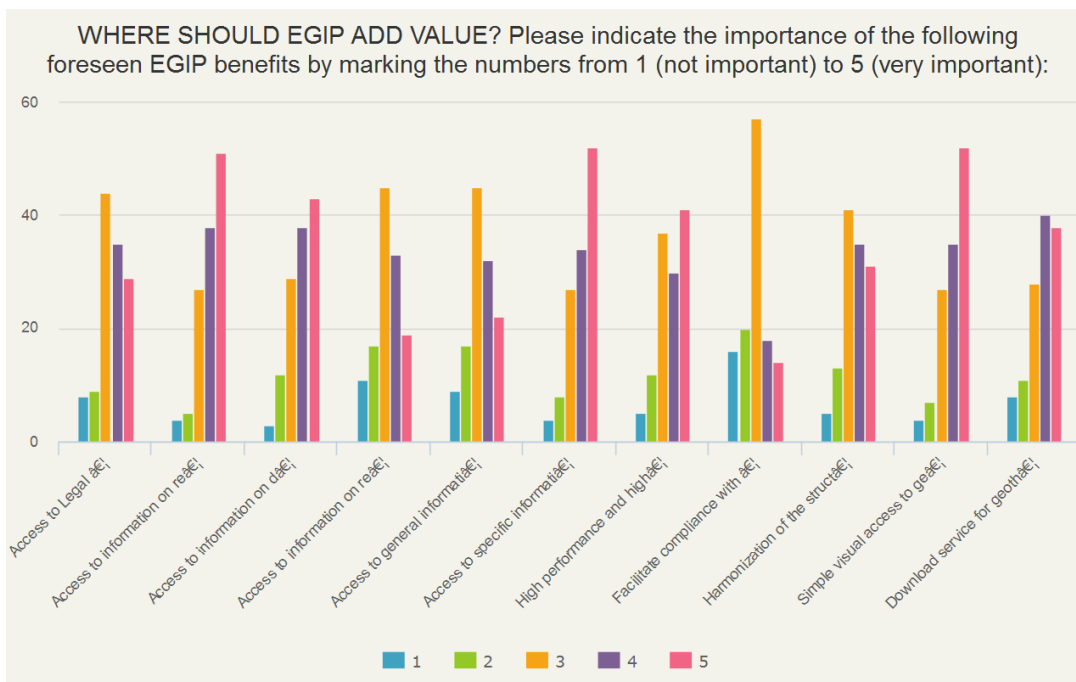


Figure 7 Added value, detailed rating of each benefit

Number of responders: 115

Description:

The averages of all aspects lie more or less in the range of 3 to 4 (rather interested to interested). No aspect was clearly and definitely dipping into the range of “not interesting”. The aspect that raised the least interest was “Facilitate compliance with e.g. INSPIRE”.

Most important benefits of EGIP:

- Simple visual access to data and information, specialist information and data, access to information on R&D, download functionality, information on projects and activities, high performance and accessibility of EGIP.

Intermediate importance:

Legal and regulatory information, harmonization of the datasets, general, non-specialist information.

Least importance:

- Information on relevant industry and service providers and compliance with INSPIRE directives.
- In the open text option on more benefit was delivered: Learning about useful formats for data acquisition and archiving (see Appendix A).

The benefits related to INSPIRE, in this question surveyed (i.e. “Facilitate compliance with INSPIRE directive” and “Harmonization of the structure and content of geothermal datasets”), gave back an ambiguous interpretation. The 23% of the respondents marked important or very important a question "Facilitate compliance with e.g. INSPIRE directive ", 45% were neutral and 30% considered the issue as a little or not important. The 53% of the answers in "Harmonization of the structure and content of geothermal datasets" were marked as important or very important but it is one of the major role of the INSPIRE directive. This indicates that the majority of respondents are not familiar with the specific details of what the directive deals with or that the existence of INSPIRE is known only to a selected group of probably government institutions. Stakeholders from the private sector might not have to deal directly with INSPIRE.

Question 8 and 9: Access to raw data

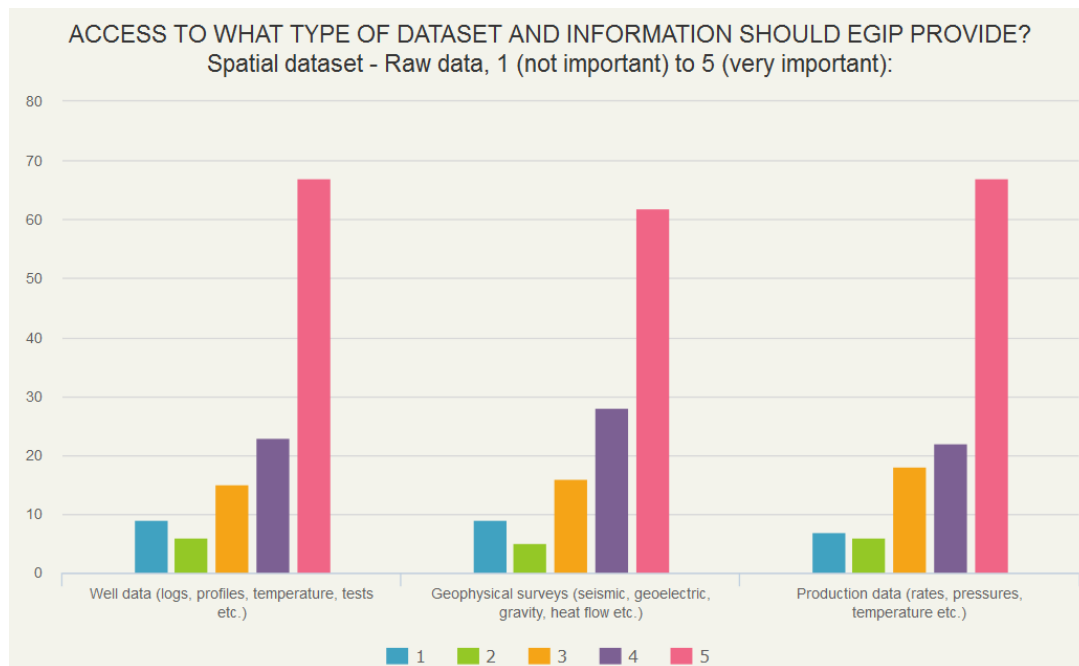


Figure 8 Access to raw data, detailed rating of each raw data type

Number of responders: 111

Description:

All three suggested raw data groups are considered to be of great importance.

In the open text option, further raw data categories were mentioned. Some of which actually fall into one of the 3 suggested categories, or cannot be classified as raw data (also see Appendix A): *Energy demand; Groundwater data; fluid geochemistry (twice); economic data of projects & developments; lessons learnt; drilling data (ROP, WOB etc...); passive seismic monitoring.*

Question 10 and 11: Access to interpreted data

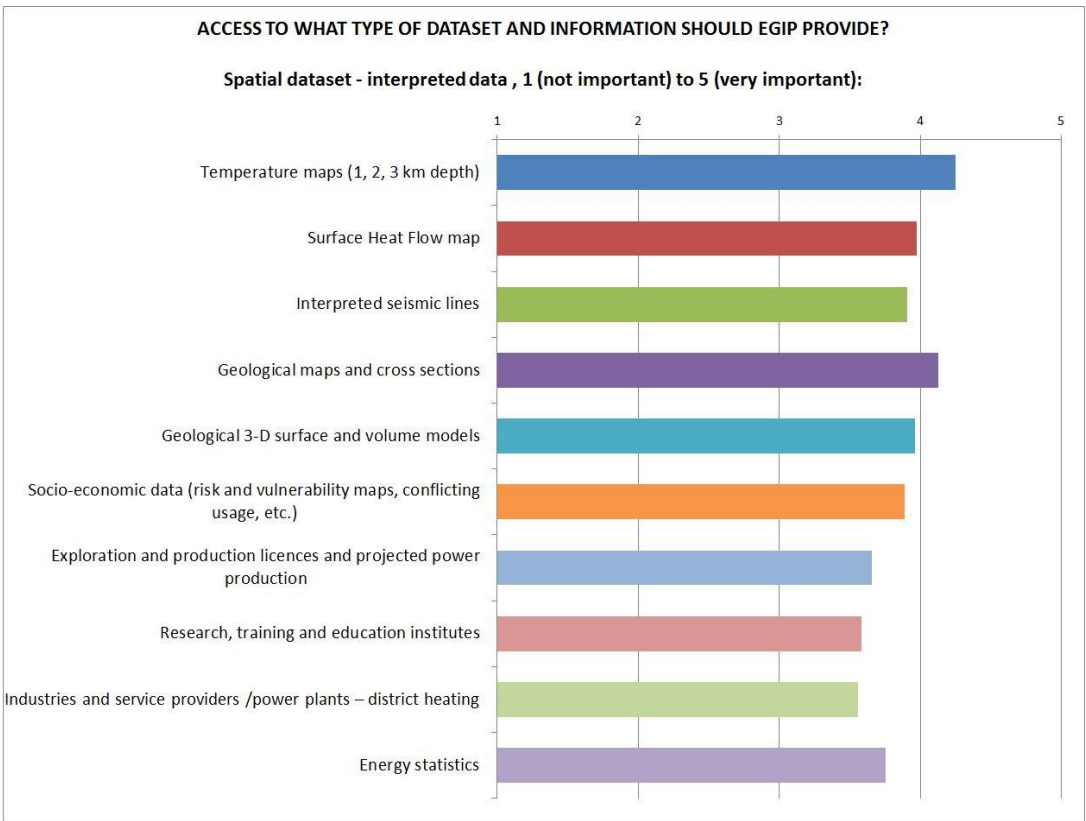


Figure 9 Access to interpreted data, summary plot, averaged rating of each type of interpreted data set

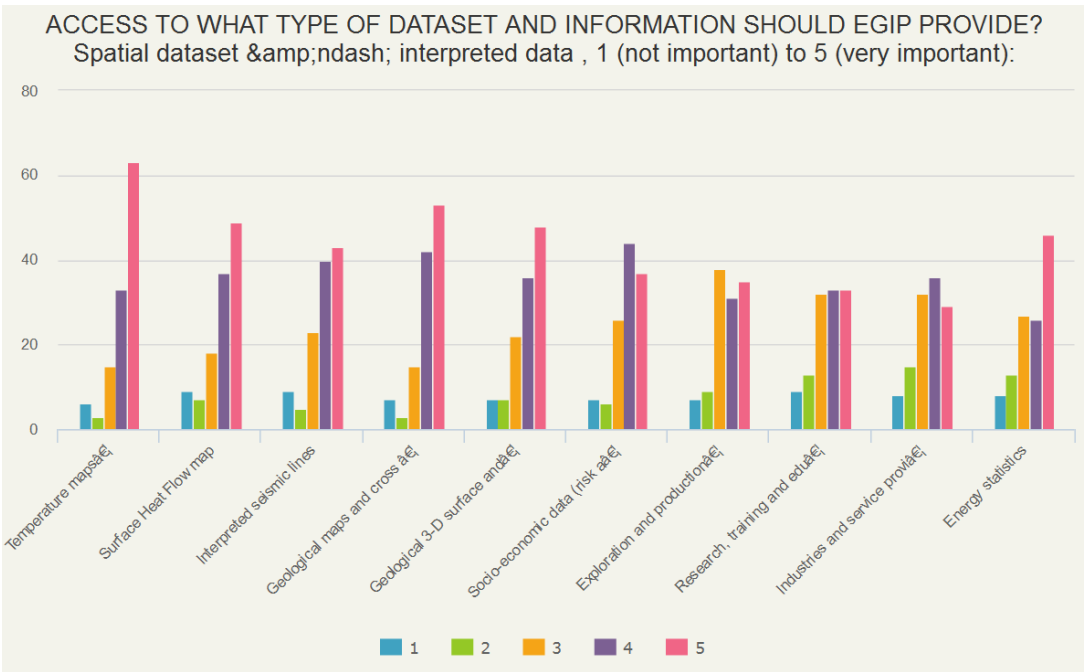


Figure 10 Access to interpreted data, detailed rating of each interpreted data type

Number of responders: 111

Description:

All suggested datasets were overall considered important (average rating of each category above 3.5). None of the suggested interpreted datasets was overall considered as not important.

Highest importance:

- Temperature maps
- Geological maps and cross sections
- Geological 3D models
- interpreted seismic lines
- heat flow maps

Intermediate importance:

- socio-economic data
- information of exploration and production licences
- energy statistics
- research, training and education institutes

Least importance:

- Data on industry and service providers.

In the open text option further interpreted datasets were suggested (see Appendix A): dynamic groundwater flow models; petrophysical data like porosity & permeability; earthquake and microearthquake locations (e.g. seismological stations); heat production of projects and economic figures.

Question 12 and 13: Access to documents

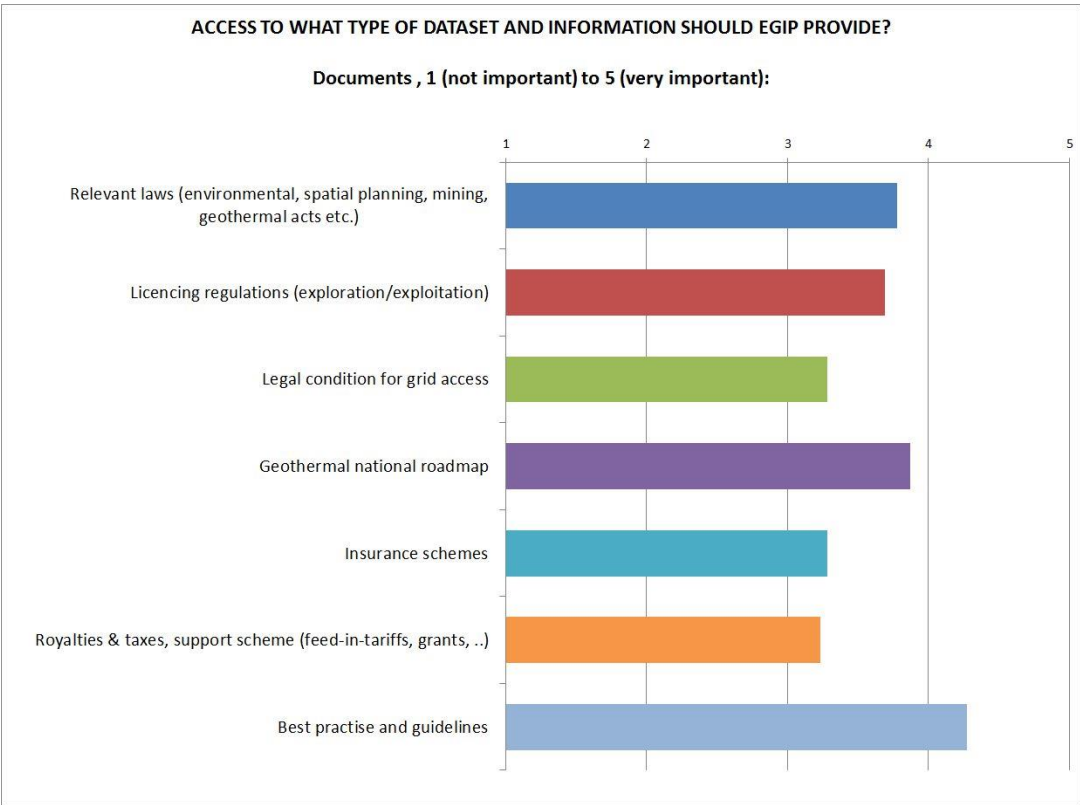


Figure 11 Access to document, summary plot, averaged rating of each document type

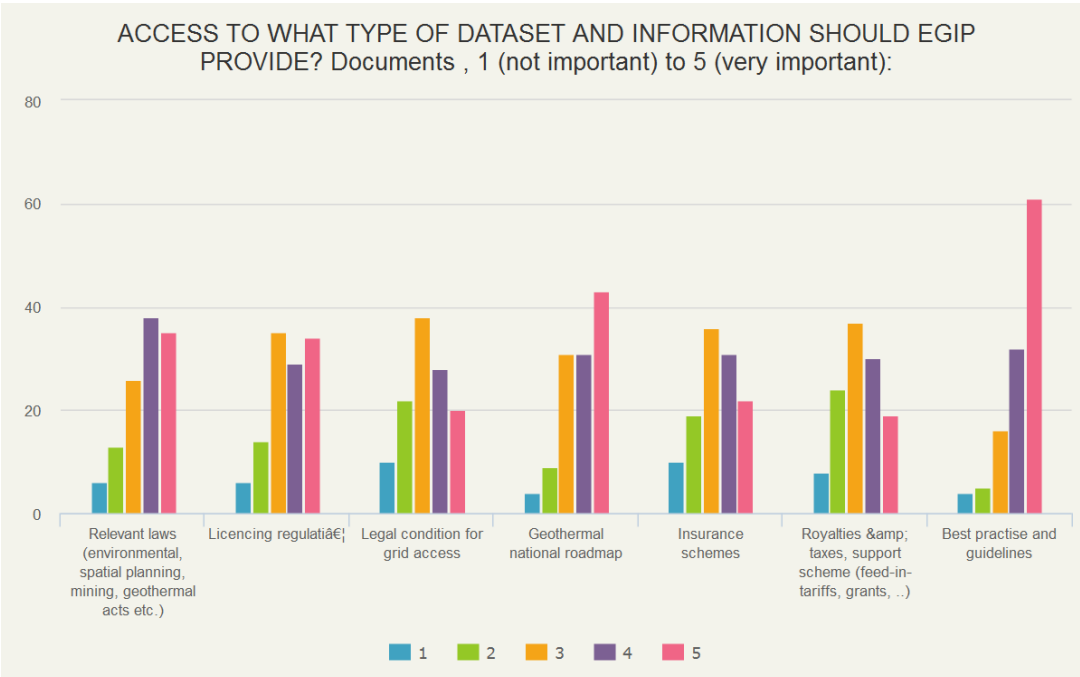


Figure 12 Access to document, detailed rating of each document type

Number of responders: 109

Description:

Generally documents scored lower than raw data and interpreted data. Most of them were in average considered as rather important to important (3– 4).

Highest importance:

- Best practices and guidelines.

Intermediate importance:

- Relevant laws; licensing regulations; national geothermal roadmaps.

Least importance:

- information on grid access;
- insurance schemes;
- information on royalties and support schemes.

In the open text option, there was also mentioned (see Appendix A): provision of didactic material (case studies, examples, feedback, etc.).

Question 14: INSPIRE compliance

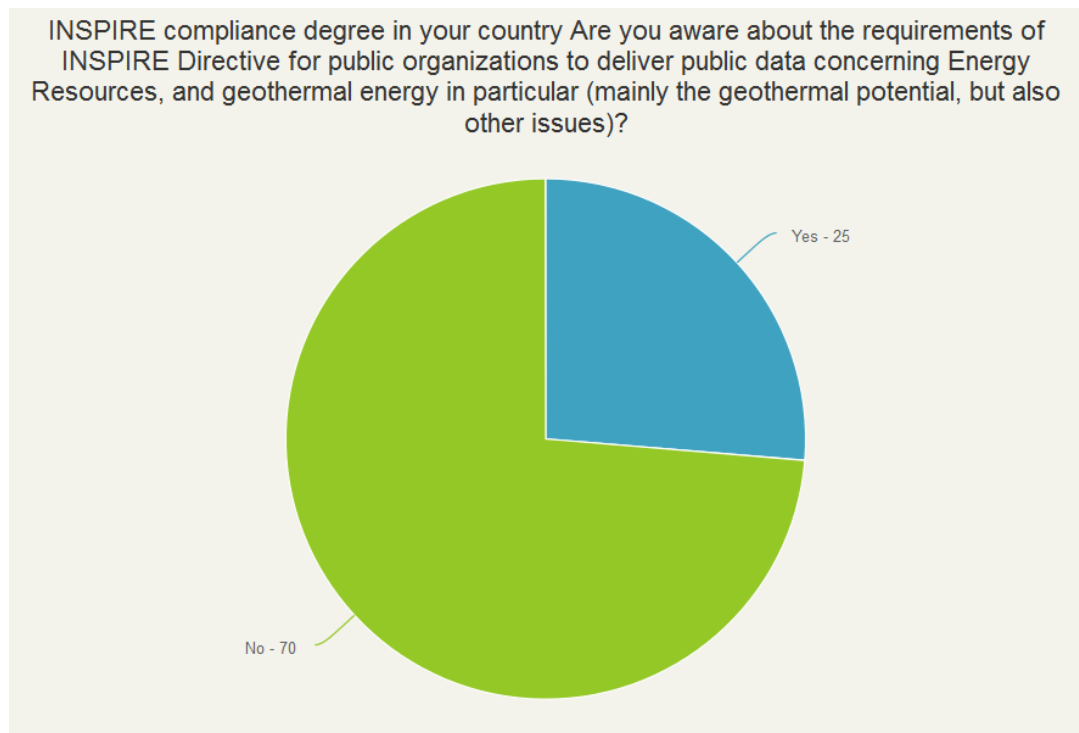


Figure 13 INSPIRE awareness

Number of responders: 86

Description:

75% of the SHs are not aware of INSPIRE requirements. Those that stated to be aware of it belong mostly to the user groups (see question 2) of public/administrative institutions (authorities, regulators, funding bodies, geological surveys), R&D, Academia.

Possible interpretation:

The low level of INSPIRE awareness also has to do with an extraordinary high participation of stakeholders from Switzerland. Because the country is not part of the EU, Switzerland does not have to comply with INSPIRE and therefore the whole topic is more unknown. No Swiss SH gave a yes in this question. Of the 65 negative answered, 25 are coming from Swiss stakeholders. Also generally SHs from the private sector might not have to deal directly with INSPIRE and are therefore not aware of the requirements.

Question 15: Level of INSPIRE involvement

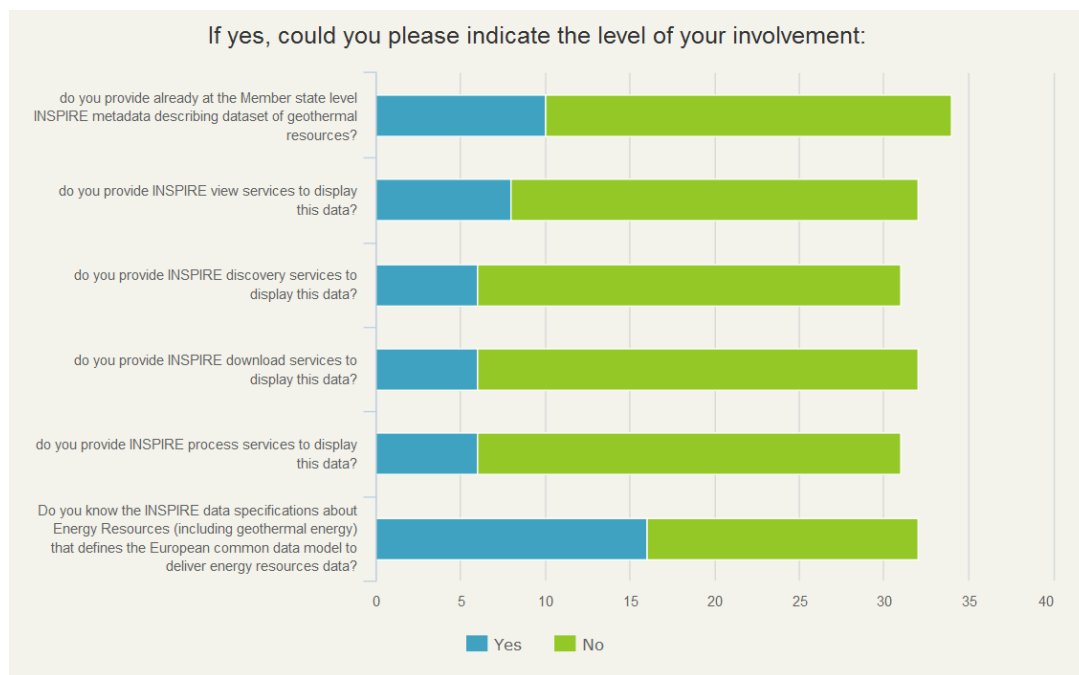


Figure 14 Level of INSPIRE involvement for those that answered YES in question 14

Number of responders: 26-29

Description:

Although the responders are aware of INSPIRE requirements (Question 14), 50 – 70 % don't provide INSPIRE based services (see Appendix A).

Possible interpretation:

The result of this question (i.e., very few service INSPIRE based) can be referred to the fact that INSPIRE is only known probably within organisations that are responsible for implementing and providing data, but not known by private/public end users of a potential EGIP.

Question 16 and 17: Other data/information web platforms/portals

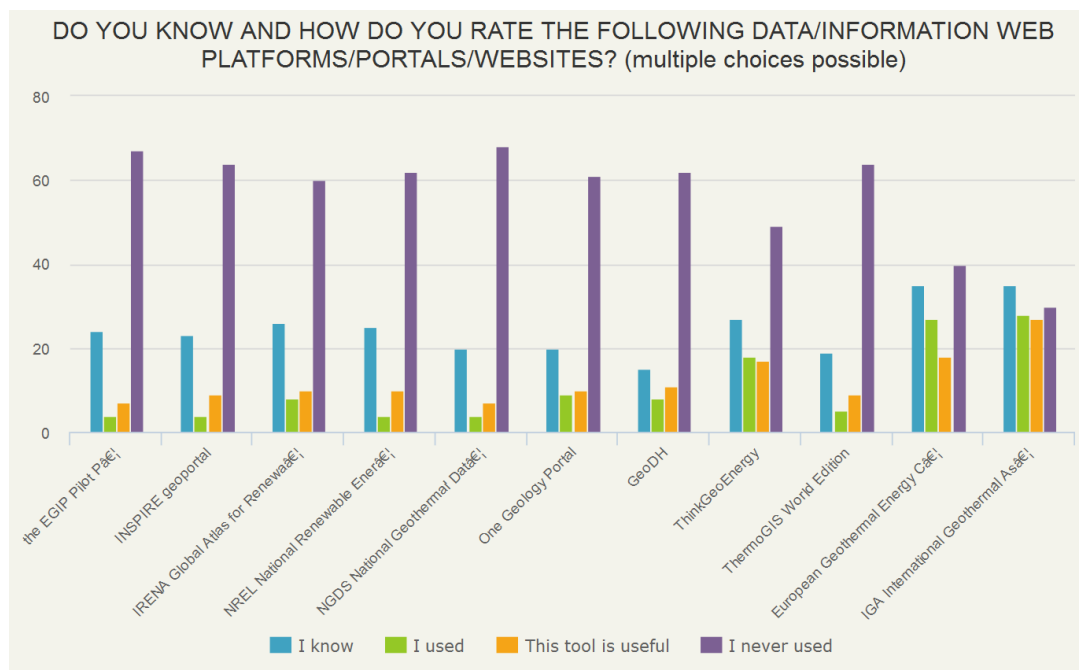


Figure 15 Knowledge of other platforms, detailed rating of each interpreted data type

Number of responders: 83

Description:

Irrelevant services: Although most of these services are known to 20 - 30 % of the stakeholders, most of them are only being used by 5 – 15 % of the stakeholders. The majority of the stakeholders (55 – 65 %) never use these services.

Relevant services: The exception to the finding above are marked by the services of “European Geothermal Energy Council (EGEC)” and the “International Geothermal Association website and the IGA Global Geothermal Energy Database”. These two services are being used by 25 % of the SHs, that’s roughly the same amount of SHs that stated they know about these two services. It can thus be said, that the almost all the SHs that know about the services also use them. It would be interesting to analyse what differentiates these two services from the others, which seem to be rather irrelevant in this European context for the chosen SHs groups. One possibility is that they provide multiple types of information spanning from general information regarding geothermal to conference proceedings, policy documents, list of plants, operators, heat and power production. They are, therefore, the closest in design to EGIP concept, although they do not cover all aspects as defined for EGIP.

Additional services: In the open text option, additional services were mentioned, that stakeholders use frequently (see Appendix A):

- Swiss Geology Portal (www.geologieportal.ch);
- Web database of geothermal fluids in Switzerland (<http://www.crege.ch/BDFGeotherm/>);
- www.geotis.de (twice);
- Data archives of EU Project TRANSENERGY (excellent compilation of geothermal data from Austria, Hungary, Slovenia and Slovakia). Details on <http://transenergy-eu.geologie.ac.at> (twice);
- www.Geoolec.eu

- www.geologie.ac.at

For part 3 of the survey a complete results analysis is not provided here, since evaluation of EGIP pilot was not the most important aim of the survey and this part was optional. The pilot implementation, which was setup in less than three summer months using an already available system deploying a promoted (by EC) e-infrastructure, is just one possibility for future use. As a brief comment regarding the result, this very limited platform has been seldom used, but was considered by 56% of responders (18 over 32) relatively user-friendly for retrieving information, and met expectation in terms of visualization and computation capabilities. Enlargement of platform capabilities and users is, however, necessary to conclude something on this regard.

3 Conclusions

Based on the feedback and results of the survey on EGIP, the following conclusions can be made:

- ❖ The respondent stakeholders, from JA participating countries, are interested in geothermal data Information Platform.
- ❖ The majority of respondents who took part in survey believe that improved access on the Internet to specific geothermal data and documents as in EGIP Pilot (or similar web application) is important. It is for both spatial datasets and other data.
- ❖ The main interested groups are Academia/Research centres, public authorities and industry (the latter consisting of upstream, midstream and downstream industry and consulting enterprise
- ❖ Geothermal potential assessment, geothermal energy from hydrothermal as well as research and innovation are the topics of most interest for those who answered. Against expectation the interviewees showed significantly more interest in hydrothermal than in petrothermal (EGS) systems.
- ❖ The suggested contents (in terms of raw data, interpreted data and documents) met expectations of those who answered.
- ❖ Easy and quick access/visual access to data, documents, specialist information are seen as the most important added values to today's situation.
- ❖ All three raw data types (well data, geophysical surveys, and production data) are very valuable.
- ❖ Temperature and heat flow maps, geological maps, cross-section and 3D Models, interpreted seismic lines are the most valuable interpreted spatial datasets.
- ❖ Best practices and guidelines are the document type mostly required.
- ❖ INSPIRE awareness and country compliance cannot be evaluated.
- ❖ IGA and EGEC web site are the most used and known geothermal information platform.

Finally the web survey was useful to focus on important aspects regarding the future possible implementation of a *European Geothermal Information Platform*. It allowed to identify the most relevant and most interested stakeholder groups that the realisation of EGIP should focus on.

There is a good general perception of the EGIP concepts among different kind of stakeholders among the respondents that can indicate a valuable interest on the possibility to have such platform. An easy and quick way to access (visualisation and where possible download) raw data, interpreted data, documents, is crucial for many users. A detailed inventory of the available information including the contact reference for those not available should be considered for the implementation of EGIP.

The results of the survey allow a prioritisation of the various kinds of raw data, interpreted data and documents and also allows focusing on the most important applications of geothermal energy for an eventual realisation of EGIP.

Some of the identified SH priorities fall clearly within the vicinity of national platforms and responsibilities. This allows a further focus on the topics that must be treated on a trans-national level like EGIP.

The survey also proved to be useful in sharpening individual countries requirements for their national platforms. The interest in petrothermal systems is a good example for that. Whereas the overall interest proved to be quite low compared to hydrothermal systems, the Swiss SH stated the same high interest in both concepts. The survey itself can serve as a product of this joint activity and can be distributed to countries interested in collecting their SH needs and requirements for a national platform.

The INSPIRE perception remains still not clear, as more than half respondents were Swiss, where the INSPIRE regulation is not working. Moreover in each country there is a key institute controlling the INSPIRE implementation, in most cases it is the National Land Survey of each country, and those institutes usually have no connection with Geothermal energy related issues, and answers to the web survey did not come from them.

The EGEC and IGA web sites, which provide different kind of information (multi-purpose/multi-information), are the most known and used, highlighting how the users usually look for more than one information typology.



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