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EuroGeoSource

EU Information and Policy Support System for Sustainable Supply of Europe with
Energy and Mineral Resources

Grant Agreement no. 250532

WP 2

Requirements for geo-energy and mineral resources data delivery at European and national users' levels

Report

January 2011

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1   Introduction

1.1   The project

The EuroGeoSource project (Eu Information and Policy Support System for Sustainable Supply of Europe with Energy and Mineral Resources) is a three-year project, co-financed by the European Commission under the European Research Area, competitiveness and Innovation Framework Programme (CIP), Theme "CIP-ICT-PSP.2009.6.2 Geographic Information".

The main goal of the project is to provide data on energetic and non-energetic mineral resources through an internet portal. The system will allow users to identify, access, use and reuse in an interoperable and seamless way and for a variety of uses, aggregated geographical information on geo-energy and mineral resources, covering a significant part of Europe (at least 9 countries) and coming from a wide range of sources.

The project has 11 workpackages (WPs) and this report concerns the workpackage 2 (WP2) "requirements for geo-energy and mineral resources delivery at EU and national users' levels".

The anticipated deadline for this WP was the end of September 2010. In the interest of the project, it was decided to move this deadline to the end of January 2011 in order to allow for a more in depth consultation of the potential user group. A detailed argumentation for this decision is given in section. Extensive intermediate reporting on project meetings assured that activities in the workpackages that rely on the outcome of WP2 were not hampered or delayed.

1.2   Objectives and tasks of the WP2

One of the main preoccupations of the project is to ensure that users and their needs are the center of the working approach.

The main objective of the WP2 is to scrutinize the business needs of the potential users with regard to the functions of the internet EU Information and Policy Support System for Sustainable Supply of Europe with Energy and Mineral Resources. As the result the WP2 will produce the specification of functional requirements to the EuroGeoSource system, integrating the business needs of the potential users that are to be collected via their interviewing. The user group includes, but is not limited by, EU and national authorities, representatives of which participate in the project advisory board, other mining and investing companies, not participating in the project.

This report presents the results of the interviews of the users group. The recommendations about the requirements are presented at the section 7. In annex, a list of the participants along with a overview of the literature (national and international) related to the management of geo-energy and mineral resources spatial information, are presented.

1.3   Relation between WP2 and other workpackages

The work in WP2 constitutes the base for several other workpackages. More the conclusions of this report are specifically relevant for the following workpackage:
*   Workpackage 4 (interoperability of the Geo-resources attributes and the data exchange format)

The main mission of this workpackage is to agree on or create a format for delivery of the key economic attributes for oil and gas and minerals resources fields. To achieve this, the key parameters and geological parameters are selected according to the results of workpackage 2.

*   Workpackage 5 (interoperable Geo-resources spatial data web services)

A main objective of this workpackages is, based on the results of the workpackage 2, to finalize the list of prioritised data sets that are most relevant for the identified user groups and thus will be disseminated via the EuroGeoSource system.

The workpackage 5 team is also charged to integrate the relevant datasets already published elsewhere (e.g. eWater, GeoMind, OneGeology Europe...). These datasets will be selected using the outcome of WP2 regarding the priorities of the potential users in this respect.

- The workpackage 6 (Development of the concept and technical design of the web GIS EuroGeoSource portal)

The main tasks of this workpackage will be to design the system according to the user requirements, with the technical capabilities that will allow system implementation. This team will mainly work with the functionality of the portal identified by the workpackage 2.

This workpackage is also charged to translate user requirements in a number of use cases and use scenarios in order to define the concepts of the portal in detail. The findings of WP2 regarding the user expectations towards functionality are directly relevant for this last task.

2   Identification of the user groups

In each partner country, a potential user group has been identified consisting of different institutes from both the public and private sectors. This was done through an excel list that was completed by each project partner. A list of international institution, especially EU institutes, was drawn up in a similar way by the WP2 leader with aid of the other partners.

These user groups constituted the core of the group among which the questionnaire was distributed, although additional organisations were added in the course of the process.

More than 1000 potential participants were identified for the project in the different partner countries. The questionnaire was submitted to different ministries and national agencies responsible for minerals and energetic issues. However, it was also distributed on a wider scale to offices for which these topics are not core business, but may play an important secondary role, such as environmental agencies and economic offices.

Also private investment companies were approached, as well as companies related to the extractive industry such as quarry and mining companies or the oil and gas sector. Research institutes were also approached, including several universities. Furthermore a few NGO's, professional organisations and sectoral networks were identified with particular interest to this topic. A list with the organisations that participated to this questionnaire is given in the annex 1.

The number of potential participants varies a lot between the countries. For instance, Portugal identified more than 700 potential users while Estonia selected 13 institutes suitable to participate to the project (see also figure 4.1). There are several reasons for these large differences between the countries:

For instance, the difference observed between Portugal and Belgium could be explained by the difference in the size of the country but also by the amount of natural resources in these countries. In the same way, the Netherland has less participants than other country because of his main type of natural resources. Indeed, the off-shore extraction generally concerns fewer parties directly involved than extractive industry.

Finally, the governmental organisation of these countries could also explain the observed differences. Indeed, depending of the distribution of the competences (national, provincial, communal...) the number of institutes involved in these issues can differ a lot from a country to another one.

The user group is classified depending on their involvement level in the project. We defined the following sub-categories:
- The current users
    These are the institutes which already have some relation with one of the partners (data exchanges, collaborations…). Universities, ministries, national agencies, regional authorities... are some of the main institutes belonging to this category.
- The potential users
    Opposed to the current users, potential users do not have a frequent/privileged contact with one of the partner. This group mainly concerns the private institutes (mining companies) and some public institutes which are not directly related to the geo-energy and minerals resources issues (environmental agencies, economic/statistic departments...)
- The VIP users
    This group concerns the users which were given special attention as they may become intensive users of the portal. Some ministries and the European institutes have been classified in this category.

3 The questionnaire

3.1 On-line questionnaire

In order to achieve a sustainable base for determining the profile and needs of the potential users of the EuroGeoSource portal, a large number of persons and organizations were approached in 9 countries. In this context, an on-line questionnaire seemed to be the best option and has the additional advantage of ensuring homogeneity of the questionnaire answers, which is essential to have a correct overview of the needs at European level. Processing of data was also facilitated because all answers where directly gathered in a centralized database.

The questionnaire has been closed for input, but is kept available as documentation at the original location where it can be consulted in view-only mode. The questionnaire resides at: http://eurogeosource.eu/questionnaire and can be accessed with the viewer code 29129100. The functionality of the questionnaire can be tested, but all input is lost and reset when the questionnaire is submitted.

The questionnaire was made available in 4 languages: English, Polish, Romanian and Hungarian. It was left to each project partner to decide whether a translation from English into the national language was a necessity. For the majority of the countries, at least passive knowledge of English within the administrations and industry was considered sufficient. Nevertheless, also in countries for which no translation was foreseen, the participants were given the option make the free text replies in their language of choice. Those answers were then translated by the respective country partner before being analyzed by the WP2 workpackage leader.

The final questionnaire being made available to the potential users was version 4. Version 1 was a rudimentary version presented during the kick-off meeting (15-16/04/2010) of EuroGeoSource and aimed particularly at discussing the general structure and approach. A more mature version of the question list was presented at the next partner meeting (19-20/07/2010). During this meeting, the paper version was discussed and filled out by each project partner. During this exercise, the partners and advisory board members present were each asked to either fill it out on behalf of their own organisation, or on behalf of a relevant organisation, project or network in which they were active. Where relevant, those entries were entered into the final database to be update during the official opening of the questionnaire.

Prior to this meeting, the questionnaire was also orally presented to two stakeholders based in the country of the WP leader (Belgium), after which they were asked to fill out the online version. They experienced significant problems in filling out the questionnaire, especially regarding loss of data due to time-out. Useful comments were also received regarding the content, formulation and completeness of the questions.

These comments were embedded in version 3 that formed the subject of detailed discussion during an ad-hoc meeting at Utrecht between the WP leader (GSB-RBINS), the project coordinator (TNO) and Geodan (28/07/2010). Content but also the layout/presentation of questions was changed in order to facilitate the filling out of the questionnaire by the participants. The technical changes to accommodate for this, together with the proper testing of the questionnaire, was terminated on 01/09/2010 when the questionnaire was opened to input from potential users of the EuroGeoSource portal.

The link http://eurogeosource.eu/questionnaire directs participants to the introductory page where the project questionnaire is presented in different steps. First, a short presentation of the project is provided with a link to the homepage of the EuroGeoSource project. Also the context of the questionnaire is detailed, highlighting that the questionnaire is an opportunity to know their usual use of on-line data in order to provide a suitable portal. The collected information will be used for the portal development, or, when suggestions are out of scope of the EuroGeoSource portal, it will serve as guidelines for post-project targets.

Secondly, this introductory page provided some practical information about the expected duration (30 minutes) and about the languages that could be used to fill out the questionnaire.

It was also explained how they could proceed to fill out the questionnaire (a participant' code is needed, the questionnaire can be completed in several session,…)

Finally, this page also shortly presented the privacy statement about the collected information.

3.2   Technical set-up of the questionnaire

Participants could change the language of the questionnaire by using the flag button on the introductory page. Subsequently, all texts, were translated in the selected language, including the introductory page and the pup-op windows.

To be able to fill out the questionnaire, participants needed an identification code that was provided along with the invitation of the contacting partners. Filling out of the questionnaire could be done in several sessions. Participants had the possibility to stop their work by closing the web page and go back later using their identification code again. When the participants clicked on the submit button at the last page of the questionnaire, a pop-up window appeared explaining that it would no longer be possible to modify their answers. It's only when they confirmed the closure of their questionnaire using this pup-op window that their session was definitively closed and the answers would become available to the WP2 leader for analysis. This process was also confirmed by a mail stating that a questionnaire has been completed. If a user would try to re-open a closed session, the following message would appear:

> *'Your questionnaire has already been submitted and has been locked. If you need to correct or change any answers, it can be reopened by sending a mail to Nathalie Maricq'*

Throughout the questionnaire, help buttons were available to guide the participants. By clicking on the help button, a text appeared providing additional information about the question (figure 3.1).

The EuroGeoSource questionnaire was hosted on the EuroGeoSource.eu server, based in Romania and managed by Mr. Alexandru Balan (IGR). The main questionnaire was built using PHP, CSS and Javascript, connected to a MySQL database, and was tested to be compatible with Internet Explorer, FireFox and Chrome.

3.3   Content of questionnaire

The questionnaire was organized in 8 pages, each divided in different categories. The first page and the last page focused on the participant information and practical issues about the participation to the questionnaire. In the 6 others pages, we approached different topics to map the participants and their needs regarding the EuroGeoSource portal. The main goal of the questionnaire was to answer to following questions :

- What are the general data needs of the potential users of the EuroGeoSource portal?
- How do they currently use this information and in relation to what activities?
- What are their current sources of information?

We divided the questionnaire in different parts: The participant information (page 1), the data needs (page 2), the use of data (page 3), the current source of information (page 4), the integration of related data (page 5), the scope of the portal (page 6), its functionality (page 7) and finally the closing page (page8). These categories are detailed in the section below.

3 different types of questions can be discriminated in the questionnaire based on how the answers could be entered (Figure 3.1):
- Questions with answers constrained to checklist,
- Questions with open answers gathered through free text entries,
- Questions with answers constrained to a scale of appreciation (agree-not agree).

The checklist's option mainly concerns the data needs and the use of data where participants have been invited to choose from a list of the fields in which they are active (e.g. energy, minerals, Industrial planning, education...). The resource list was a two level check list, in which first general selections could be made. Once these were selected, a longer and detailed list would appear from which particular commodities could be selected. Multiple selections were allowed.

Check list questions could be used where the answers were relatively straightforward (typically a list of required data, activities, etc.). In such instances, check lists allow to obtain data at the same level of detail and completeness from all participants. Although a field of 'others' was included in order to allow the user to extend the list where he or she felt this was required, particular care was taken to start from lists that were as complete as possible. This is of particular importance to avoid effects of out-of-sight or implicit factors (Morgan & Keith, 2008). As such, the degree to which the fields 'others' are used is an indication of the a-priori completeness of the check lists. The exact numbers for each question are given below, but they are in all cases satisfactory.

The free text option was systematically foreseen at the end of each topic. The major questions were followed by a free text field in which general or specific comments or remarks could be entered. Free text option was also use for a specific question about their current source of information.

Finally, the answers using an evaluation scale have been used when it was asked to the users to give their opinion about a topic. They noted the answers from 1 (agree - useful) to 5 (not agree – of no value) instead of using simply "yes" or "no". Participants could also select 'no opinion'. We preferred this option because it allows to answer with nuance instead of choosing one of the extreme positions. The free text fields allowed to explain or motivate the answers.

3.3.1 Participant information

The questionnaire was not anonymous. Instead it was clearly communicated that the contact details would be used for sake of data analysis only and that replies would be sufficiently generalised in the public reports and presentations in order to hide the identity of the respondent. The participant could also choose at which level of detail to fill out the participant information, since this form did not contain any required field. This freedom could be allowed since a questionnaire could also be traced back to its source with the personalised user code. However, all forms received were sufficiently complete.

The amount of information to be entered on this form was deliberately kept to an absolute minimum. Information was gathered on the participating institute and the contact person within that organisation. They were asked to provide their address, the status of the company (public, private, research institute, NGO, others) and also the way to contact them later if necessary. It is especially the status of the company that is an important element during the analysis of the data provided in the following forms.

3.3.2 Data needs

The goal of this section (page 2) was to identify the mineral resources by which participants are interested. We divided the resources in two big categories:

1. energetic mineral resources,
2. non-energetic mineral resources.

Participants were invited to select in the check lists their general interested. Upon doing so, a detailed selection list would appear where, if relevant, they could refine their selection. A diagram (figure 3.2) shows the structure of the check list with the first level of choice (in red) and the detailed selection (in blue). The complete selection list and exact formulation of the questions in English is available in the annex 1. At the detailed level, it was also possible to select "other" and then an empty field appeared where participants could suggest missing fields.

A second part of this questionnaire prompted the participant with the status of resources, asking which of these would be of interest. This status was simplified into three categories:

1. historic sites,
2. actual sites of extraction,
3. reserves or potential sites.

3.3.3 Use of data

The main idea of this section (page 3) was to identify the activity sectors of the participants and their future uses of the data provided by the portal. The page is divided in three sub-sections:

1. use of data,
2. level of activity,
3. international data accessibility.

For the use of data, they had the possibility to choose general topics from a list of 8 different activity sectors. Then, a detailed list appeared (below the general selection) in which participants could refine their selection if necessary. Figure 3.2 provides the structure of the checklist.

Secondly, they were invited to indicate the level at which they were active using a short checklist (national, regional, local or international level). Several choices were allowed.

Finally participants could give their opinion about the degree to which they had or did not have easy access to international data. We proposed two short questions and invited users to evaluate these by using a scale from 1 to 5. The first one was about the possibility to easily access to international data and the second one was about the usefulness of a cross-border portal such as the EuroGeoSource portal under development.

3.3.4 Current source of information

The goal of this section (page 4) was to identify the main sources of information about energetic and mineral resources for the participants. The behaviour of the users was identified by probing for the current sources and format of the information typically consulted.

In a first step, users were invited to select from the following list what kind of information they usually revert to:

- Internal data (e.g. report, PhD thesis…)
- Public data (e.g. website of national agencies, existing portals…)
- Commercial data (report or website of private companies or consultants)
- Others

Three free text fields were available below each selection in which the actual sources of data could be named (names of magazines, websites, databases...).

A second question the users were invited to specify in which format the consulted data is available:

- On paper (analogue format)

- Database (digital format)
- GIS system.

In this section they were also asked what other portals could be used as an example for approach of the EuroGeoSource portal regarding layout and functionalities. We left a free text field for this and suggested them some examples of the European portal (i.e. eWater, eEarth...) in the respective help button.

3.3.5 Integration of related data

An essential functionality of the EuroGeoSource portal will be the possibility to combine different datasets with the data provide by the portal. In this section (page 5), participants could indicate with what data they would probably like to combine the data available on the EuroGeoSource portal when analysing or searching for data.

We proposed a checklist with some topics and a free field 'Other'. Again, an open field was available to collect participants' suggestions about other kind of data for which it could be interesting to provide a possibility of combination.

In the checklist, 10 topics were proposed and several choices were allowed:

- Geology
- Land use
- Ecological data (e.g. Natura 2000)
- Basic geography (borders, cities, rivers...)
- Road maps
- Economic data

- Consumers
- Merchant
- Transport (pipeline, Harbour...)
- End-use
- Other
  - ...

This section provided additional information about the activity sector of the participants.

3.3.6 Scope of the portal

This section (page 6) is intended to provide a better idea of the participants' expectations regarding the field of action of the portal. Does the portal have to be just a platform with geo-resources information or does it expected to be more, e.g. a decision tool? We proposed several options and invited participants to rate these using an evaluation scale.

The proposed options were:

- The portal should allow to address :
  - Issues of security supply,
  - Issues of socio-economic planning,
  - Crisis management (e.g. disruptured chains of supply, switch to reserves or alternative commodities, environmental incidents...)
- The portal should pay attention to increase the:
  - Exploration of energetic and non energetic minerals resources in Europe,
  - Production of energetic and non energetic minerals resources in Europe,
  - Sustainable use of energetic and non energetic mineral resources in Europe

  (e.g. increased awareness of scarcity of supplies, increased recycling, alternative commodities, etc.)

Each of these options could be rated from 1, disagree completely, to 5, agree completely, or the participants could choose "no opinion".

3.3.7 Portal functionality

This section (page 7) concerns some practical aspect of the portal. It contained suggestions on the basic functionality for searching and viewing of information and allowed to rate these from 1, not important, to 5, very important or "no opinion".

For the search functionality, following options were proposed:

- By location,
- by keywords,
- by wizard,
- provide the possibility to perform ad-hoc requests using a specific language (e.g. SQL).

For the viewing, we proposed to view the data:

- on map,
- as graphs,
- in table,
- the original documents.

Finally, we proposed the possibility to download the data from search results.

3.3.8 Contact with the participants

In the questionnaire, the possibilities to contact the WP2 team were multiple. Indeed, at different place of the questionnaire, an email contact was provided in order to allow them to ask some more question if necessary:

First, on the introductory page, an email contact appears to allow people without participants' access to get one. Secondly, on the closing page, this same contact is also provided if participants need to re-open his questionnaire, to make some modifications.

Finally, the participants was invited to fill his email contact at the last page of the questionnaire if they would like to stay inform of the report and of the development of the project.

3.4 Dissemination and time line

The distribution of the questionnaire link and the access codes was principally done at national level (figure 3.3), as it was considered better to approach the potential users through a national institute that they were acquainted with, than a foreign office or project secretariat. Thus each partner was charged to prepare a list of the potential users (see chapter 2).

Based on these lists, the WP2 team prepared the participants' codes per country and provided these to the partners that acted as national contact points. Each of them was in charge to contact their own national participants, to present the questionnaire and to distribute the access codes. The participants were contacted one by one to minimize the distance between the project and the user group, and for the distribution of the personal access codes.

Participants were mainly contacted by mail but a special attention was paid to one user group (VIP users). For this limited group, private meetings were organised to present the project and explain the role of the WP2 and the questionnaire.

When a participant had submitted his answers, the WP2 team received a mail saying that a participant had completed his questionnaire and the results were stored on the database. When the answers would be in a language foreign to the WP2 team, these would be returned to the partners for translation.

The web-questionnaire was opened on the 1th September 2010 and 1041 requests have been sent to institutes based in the partners' countries and to European institutes. Approximately two weeks after

the first contacts, a reminder was sent to the user group by the partners. This could be by mail or by phone, depending on the approach considered most efficient by the partner.

According to the original timeline the questionnaire would be closed at the beginning of October. The response received at that moment was presented at the Budapest partner meeting (18-19 October 2010), along with the recommendation to extend the deadline for replies to the questionnaire. Reason for this was that the number of answer was slightly insufficient (120 answers) and that the number of respondents was especially low in a number of countries (especially the Netherlands and Slovenia). Following this recommendation, the questionnaire was kept open during November and a new call for participation was launched in all countries. During this time slot also the meetings with European institutes (i.e. Directorates-General...) were intensified.

In total, the questionnaire was kept open during 3 months, from September to November. At the end of November, 187 answers had been received with a satisfactory representation of each country.

The number of reply wasn't constant in time and the second phase of contact had an important impact, the number of replies increasing at the middle of October (figure 3.5).

At the end of November, 187 answers had been received with a satisfactory representation of each country.

4 Questionnaire response - Results

In total, 187 offices/institutes out of 1041 provided input through the questionnaire, which represents a reply rate of approximately 18 %. This can be considered as normal for this type of questionnaire, especially since the group of potential users was very broadly defined in some countries, and therefore include groups from which a-priori only a low participation rate was expected (e.g. communes with local, rather than international interest in the topics).

The balance between the number of questionnaire sent out and the number of replies is not equal for each country (figures 4.1).

The rate of participation is different between the countries but especially the absolute number of answers. Indeed, for Portugal and Bulgaria, the number of answers is high compared to the other countries, and they represented more than 50% of the total number of answers. At the same time, a country such as Hungary received little response with only 5 answers.

Because the main interests of a country are determined a.o. by its national resources, it is important to have a similar representation of each country in the data pool to be able to assume the results as being an acceptable European average.

For this reason, a methodology was applied to balance the impact of each country in order to avoid an over-representation of the expectations of the countries with high response rates.

In practice, the absolute number of responses are expressed as percentages for each country (9 countries and the International institutes group as a separate group). It are the percentages that are further used to calculate the European average.

This approach could be used for the majority of the information. It was chosen not to apply this to results of e.g. the detailed checklists (detailed data needs on page 4, detailed use of data on page 3) because the number of answers obtained at this level was insufficient. More specifically, for some of these checklists, countries are present where only one person refined the selection, or sometimes no selection was made at all. If the above approach would be used, then at least 10% of the results would be determined by the opinion of only one person. In such cases, results are not corrected and only discussed at the level of Europe.

4.1 Identity and status

The participants' group is composed by different type of institutes (figure 4.2). While the countries presented difference regarding the main status of their participants group (figure 4.3), we observe a nearly equal representation of public and private institutes at European (respectively 37 and 34%). Research institutes and NGO's represent respectively 12 and 3.4 % while the "other" category totals to 13% of the participants' pool. This last category comprises institutes with a special status (i.e. foundation, double function, independent actor, non profit organization...).

The public and private institutes comprise the most important potential user group of the EuroGeoSource portal. It is therefore essential that they are well represented (together 71% of the respondents). The fact that both groups show the same degree of participation facilitates drawing well balanced conclusions with an equal level of confidence for both groups. In view of the limited response from NGO's and the relative diversity in this group, they will usually be grouped with the category 'others'. Depending on the number of answers received on particular questions, also the group 'Research institute' will be grouped with others. In those cases, these results are tagged 'Res-other'.

As we expect a different behaviour between the different kind of institute (public, private, research institute, NGO), regarding the data needs and the use of data, we systematically represented the

results making a distinction between the different kind of institute, in order to account of these difference when analysing the data.

4.2 Data needs

The general analyse shows that the most important need concerns the construction minerals, followed by the hydrocarbons and the industrial minerals, with respectively 61%, 49% and 48% of the participants who chose these categories (figure 4.4). There are no obvious differences regarding the data needs between the different group of participants (public, private, research/other).

If we look at overall level, 49% of the users are interested in non-metallic mineral resources, 41% in energetic resources and 31% in metallic mineral resources.

Each category is discussed in more detailed below. 20% of the participants chose to refine their selection.

4.2.1 Energetic mineral resources

• *Hydrocarbons*

49% of the participants' group are interested in general by this energetic resource. Hydrocarbons is subdivided into natural gas and oil. 35 persons (18% of the participants) chose to refine their selection in this way and we observe more or less a same interest for oil and for gas (respectively 85 and 80% of the participants are interested by these resources) (Figure 4.5)

• *Solid/Fossil*

48% of the participants have a general interest in this resource and 29 persons (15% of the participants) detailed their choice. Solid/fossil is subdivided into peat, brown coal, lignite, coking bituminous coal, energetic bituminous coal, anthracite, carbonaceous shale and oil shale.

We observe an important interest for the oil shale (62% of the users) followed by brown coal and lignite which have an equal score (48%). 41% of users are interested by peat as energetic resources while the others are below 30% (carbonaceous shales, energetic bituminous coal, anthracite, coking bituminous coal) (figure 4.6).

• *Other*

27% of the participants have a general interest in this resource. It was subdivided in geothermal energy, uranium and "other" with a free text field. 45 persons (24% of the participants) have a specific interest for other kind of energetic resources. There is an important interest for geothermal energy (70% of the users) while those that indicated uranium is clearly lower (44%) (figure 4.7).

4.2.2 Non metallic mineral resources

• *Construction minerals*

This is the most important need with 61% of the participants who selected this resource in general. The subcategories were notably clay, sand, gravel (the completed list is available in annex 2)

24% of the participants (n=44) chose to go further and to detail their selection. According to their opinion, industrial limestone/dolostone is the most important material to consider (70%). In the second place, there is the crushed stone aggregates closely followed by sand and gravel (respectively 63, 61 and 56% of the participants) (figure 4.8).

• *Industrial minerals*

This resource is ranks fourth with 48% of the participants who selected it. This resource is subdivided in 38 different minerals, a list is available in the annex2. 17% of the participants (n=32) have chosen

to refine the selection and consider that the main needs concerns kaolin and quartz following by pure quartz sand and calcite (figure 4.9).

- *Ornamental stone*

38% of the participants consider this resource as an important need in general. Three different ornamental stones were proposed : granite, limestone and marble.
Only 23 persons refined the selection which represents 12% of the total of participants. The main interest is for limestone followed by granites and marbles (respectively 70, 43, and 32% of the participants) (figure 4.10).

4.2.3 Metallic mineral resources

- *Mined in Europe*

This resource is in general considered as an important data need by 38% of the participants. In the questionnaire, 24 metallic minerals were proposed (e.g. arsenic, bauxite, beryl... a completed list is available in annex 2). 27 persons selected one or more specific metallic minerals (14% of the participants). Copper and gold are the first in the list with more than 70% of the participants indicating these metallic elements. More than 50% of the participants are interested by silver and then by zinc, lead, iron with respectively 48, 44 and 40% (figure 4.11).

- *Not mined in Europe*

This category is ranks lowest with 24 % of the participants who are in general interested by this group. Only 2% of the participants (n=5) have detailed their choice in a list of 15 metallic minerals available in the annex 2). The main areas of interest are the Rare Earth Elements (REE), Platinum Group Elements (PGE), cobalt and rhenium which are of interest to all five respondents (100%) (figure 4.12).

4.2.4 Status of the fields

Participants are interested in actual extraction fields and reserves and potential fields but also in depleted fields with respective percentages of 86, 80 and 38% of participants (figure 4.13)

4.3 Use of data and activity

4.3.1 use of data

General results indicate that the main use of this data seems to be for mineral policy issues and for industrial planning issues (with 49 and 46% of the participants who have selected these). However, an important difference can be observed between the private and the public institutes. Indeed, at public level, the main uses concern the government planning and the education sector while these activities are of low relevance to the private institutes (figure 4.14). Each category is detailed below.

- *Mineral policy*

Each kind of institute are active, in an nearly equal way, in this sector. 49% of the participants will use the data in this purpose and detailed their selection choosing the international, the national, the regional or the local level (figure 4.15).
National level seems to be the most important followed by regional level and local level (respectively 79, 56 and 54% of participants). International level is on the last rank with 42%. At more detailed level, we observe that the distribution is not the same for each kind of user. Indeed the ranking is different for the private institutes for which the international level is at the same level than the national level.

- *Industrial planning*

This sector concerns 46% of the participants' group, mainly the private institutes. The participants refined their selection, selecting the reserve estimation, the exploration, the investment decisions or the location/relocation issues.

The main use appears to be for the reserves estimation, at the same ranking with the exploration for new reserves (76% of the participants). At the second place, the main use seems to be for the investment decisions and location/relocation issues (58 and 46%) (figure 4.16).

- *Economic analyses*

This use concerns 39% of the participants' group, distributed in an nearly equal way between the different kind of institute. At the detailed level, a difference between public and private institutes appears (figure 4.17). According to the private institute, the main use concerns the import/export balances issues (57% of participants) following by sector performance and competiveness (concern respectively 46 and 40% of participants). The public institutes seem more concerned by these last uses, in comparison with the private institutes.

- *Economic forecasting*

37% of the participants are concerned by this issue (all kind of institutes) and almost all of them detailed their selection, choosing among the national level, the international level or the macro-economy. It seems to be at national level that this kind of issues will be addressed but the international level is also an important potential use of the data (respectively 83 and 65%). Macro-economy issues are at the last rank with 37% of participants (figure 4.18).

- *Education*

This sector concerns 32% of the participants' group, with a very low level of preoccupation from the private institutes in comparison with the previous uses. The participants could choose between the general level, the junior school level, the high school level, the university level or the post graduate level. It's mainly at university level and post-graduate level that the data will be used (respectively 73 and 60% of the participants' group is involved in this sector) (figure 4.19).

- *Land use planning*

30% of the participants will use the data for this purpose, with an equal representation of public and private institutes. They consider first the local level before regional, national or international level (respectively 67, 57, 41 and 17% of the participants who have chose this section). It's mainly the private institutes who have selected this last level (figure 4.20).

- *Government planning*

28% of the participants' group are involved in this sector and this use was mainly selected by public institutes. With the education sector, It seem to be one of the most important activity for them. The proposed sub-categories of this area were the consumption patterns, the import dependency, the transport infrastructure and the transit operations. According to their selection, Participants are mainly concern by consumption patterns issues following by the transport infrastructure, with respectively 70 and 60%. The other sectors, import dependency and transit operations, concern 45 and 30% of the participant (figure 4.21).

4.3.2   Level of activity

The participant's group is mainly active at national level and at international level with 65 and 57% of them choosing these. 49 and 41% of the participants are also active at regional and local level (figure 4.22). The ranking is similar for each kind of institute.

4.3.3 International data accessibility

• *Access to international data*

According to the results, the accessibility to the international data is somewhat difficult. The figure 4.23 presents the distribution (in percent) of the participants' answers between 1 "very difficult" and 5 "very easy" for the accessibility to the international data. We can observe that the largest group (39%) claims that access to international data is nor difficult, nor easy. The second largest group considers this to be (rather) difficult (30%). Only a minority considers the access to be very easy. This distribution is in line with the average score is around 2.7. 7% of the participants don't have any opinion about this question. This appreciation is the same for public and private institutes.

• *Usefulness of a cross-border portal*

According to the opinion of the participants, the EuroGeoSource portal will be a useful tool. Indeed, 45% of the participant noted this option with a 5/5 (very useful) and 22 % with a 4/5 (useful) (figure 4.24). The answers are distributed in increasing order between 1 "of no value" and 5 "very useful". The average is around 4.1 and 6% of the participants' group seems to have no opinion about this question. Also for this question there are no obvious differences between public and private institutes.

4.4 Current sources of information

Participants indicate that they mainly revert to public data and internal data (40% and 35% of the participant group) compared to commercial data (less than 20%) or "other" kind of data (less than 7%). More than 70% of the data is in analogue (paper documents) and digital (digital documents, tables and databases) format. Data in GIS format on the other hand is not very common, and seems to be slightly more present in internal data systems than in public or commercial ones (figure 4.25). No significant differences were observed between public or private institutes regarding their current sources of information (figure 4.26).

In addition to the above question, the participants were encouraged to suggest portals which could serve as an example for the EuroGeoSource portal regarding the layout and the functionality.
Here is a short summary of what they proposed (complete list is available in annex 5):
- Portals of the national geological surveys (BGS, BRGM, TNO, USGS…)
- Public portals: Google earth, Wikipedia, infomine,
- European portal: eEarth, eWater, GeoMind, OneGeology, European nature information system web site (European environment agency), Maratlas (European atlas of the sea)…

4.5 Combination with related data

The questionnaire proposes 10 related data sources that can potentially be combined with the core data in the EuroGeoSource portal (completed list in annex 3). From these, geology, basic geography, ecological data and land-use are indicated by the participants as most important secondary data elements (respectively 82, 70, 60 and 59 % of the participants group) (figure 4.27). A few slight differences exist between public and private institutes. Indeed, the favourite related data of the public institutes are the same as the general analyses while the private institutes also suggest to provide a possibility of combination for economic data as well as geology , ecological data and land-use.

4.6 Scope of the portal

According to the participants group, the portal should clearly allow to address issues of socio-economic planning, crisis management and the security of supply. On a scale from 1 to 5, the averages are respectively 4.12, 4.07 and 4.01. 15 to 20% of users didn't express an opinion about these questions (figure 4.28). which is relatively high. This may indicate that the topic addressed in this question is of low importance to a significant percentage of the participants.

Participants indicated through the second series of questions that the portal should pay attention to increase the sustainable use, the exploration and the production of energetic and non-energetic mineral resources in Europe. The averages are very close and respectively 4.60, 4.44 and 4.6. 7 to 11% of the participants expressed no opinion about these questions (figure 4.29).

4.7 Functionality of the portal

According to the participants group, the more classical searches by keywords and location are preferred over the use of wizards or the advanced functionality of formulating specific user-defined queries (e.g. SQL). The averages are respectively around 4.55, 4.59, 3.7 and 3.7 (figure 4.30). These preferences are emphasized by the 10% and 15% of the participants who don't have any opinion about search possibilities by wizards or query languages while this percentage is close to zero for searching by keywords or by location.

Concerning the possibilities for viewing data, the resulting averages express a preference for consultation of data on maps (4.6) and in tables (4.4), rather than as graphs (4.1) or by viewing the original document (4.2) (figure 4.31). The proportion of participants without opinion is for all options below 2%.

Downloading of data is considered as essential functionality, evidenced by a high average of around 4.7 (figure 4.32).

5 In depth analysis

In this section, several aspects of the study are presented more in detailed, such as the relations between the different topics, observations about the behaviour towards checklists and the analyses of the free text fields.

5.1 Checklist responses

The questionnaire included 3 different checklists regarding the data needs, the use of data and the possible combination with related data (questionnaire pages 2, 3 and 5). To understand how the participants used these checklists, the number of checkboxes selected by each participant for a question was counted.

For the data needs checklist, participants could select up to 8 different check boxes. The majority however limited their selection to one resource, but we observe a clear difference between public and private institutes. Indeed, the private institutes typically select one resource while public institutes indicate to be interested in a range of commodities (figure 5.1).
Also regarding the use of data (7 checkboxes), participants as a whole tend to make only one selection. However, this time it are the public institutes that typically make one selection, while the majority of the private institutes have indicated to use data for one to different purposes (figure 5.2).
Finally, for the checklist about the combination with related data, which holds up to 10 possible selections, the situation is completely different than for the data needs or the use of data checklists. Indeed, 50% of the participants have selected 4 to 6 additional data sources and almost 10% of the participants have chosen all the suggested propositions (figure 5.3). This pattern is most clear for public institutes, but seems equally true for the private sector.

Based on these observations, we can conclude that the participants used the checklist with care and proper consideration. This shows from the fact that they did not select an equal number (e.g. 3) of options for each question, but instead varied their number of answers in relation to the question and available answers. This is further underlined by the fact that the public and private groups show different selection behaviour for the first two questions.
A not completely surprising result is that the private institutes show a much more focussed interest in data (need of data) that public institutes. This relates to their core business, which is in this respect usually narrower in the private sector.
The opposite seems to be the case when it comes to the different contexts in which the data is applied (use of data). Here the private sector is clearly more diverse with an interest of up to 3 or 4 selections. Going back to figure 4.14, this seems to correspond to the shortlist of mineral policy, industrial planning, economic analysis and economic forecasting.
All user groups appear to expect a lot from combining the data from the EuroGeoSource portal with other data sources. This testifies that there is in general a high expectation for a tool that cross-links to other (INSPIRE compatible) data sources. The list of favourite data topics is summarized in figure 4.26.

5.2 Regional differences

The different participants countries may have different needs regarding the information about the natural resources depending on e.g. their national resources and extractive industry. In this section, a

comparison on the data needs of the 9 countries and the group of the international institutes is made to highlight regional or country specific differences.

Based on the main data needs for each country, it's possible to distinguish 3 clusters of participants (figure 5.4).

- Group 1 : Data interest dominated by energetic mineral resources

The Netherlands and the international institutions fall in this category, with 68 and 64% of the data interest concerning the energetic mineral resources. For the Netherlands this is not surprising, considering that the extractive industry in the Netherlands is almost exclusively focussed on oil and gas exploitation. The high interest for the energetic resources by the international institutions, on the other hand, can be explained by the composition of this group. From this group, 11 persons have answered to the questionnaire, of which 4 are working either within DG Energy or the Institute for energy of the Joint Research Centre (IE-JRC). Their high participation rate relates to their enthusiasm for the project and is due to an a-priori unbalance in the user group selection criteria.

The interest in this group for the other resources is relatively evenly spread with approximately 20% of the requests related to the non metallic mineral and 13% related to the metallic mineral resources (figure 5.5).

- Group 2 : data interests dominated by non metallic resources

4 countries present an important interest (average of 54%) for the non metallic resources. It concerns Estonia, Poland, Portugal and Belgium. The explanation of these results are not obvious. Indeed, multiple facts can explain this situation.

For instance, it could reflect the main industrial activity of the country. It's probably the fact for Belgium where the extractive industry is mainly focused on the non metallic resources. This argument is not enough to explain the situation for the three other countries which have a more diversified industrial activity. Further studies are request to be able to understand this behaviour and know if is a fact of the activity of the country or if is due to the constitution of the national participants list.

Regarding the other resources, 27% of the requests are related to the energetic mineral resources and 17% to the metallic mineral resources (figure 5.6).

- Group 3 : General data interests

Finally, the 4 others countries (Bulgaria, Hungary, Romania, Slovenia) have diverse interests, but they are mainly closer to the energetic pole and non metallic pole than to the metallic pole.

They all show a slightly increased interest in non-metallic mineral resources (around 40%), followed by an equal to lower interest in energetic or metallic mineral resources (between 25 and 40%) with Romania being most interested in metallic minerals while Slovenia and Hungary are on the energetic resources side (figure 5.7).

- European average

The European average lies within the range of group 3 but towards to the energetic and non metallic resources side.

This analyses reflects the difference of activity in those countries but not only. Indeed, the difference in the constitution of the participants' group of each country does certainly have an influence. In the framework of this study, it isn't possible to clearly identify the origin of the difference observed between the countries.

5.3 Difference relating to the status of the institutes

The participants' group is composed by different types of institute. As argued previously, we made a distinction between public institutes, private institutes, research institutes and NGO's. In this section, a more detailed analysis is presented about the differences and the similarities between the public and private institutes, which are the dominant groups, in terms of influence on the results. It should be kept in mind that 75% of the participants' group belongs to one of these two categories, and it is therefore important to consider both of them when determining the overall requirements of the potential users of the EuroGeoSource portal.

Regarding the data needs, we didn't observe an important difference with respect to the public or private status of the institutes. Indeed, the first needs, namely the construction minerals, industrial minerals as well as hydrocarbon, are important, for both groups.

Differences are more obvious between the public and the private institutes regarding the use of the data. Public institutes put data analysis in a context of government planning, education and mineral policy, while industrial planning and mineral policy followed by economic analysis are most important for the private institutes (figure 5.8). We assume, based on these results, that public institutes such as national ministries or European institutions would use the future EuroGeoSource portal as a decision or policy support tool for different issues. At the same time, private institutes may be expected to use the portal for industrial planning (including prospection or extraction) or for economic forecasting (e.g. investment planning).
Regarding the current source of the information, public and private institutes seem to revert to the same types of data sources. Indeed, they apparently use the same kind of data (internal data, public data,...) in more or less the same proportion. Regarding the format, the GIS system is not more used in the private institutes than in the public institutes (around 22%), compared to the other formats (analogue ~34%, digital ~44%) (figure 4.26). They also share the same opinion regarding the accessibility to the international data and the usefulness of a cross-border portal.

Some slight differences between the two groups are observed regarding the preferences for combining related data on the EuroGeoSource portal that seem to reflect the differences in the activities of public and private institutes. Geology and ecological data are important to both, but private institutes additionally indicate the importance of economic data.
Finally, regarding the scope of the portal and its functionality, public and private institutes seem to have the same expectations.

In summary, these two groups are different mainly by their use of data and their activity. Because both of this groups are in majority and have the same proportion, it's essential to consider both of them to meet the requirements of all users.

5.4 Free text fields analyses

Throughout the questionnaire, free text fields were included at the end of each page under the designation "comments and clarifications". About 10% of the participants used it to provide additional information about the choices they made or answers they provided. In this section, the content of these comments is considered.

On the first page, the text field has been used to clarify the status of the participants. Several participants that selected the "other" category from the status checklist provided more information in the text field information, which was essential for us to understand the activity of the participant in the project.

Regarding the data needs (page 2), some of the participants provided additional information through the free text field. These clarifications mainly concerned the use of the data which is actually the topic of the following page (page 3: use of data). Nevertheless, some participants gave some explanation about their choice. For instance, one participant suggested that it would have been useful to include depleted fields as these could be useful for gas storage issues.

On page 3, which is about the use of data and international data accessibility, the comments that were gathered are most important to understand the results obtained on the accessibility to international data. As presented on figure 4.23, the results are not straightforward because the average is close to the 'nor difficult-nor easy' rating. Without further context, it is difficult to explain this moderate reply when compared to the very high importance that is given to a cross-border portal (figure 4.24). The comments provide the necessary context to frame both results. Several participants indicate that accessibility to international data often depends of different factors. For instance, the accessibility seems to differ from one country to another. Sometimes, data exists but is in a digital format or does not allow to be combined because of the absence of a harmonized format. Some participants also mentioned a problem regarding the price of the commercial data. This leads to the conclusion that it is possible to access (with limited effort) international data, but that it is the (cross-border) harmonization and combination of this data that currently poses major problems.
On page 4 of the questionnaire, regarding the current source of data, some participants additionally mentioned some problems about the update of the data and its quality/validity. According to the participants, this information is often missing and hampers analysing it.

The comments on these two pages (3 and 4) clearly express that the EuroGeoSource portal is an opportunity for us to homogenize this information allowing to combine and analyse data at European level. This is confirmed by the opinion of the participants about the usefulness of this portal, presents on the figure 4.24.

Finally, the comments of the last pages mainly suggest other possibilities for combining data with the data on the EuroGeoSource portal. Some relevant comments stress to use the standard INSPIRE for the development of the project, which is in fact clearly embedded in the project.

The extracted information from the free text fields are in some cases highly relevant for the interpretation of the results. It allows us to provide explanations for some apparent contradictions that would be hypothetical at best without the free text comments.

5.5   Users expectations versus critical minerals and EU opportunities

When comparing the goals of the Raw Material Initiative (COM(2008)699 final/2) with the expectations expressed by the participants to the EuroGeoSource questionnaire, both consistencies and differences come forward.

The project EuroGeoSource addresses several issues that are equally emphasised in the Raw Material Initiative, such as on the relation between mineral resources and a knowledge base at EU level:
- *"The sustainable supply of raw materials based in the EU requires that the knowledge base of mineral deposits within the EU will be improved."*
- *"Encourage better networking between national geological surveys with the aim of increasing the EU's knowledge base"*

The importance of these two points is clearly mirrored by the importance that questionnaire participants attribute to a cross-border portal with information in a standardized format. Further support of the participants for especially the relation between sustainable supply and the need for an

advanced knowledge base is found in the high expectations that most potential users have of the EuroGeoSource portal as a means to increase production and exploration.

Also the importance of innovation that is highlighted by the Raw Materials Initiative should become embedded in the goals of the EuroGeoSource project:

- *"Promote skills and focused research on innovative exploration and extraction technologies, recycling, materials substitution and resource efficiency"*

It is noteworthy to see that public institutes indicate to use data on mineral resources for education purposes, and in particular at university and post-graduate level. It is possible that this is a direct effect of the European wide attention for the Raw Materials Initiative, and in particular for their recommendation to promote skills and innovation. The influence of the Raw Materials Initiative is however not the topic of the EuroGeoSource questionnaire, and can therefore not be properly judged for the information gathered.

Participants to the EuroGeoSource questionnaire see the future portal as an important means to increase the sustainable use of mineral resources. Also this is position is directly supported by the Raw Materials Initiative, which states for example that:

- *"Resource efficiency, recycling, substitution and the increased use of renewable raw materials should be promoted in view of easing the critical dependence of the EU on primary raw materials, reduce import dependency, and improve the environmental balance, as well as meeting industrial needs for raw materials."*

This overview shows that the EuroGeoSource portal will be a tool that may play an essential role in the application of some important points of the Raw Material Initiative. The preceding lists regard content and functionality of the portal that are at least to some degree also prioritised by its potential users. This means that the portal can on these points be designed to fulfil both the needs or expectations of its potential users, and at the same time remain in line with the recommendations of the Raw Materials Initiative.

However, on some points clear differences can be observed. The most obvious example of this can be found in the priority for data needs. The users indicate to have very little need for data regarding metallic minerals and ores that are not mined in the EU. At first sight this seems logic, and also the majority of the questionnaire participants probably consider that the only potential sources for these elements are located outside the EU, which indeed makes interest rather academic. However, for several of the critical materials in the non-EU list such as Rare Earth Elements (REE), significant potential exists within Europe even if they are currently not exploited.

This identifies an additional field of application for the EuroGeoSource portal, since it can actively aid by attracting attention to potentially strategic, but poorly known resources in Europe. Low awareness is in this case inferred from the low importance that is attributed by the participants to resources that may become of high interest in the mid-term future

5.6 Correlation of data series

In order to understand the underlying reasons for the answers given, correlations were evaluated between a few relevant questions.

Two basic techniques were used, the first being based on standard correlation coefficients, and the second on counting identical responses.

For those questions where the answer was a rating from 1 to 5, both techniques were applied and compared, while for comparing the results of checkbox lists (selected or not selected), only the counting techniques can be used. Each of these techniques has its own strengths. The discussion

between both techniques is kept general, and in the sections below only the relevant and reliable approaches are shown.

5.6.1 Techniques for expressing degrees of correlation

Correlations coefficients should be used with care for identifying relations between short and discrete series of numbers, such as is the case for the answers to this questionnaire. Counting techniques are more robust and transparent, but less standardised and less sensitive. Both techniques were therefore used side by side during the analysis of the results and only the results that are corroborated by both techniques are discussed, even where this is not explicitly mentioned. A variety of counting techniques can be defined of which the two variants discussed below were used. For double checking correlation coefficients of answers that were rated on a scale of 1 to 5, the number of answers was counted for which an identical answer was provided. This count was then normalised to the total number of answers to obtain a fraction. This method works well for comparing answers between series for which the average values are more or less equal, as is the case for the questions analysed here (see e.g. §**Error! Reference source not found.**).

The similarity by which two checkbox lists were answered is defined as the number of times that selections in both lists were checked by a user. This number is normalised to number of selections of the least checked question. With this definition, the correspondence is 100% when all of the selections of one list also made in the other list, even if the other list contains additional selections. This approach generally works well for longer checklist, such as those included in the EuroGeoSource questionnaire.

5.6.2 Data needs versus use of data

The relation between data needs and the use of data was analysed in light of the following question:
Is the use of data linked to the interest in a particular resource?

In order to address this, the answers of the participants were grouped according to their selection of data needs, which was generalised to energetic minerals or non-energetic minerals (metallic and non-metallic mineral resources were grouped after careful evaluation). Only answers from participants could be used that limited their selection to one of these groups, this in order to reliably verify their relation with the use of data. The group working on energetic mineral resources (group 1) is 36 participants large, while the non-energetic mineral group (group 2) counts 59 participants. Both groups show a sufficient balance between public and private institutes.

Energetic interests group indicates to use the data primordially in a context of industrial planning and economic issues (analysis and forecasting). On the other hand, the non energetic interests group mainly addresses issues in the industrial planning area, economic analyses area, mineral policy area (figure 5.9) .

This question has been also addressed using the counting technique. It confirms that the energetic mineral resources data will be use specifically in the economic forecasting area while the non energetic mineral resources data will be mainly used in the mineral policy and land use planning areas. Additionally, this study reveals that the industrial planning issues as well as economic analyses issues seem to be common uses of the energetic and the non energetic resources data (table 5.1).

This analyses highlights the link between the data about the mineral resources and the related data which will be provided by the EuroGeoSource portal. To ensure the coherence of the portal, it is important to identify the areas of application of the different data. This means that if we provide information about a resource, we also have to provide specific secondary information with which it is possible to address the particular issues linked to the resource.

5.6.3   *Scope of the portal*

In the same way as in the previous point, we wanted to address the potential connection between the participants' answers to the questions about the scope of the portal (see § 4.6).

It could be useful to know if, according to the participants, particular issues are linked or not. For instance, the people who think that the portal should allow to address issues of socio-economic planning, do they systematically think that the portal should also pay attention to increase the sustainable use of mineral resources, or another specific point?

To understand how these issues are interdependent according the participants opinion, we calculated the correlation factor between each questions results (table 5.2).

According to this analysis, the only highlighted correlation concerns the increasing of exploration and production of mineral resources in Europe. Nevertheless, the correlation coefficient is relatively low.

As the answers to these 6 questions are pretty high for a large part of the participants (see figure 4.28 and 4.29), no correlation is highlighting.

6 Conclusions on the users' profile

The first goal of work package 2 is to map the main requirements for different users across Europe regarding the content and the functionality of the EuroGeoSource portal. An on-line questionnaire was used to identify the potential users, the way they currently use and access data, and their expectations regarding the future EuroGeoSource portal. In total, 187 persons from nine different European countries and European institutes have participated to this questionnaire between September and November 2010.

The most important conclusions regarding the users' expectations are summarized below. One finding to keep in mind is that the expectations vary in a rather important way according to the profile of the user, and in particular the status of his institute. Public institutes represent 37% of the participants and private institutes 34%, and these are therefore the dominant groups to consider when designing the EuroGeoSource portal.

6.1 Content

The participants to the EuroGeoSource questionnaire have clearly indicated that the EuroGeoSource portal can provide an answer to an existing need of data accessibility. This is confirmed by their opinion about the access to international data and about the usefulness of a cross-border portal (see §4.3.3).

- *The data needs*

The most important point is that the users are interested by many different kind of resources. Even if we observe a significant difference of percentage between energetic minerals, non metallic and metallic minerals, the difference is not so important and the percentages are still high. Indeed, at European level, 49% of the participants are interest by the energetic resources, 41% by the non metallic mineral resources and 30% by the metallic mineral resources.

At more detailed level, the first interest concerns the construction minerals (61%) following by the hydrocarbon resources (49%) and at a similar level, the industrial minerals and the solid/fossil energetic minerals (48%). Although the metallic mineral resources are not at the first level of interest, there is a high demand around it, mainly those mined in EU (37%).
The majority of the participants has been interested at a general way. Indeed, only 20% of them refined their selection, choosing a specific minerals in the proposed lists.

Finally, more than 80% of the participants are interested by the reserves and potential and by actual extraction sites. Nevertheless, we also observe a relatively high interest regarding the depleted fields (40%).

- *Related data*

To address the main use of the data provided by the portal, the participants expect the possibility to combine these data with other related data. Thus, one of the mission of the project will be to build a portal according to some international standard in order to make available this kind of combination. The main combination expected concern the geology, the ecological data, the basic geography, the land-use and the economic data.

6.2 Use of the portal

The main use of the data provided by the portal will concern many area, different for public and private institutes.

Indeed, according the private institutes, this data will be use in the industrial planning area, mineral policy area and economic issues (analyses and forecasting). On the other hand, the public institutes will use the data of the portal for the government planning issues and in the education area.

6.3 Scope of the portal <not done>

This portal should be able to address different kind of issues about the socio-economic planning, the crisis management and the security of supply.

Participants also think that the portal should pay attention to increase the sustainable use, the exploration and production of energetic and non energetic mineral resources in Europe.

6.4 Functionality of the portal

According to the majority of the participants (80%), the most important search options are through keywords or a geographic interface (search by geographic location). Data is expected to be presented on maps, but also tables and graphs are found important, as the access to the original documents. Downloading data from the search results is also considered to be a clear requirement of the future portal.

6.5 Representativeness of the questionnaire results

Answers from the questionnaire were obtained from 9 countries and international institutes. The countries are geographically spread across Europe in a well balanced way. In combination with the total number of replies (187), the care with which the answers were provided (see e.g. §**Error! Reference source not found.**) and the near equal participation of public and private institutes, the results of this questionnaire can be considered as representative for the countries involved in the project and provide first insights to the data needs at pan-European level.

This nevertheless needs to be done with proper care. The analysis of data needs shows that significant differences exist between the priorities on data needs between different countries. The quantity of results is insufficient to map these out in detail, and it is therefore difficult to extrapolate the results to countries that have not participated in the questionnaire. A few of the participating countries are also insufficiently represented which makes it additionally difficult to detail the results to the national level. Nonetheless, the result based on the questionnaire in general reliably reflect the needs of the potential users of the EuroGeoSource portal and is as such an important guide for the further development.

7   Cross-workpackage recommendations

The EuroGeoSource questionnaire was designed to map the existing needs of its potential user in relation to the way they currently handle and access similar data. Important lessons can be directly or indirectly inferred from this information, and these are formulated below as recommendations that should be taken into account when designing the EuroGeoSource portal. The scope of the questionnaire exceeds the practical possibilities of the first three years of the EuroGeoSource projects. The recommendations are therefore categorized as first-line recommendations, accessory recommendations and recommendations for post-project development.

It needs to be stressed that all recommendations are directly and solely based on the outcome of WP2, and have an advisory and strictly non-binding status. Their value will be to guide the developments in workpackages 4, 5 and 6 (see §1.3) by providing a concrete background of user expectations during the technical discussions, but it are those discussions that will decide on the final shape of the EuroGeoSource portal.

7.1   First-line recommendations

1. Following this study, the main potential users will be public and private institutes. They constitute more or less 75% of the participants, and the portal should therefore at least serve these two groups. Due to the low participation of the other type of institutes (NGO's, research institutes…) clear conclusions about their expectations aren't obvious.

2. Regarding the content of the portal, all kind of resources are fond important (energetic, non metallic and metallic mineral resources) with a specific interest for the construction minerals, the hydrocarbons, industrial minerals and solid/fossil mineral resources. We therefore recommend to give special attention to these resources.
We also suggest to consider with care the resources related to the RMI, namely the critical minerals, especially for those the lack of interest from the main part of the participants seems to stem from a lack of information on potentially interesting resource groups.

3. We recommend to pay attention to the coherence between the data on resources and the choice of related (e.g. environmental) data provided by the portal. It is important to identify natural links between information on resources and their context to provide the adequate related data. Such combinations are also in line with the overall Inspire objectives.

4. The EuroGeoSource portal will be used for many purposes. Therefore, the portal should propose a possibility of combination with the following related data: geology, the ecological data, the basic geography and the land-use. We recommend to use the already existing portals related to this data (e.g. OneGeology Europe, Natura 2000 viewer EEA, Corine land Cover 2000...).

5. The EuroGeoSource portal should be able to encourage increasing sustainable use, exploration and production of mineral resources in Europe. By this way, the portal could become a valued tool for the application of the RMI at European level.

6. Users expect this portal to work with a map viewer, as there is a clear preference for a GIS interface with consultation of the data through keywords and geographical location. Additionally, the possibility of viewing data as tables, as graphs but also in the original documents has to be considered.

Finally, the possibility of downloading the data from the search results should also be one of the options of the portal.

The participants proposed some similar portal with an approach they found useful and relevant for the EuroGeoSource portal (available in annex 5).

7. We recommend that each partner keeps contact with 2 or 3 VIP users representative of the public and private institutes of a country. The partners will use these contacts in order to evaluate the design concepts of the future portal which will be defined in the course of the workpackages 5 and 6. By this way, the project team ensures that the portal will be designed to meet the needs of its different users in the most optimal way.

7.2 Accessory recommendations

1. We recommend to provided all resource data (as much as possible) in sufficient details since private institutes generally focus on one specific resource. Therefore, some of them won't find the portal useful unless their resource group isn't sufficiently or specifically addressed.

2. Participants also expect to be able to address on this portal issues about socio-economic planning, crisis management and security of supply. Nevertheless, the participants manifested a lower interest regarding these questions, comparing to the others issues (see §7.1.2).

3. Even if differences in expectation regarding data needs are observed by country, the international context has priority over differences at national level. The European average shows no specific, but on the contrary a balanced interest in energetic, non-metallic and metallic mineral resources. The same goes for 4 out of 9 countries. It is therefore important to give similar attention to the three data topics on the EuroGeoSource portal.

7.3 Post-project development recommendations

1. In the future, include information about the geothermal energy in Europe could be an asset for the portal. A significant part of the participants mention their interest for this option.

2. This portal could also include information on depleted fields or related structures in order to address natural gas storage issues.

3. During further development of the EuroGeoSource portal towards a truly pan-European context, differences of data needs between different countries or clusters of countries may become important. If this is the case, then an in-depth survey is required to confirm and detail the differences that were found in the present study.

8   Figures – diagram's

Figure3.1 – Screenshot of the page 3 (use of data) of the EuroGeoSource questionnaire. In blue, the help button functionality. By clicking on the help button, the Help text appeared. In red, the different option of answer are presented. The checklist option (the detailed list appears, when the general use is selected, to allow the participant to refine his selection), the evaluation scale option and the free text option.
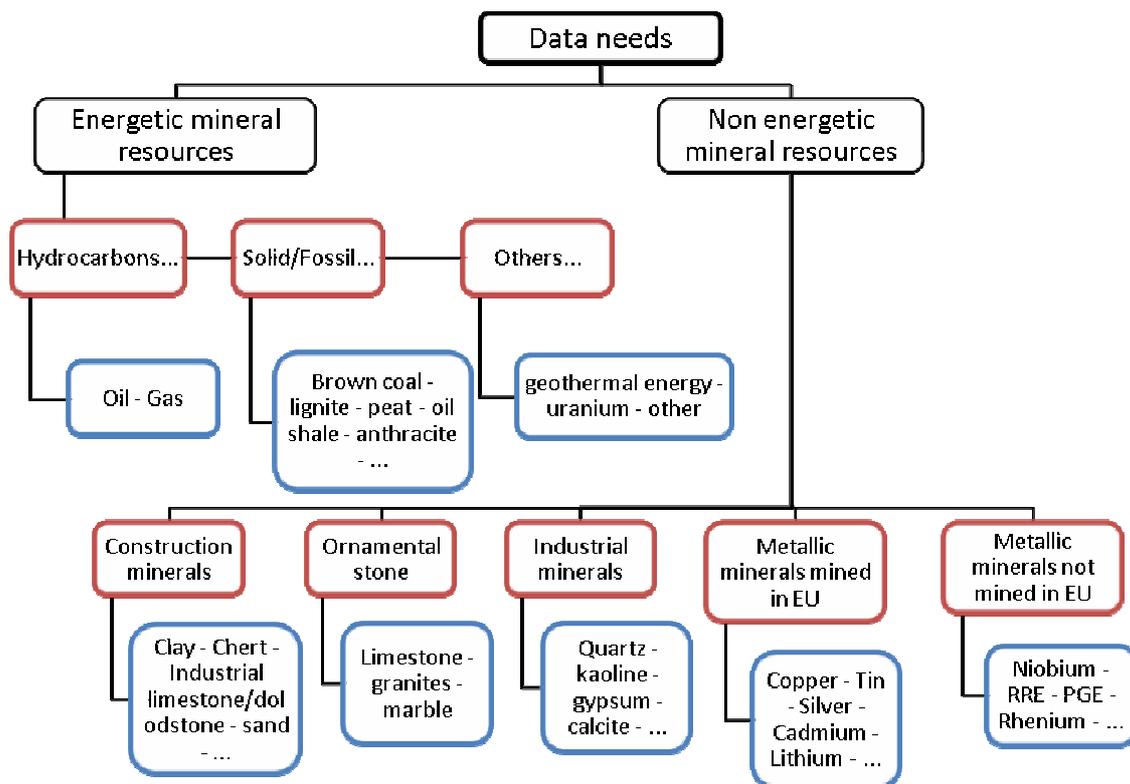
Figure 3.2 – Structure of the data needs check list. The red squares is the first level of choice. If it is selected, participants are invited to refine their selection using the appearing lists (in the blue squares). Just an overview is presented. The completed list is available in annex 2).
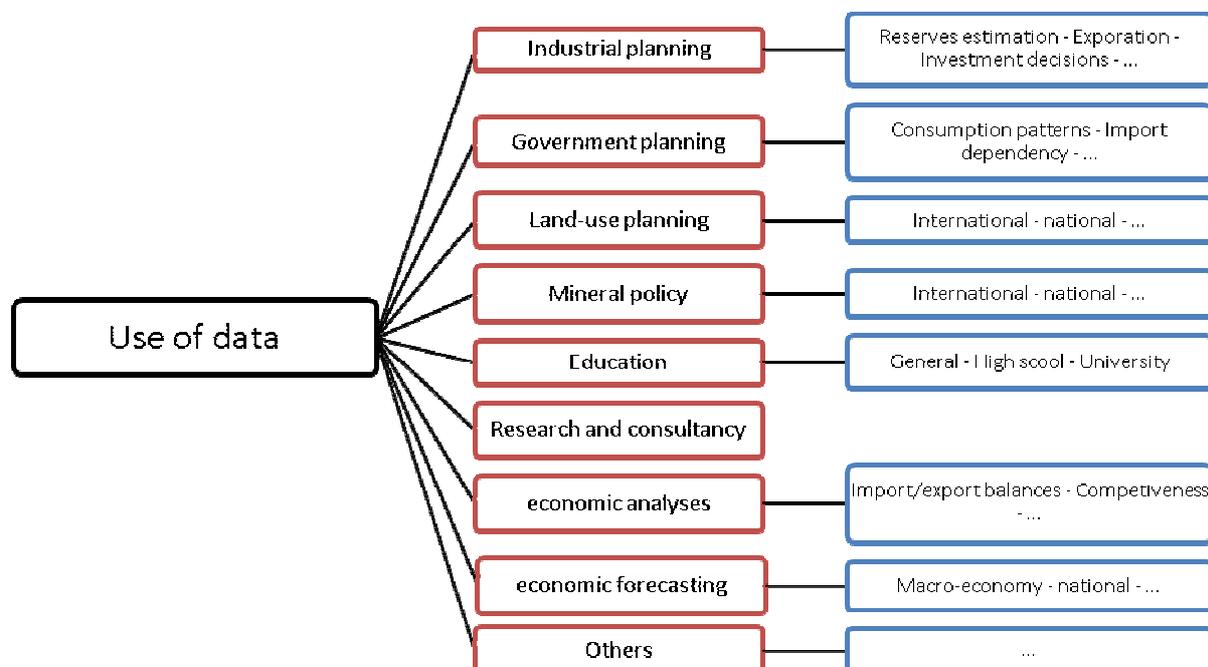
Figure 3.3 – Structure of the use of data check list. The first level of choice is in red. Participants refined their choice using the blue squares (here, just an overview. The completed list is available in annex 3).
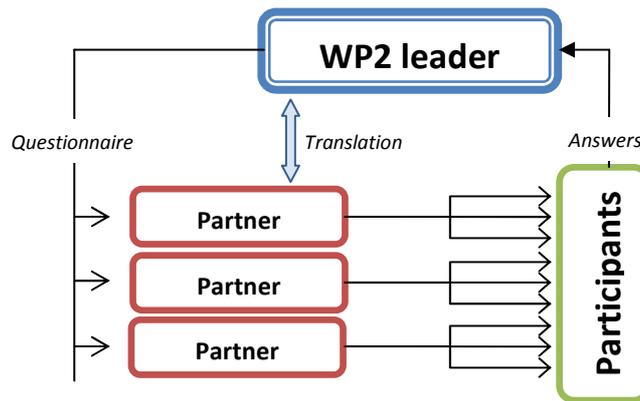
Figure 3.4 – Organisation at European level of the dissemination of the EuroGeoSource questionnaire. WP2 leader produce for each partner the access codes. The distribution of it to the participants was made by each partner, at national scale. WP2 leader received the answers and transferred it to the partners if a translation was necessary.
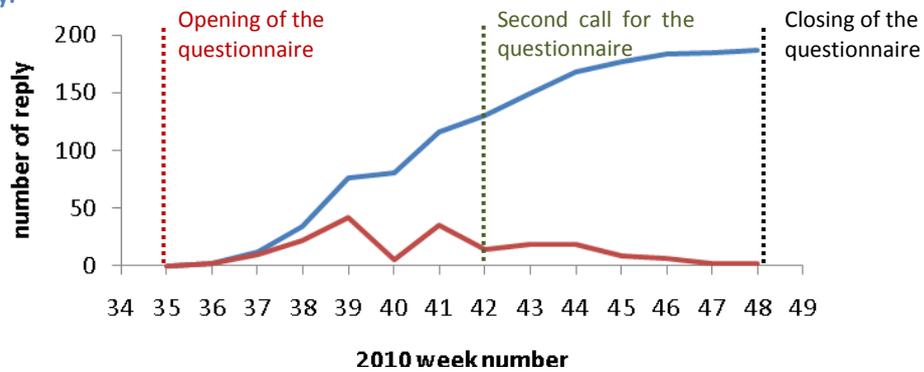
Figure 3.5 – Number of replies received per week (in red) between the 1th September (week 35) and the end of November (week 48). The Blue curve is the cumulated result.
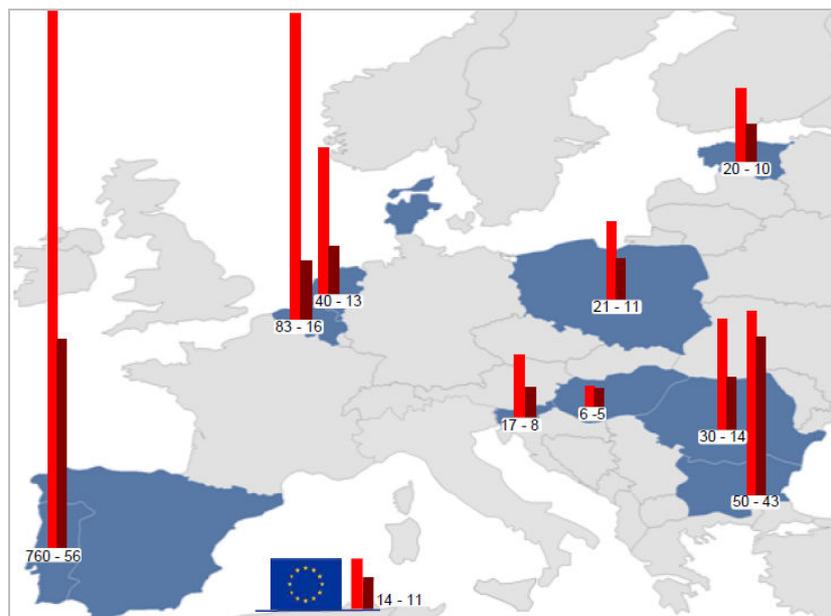
Figure 4.1 – Amount of questionnaire sent out (light red) comparing to the number of answers (dark red), for each country and international participants. The exact number are indicated below the bars.
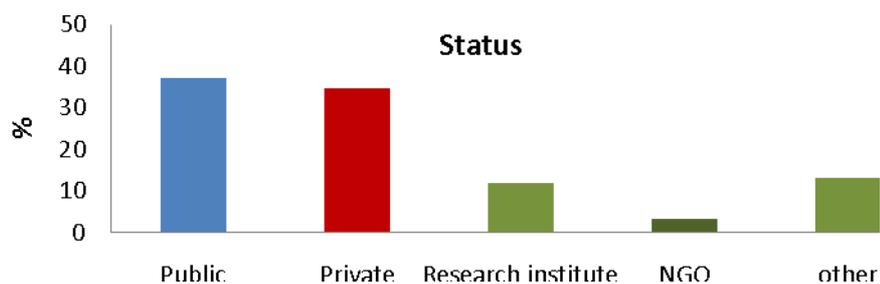
Figure 4.2 – Representation (%) of each institutes (public, private, research, NGO and other) in the participants' group (n=187).
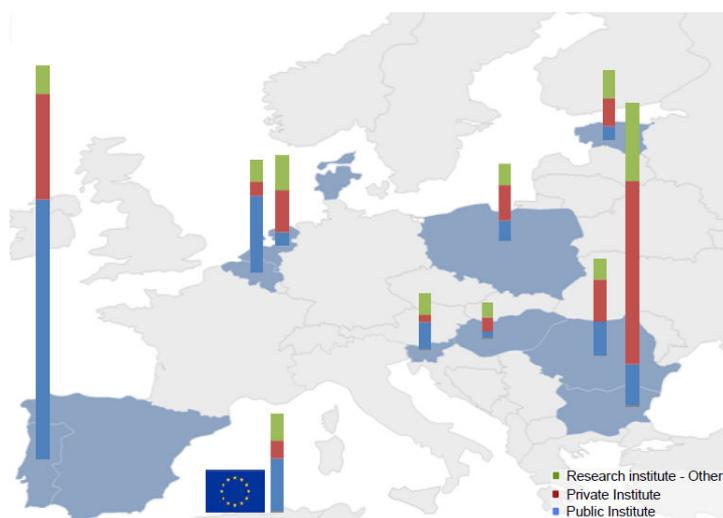
Figure 4.3 - Participation level of each kind of institutes (Public, Private, Research/Other), for each country and international participants. The height of the bars indicates the relative representation of the countries.
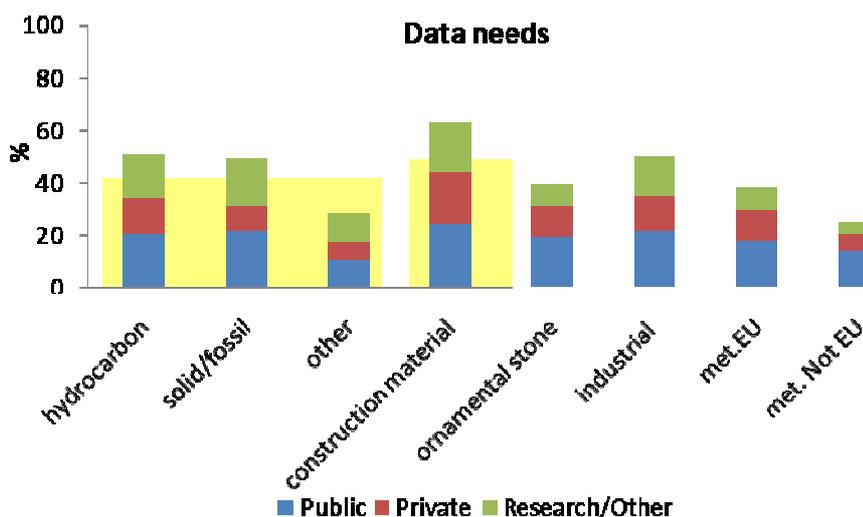
Figure 4.4 – Percentage of the participants at European scale, who selected the indicated data needs. The yellow boxes represent the average percentage of participants who selected the energetic mineral resources (right), the non metallic minerals resources (middle) and the metallic minerals resources (left). The small boxes represent the percentage of the participants who are interested by a specific resources and the different colours, the part of each kind of institute (public, private, research and other).
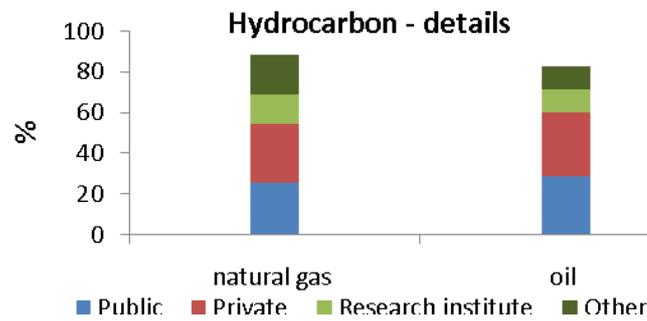
Figure 4.5 – Detailed selection, at European level, for the hydrocarbon resources (n=35). The different colours indicate the part of each kind of institute.
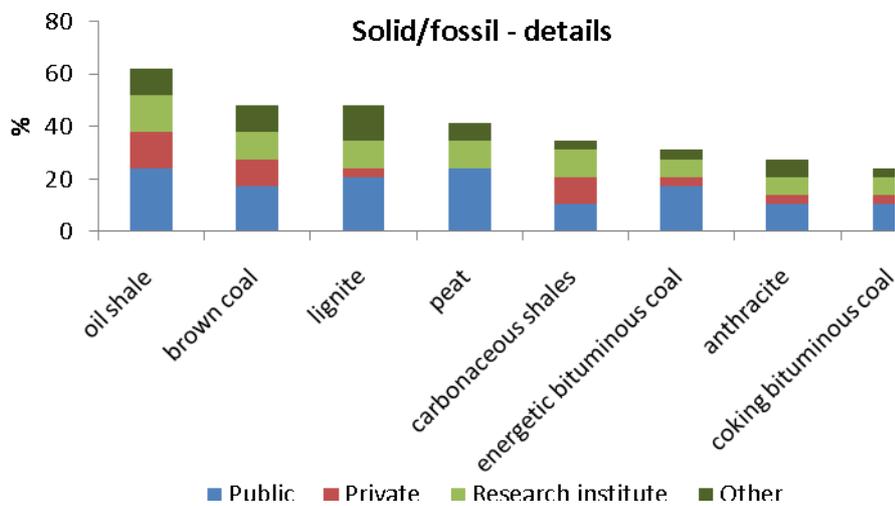
Figure 4.6 – Detailed selection, at European level, for the solid/fossil resources (n=29). The different colours indicate the part of each kind of institute.
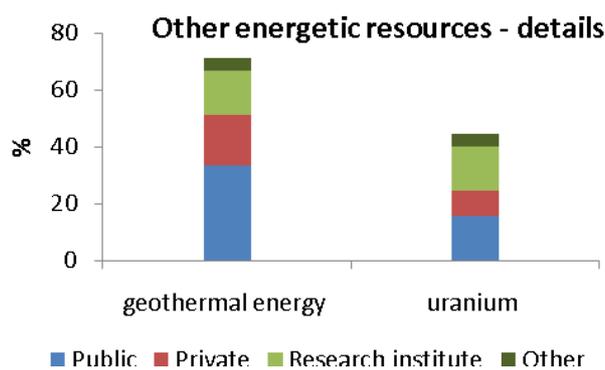
Figure 4.7 – Detailed selection, at European level, for "other energetic resources" (n=45) The different colours indicate the part of each kind of institute.
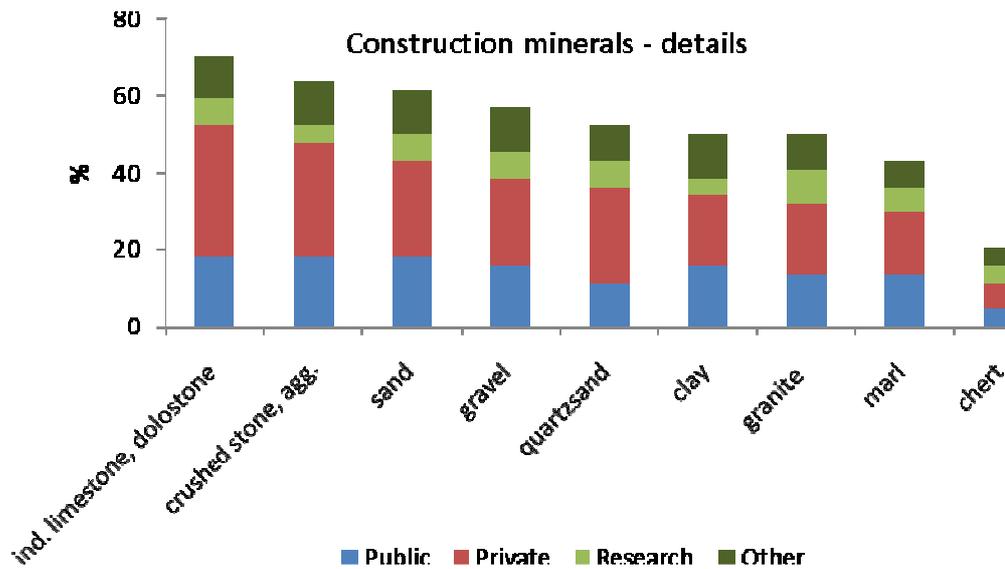
Figure 4.8 – Detailed selection, at European level, for the construction mineral resources (n=44). The different colours indicate the part of each kind of institute.
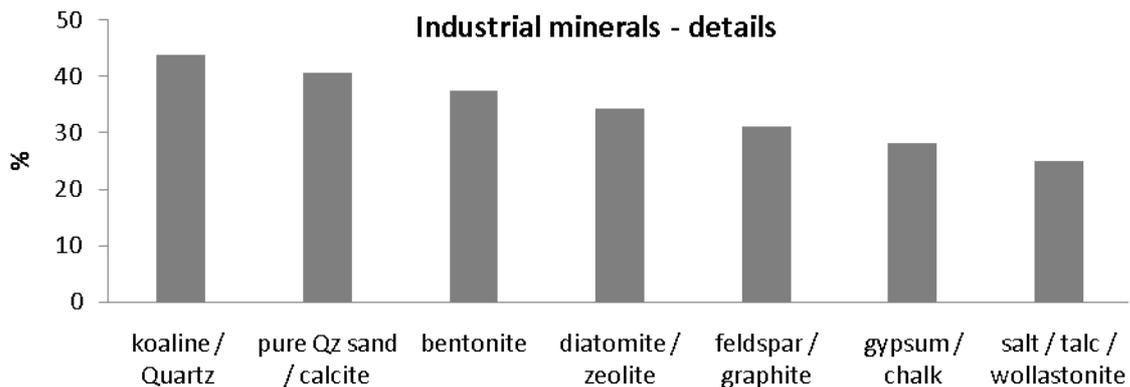
Figure 4.9 – Detailed selection, at European level, for the industrial mineral resources, for all participants. (n=32). The different colours indicate the part of each kind of institute. The minerals with the same % of selection are grouped (e.g. kaoline and quartz have been selected equally)
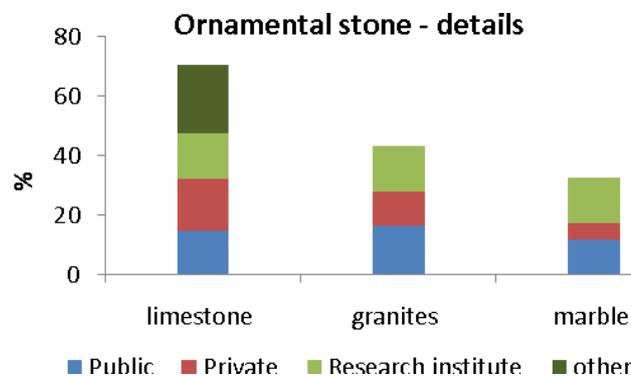
Figure 4.10 – Detailed selection, at European level, for the ornamental stones (n=23). The different colours indicate the part of each kind of institute.
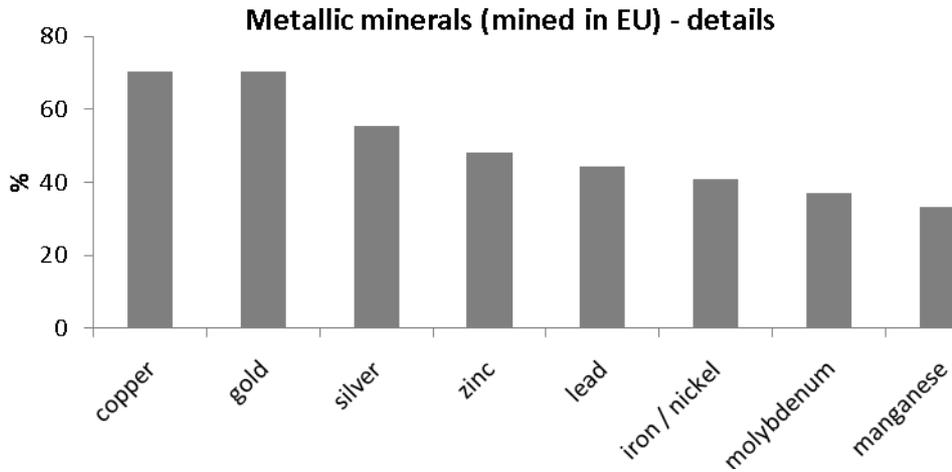
Figure 4.11 – Detailed selection, at European level, for the metallic minerals mined in Europe (n= 27). Iron and nickel have been selected equally.
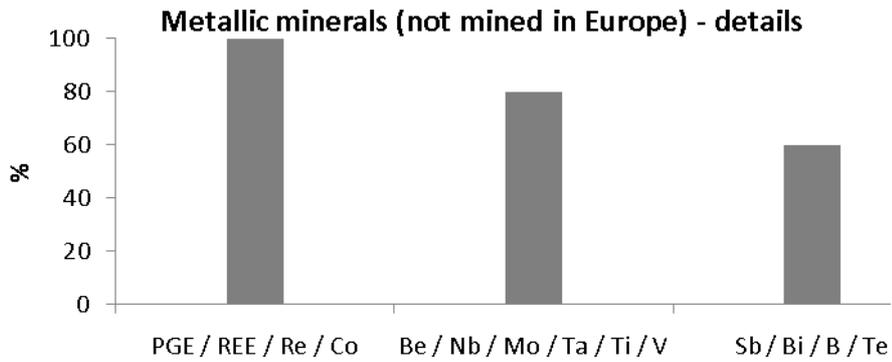
Figure 4.12 – Detailed selection, at European level, for the metallic minerals not mined in Europe (n=5). The minerals with the same % of selection are grouped (e.g. Platinum group, rare earth elements, rhenium and cobalt have been selected equally)
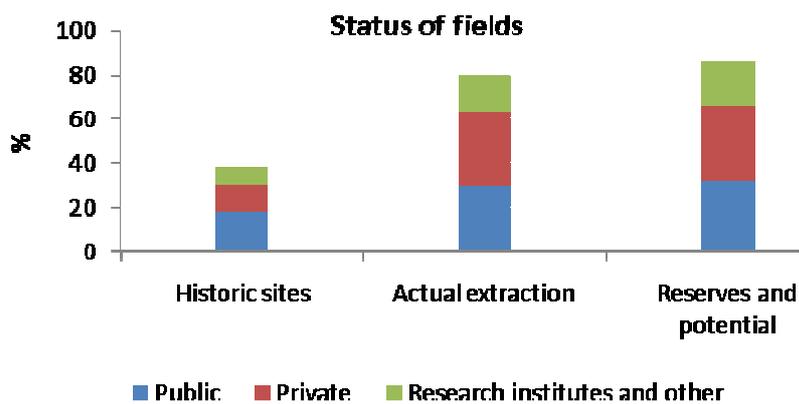
Figure 4.13 - Selection, at European level, regarding the status of field (n=187). The different colours indicate the part of each kind of institute.
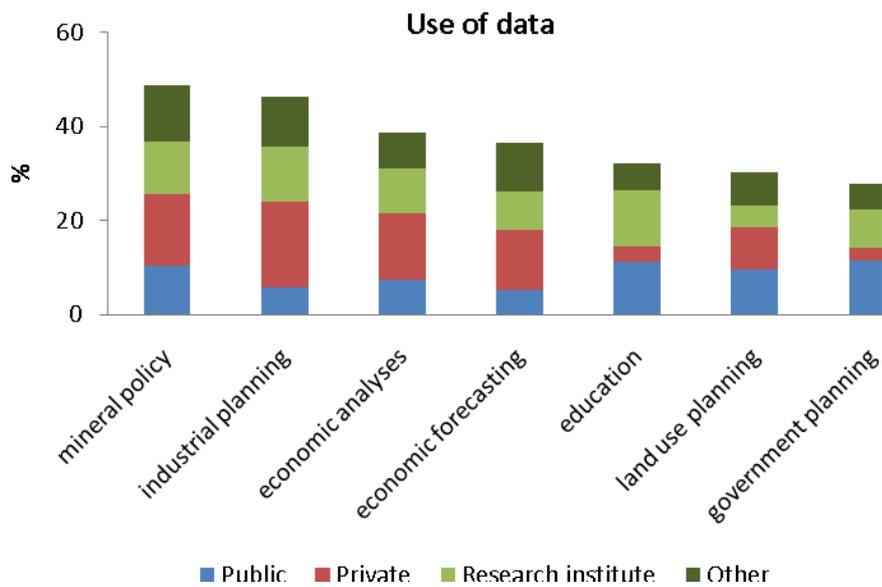
Figure 4.14 – Percentage of participants, at European scale, who has selected the indicated use of data (n=187). The different colours indicate the part of each kind of institute (Public, Private, Research, Other).
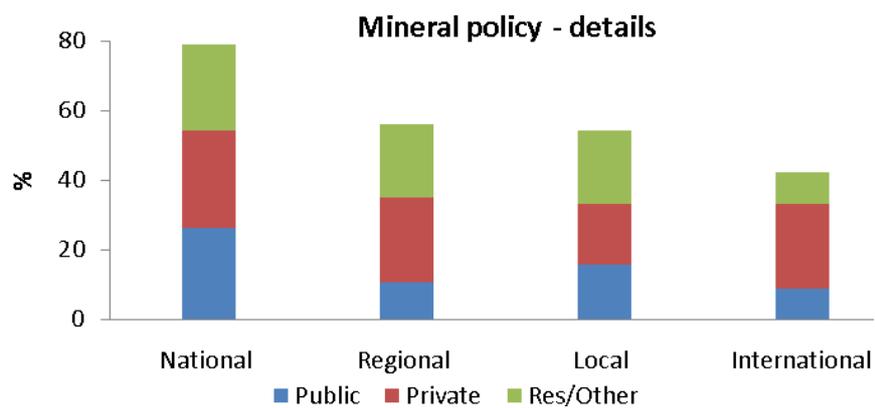
Figure 4.15 – Detailed selection, at European scale, for the use of data in the mineral policy area (n=58). The different colours indicate the part of each kind of institute.
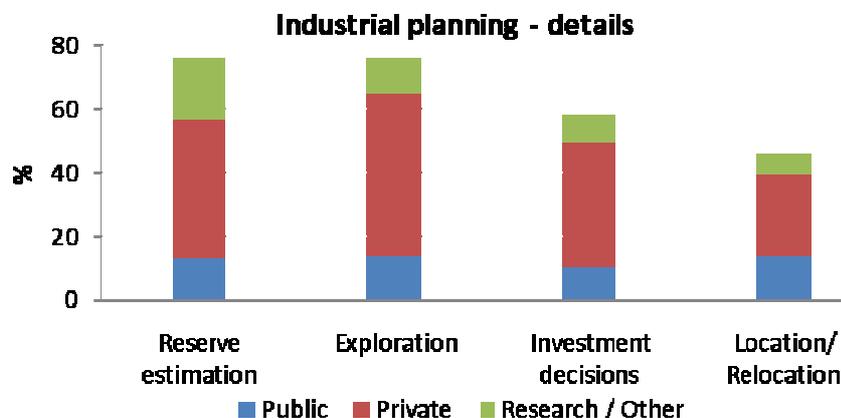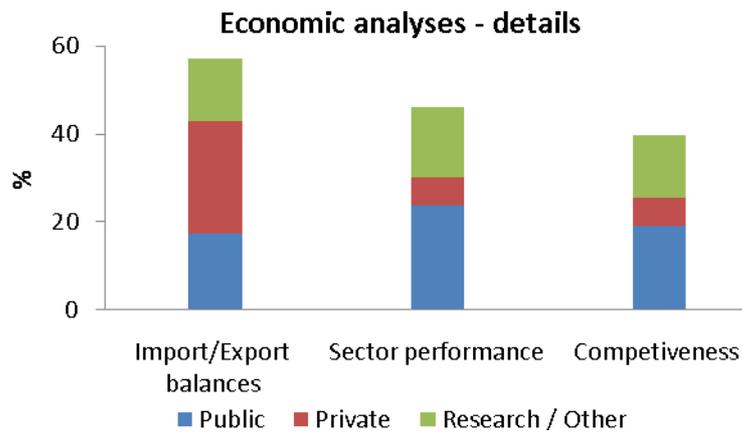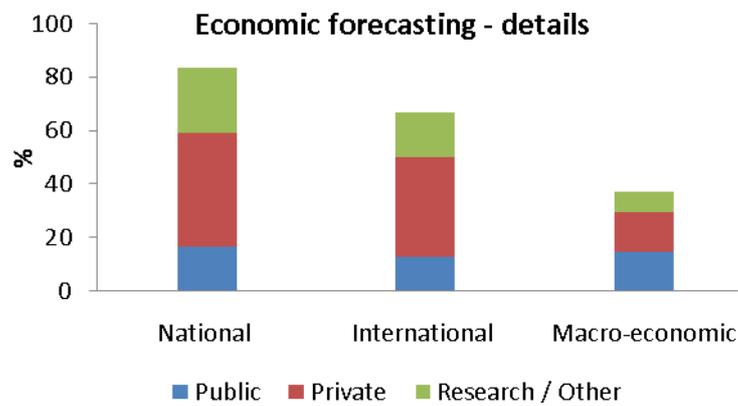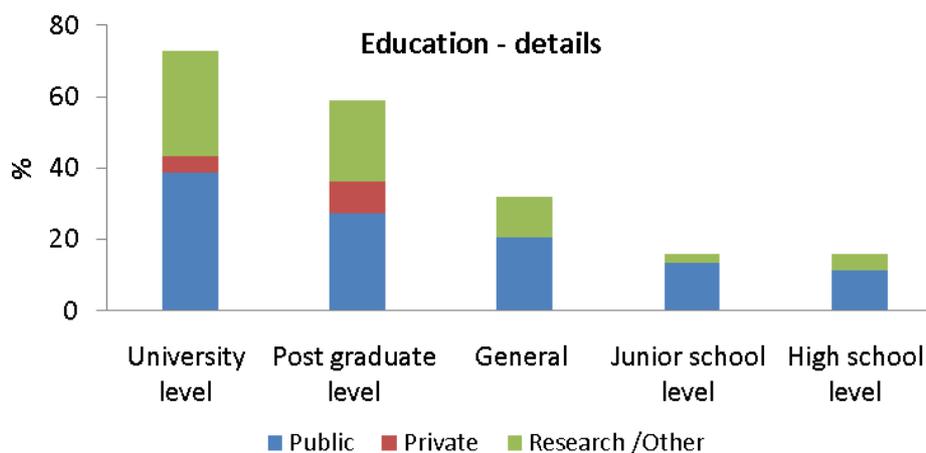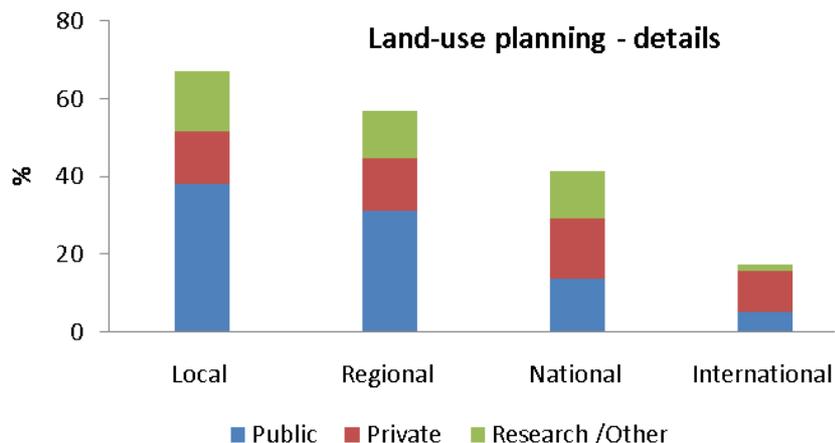

Figure 4.16 – Detailed selection, at European scale, for the use the data in the industrial planning area (n=79) The different colours indicate the part of each kind of institute.

Economic analyses - details

Import/Export balances · Sector performance · Competiveness

■ Public ■ Private ■ Research / Other

Figure 4.17 – Detailed selection, at European scale, for the use of data in the economic analyses area (n=63) The different colours indicate the part of each kind of institute.

Economic forecasting - details

National · International · Macro-economic

■ Public ■ Private ■ Research / Other

Figure 4.18 – Detailed selection, at European scale, for the use of data in the economic forecasting area (n=54). The different colours indicate the part of each kind of institute.

Education - details

University level · Post graduate level · General · Junior school level · High school level

■ Public ■ Private ■ Research /Other

Figure 4.19 – Detailed selection, at European scale, for the use of data in education area (n=44). The different colours indicate the part of each kind of institute.

Figure 4.20 – Detailed selection, at European scale, for the use of data in the land-use planning area (n=59). The different colours indicate the part of each kind of institute.
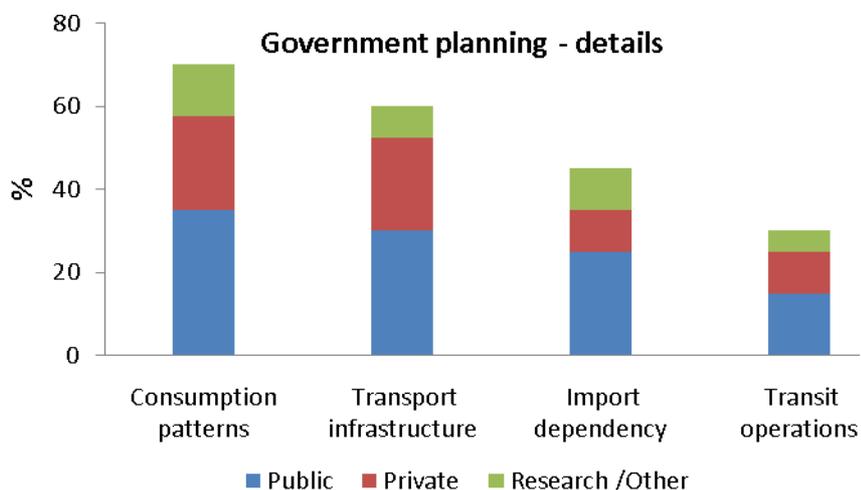

Figure 4.21 - Detailed selection, at European scale, for the data use in the government planning area (n=41). The different colours indicate the part of each kind of institute.
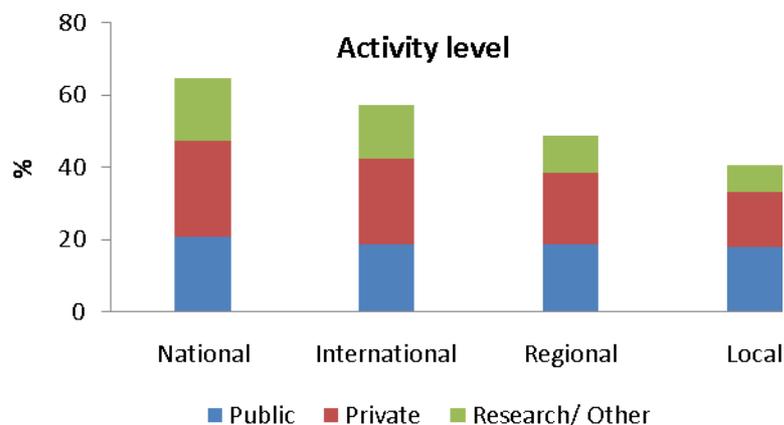

Figure 4.22 – Percentage of the participants, at European scale, who are active at the national, international, regional and local level (n=187). The different colours indicate the part of each kind of institute.
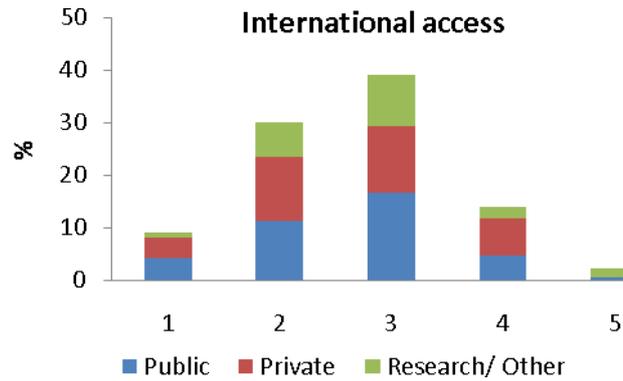
Figure 4.23 – Percentage of the participants, at European level, who selected 1 to 5 to answer to the question "Access to international data is very difficult or very easy?" 1=very difficult, 5=very easy (n=187, average=2.7). The different colours indicate the part of each kind of institute.
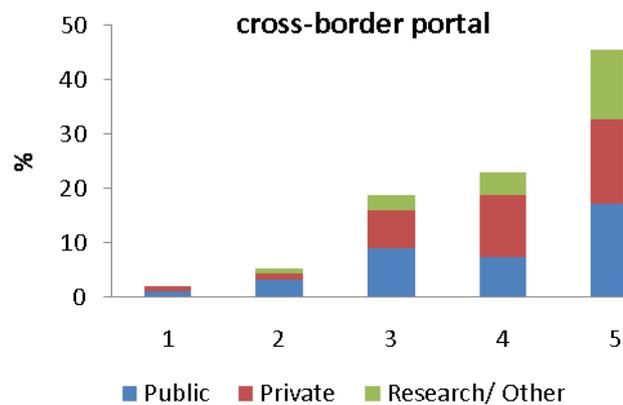

Figure 4.24 - Percentage of the participants, at European level, who selected 1 to 5 to answer to the question "A cross-border portal is of no value or very useful?" 1=of no value, 5=very useful (n=187, average=4.1). The different colours indicate the part of each kind of institute.
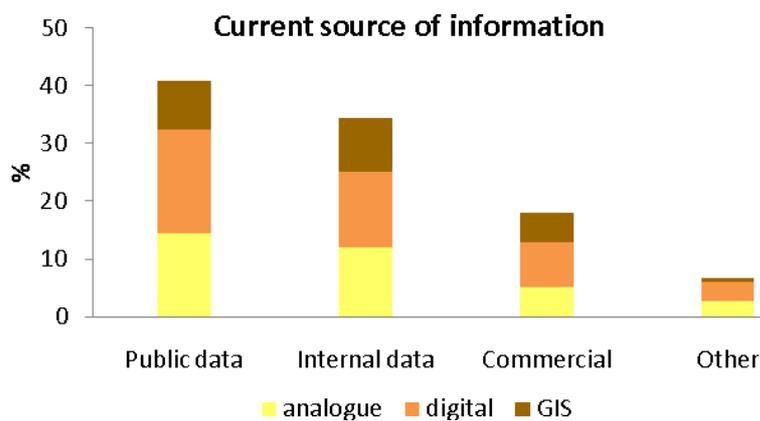

Figure 4.25 - Percentage of participants, at European scale, who used the following kind of data (Public, internal, commercial or other) as current source of information (n=187). The different colours indicate the part of each format of data.
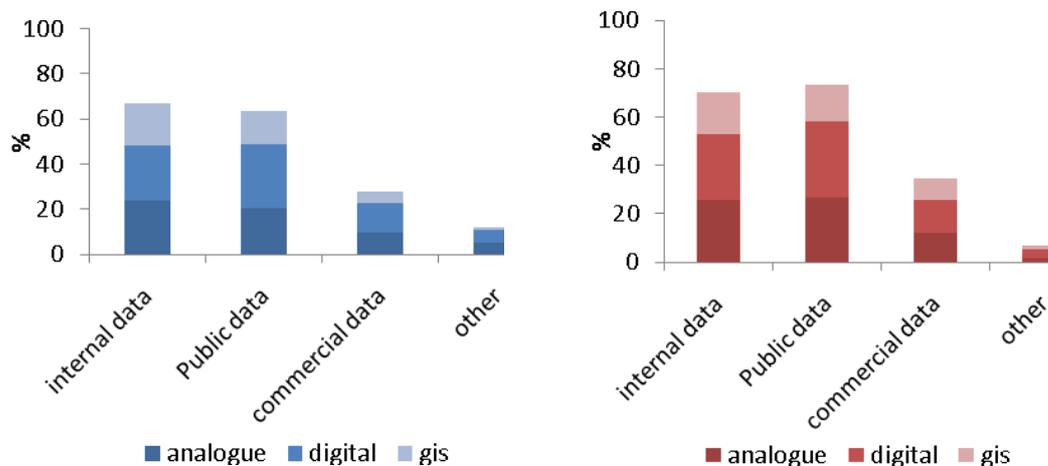
Figure 4.26 - Percentage of participants, at European scale, who used the following kind of data (Public, internal, commercial or other) as current source of information (in blue for the public institutes, in red for the private institutes). The level of the colour intensity indicate the format of the data.
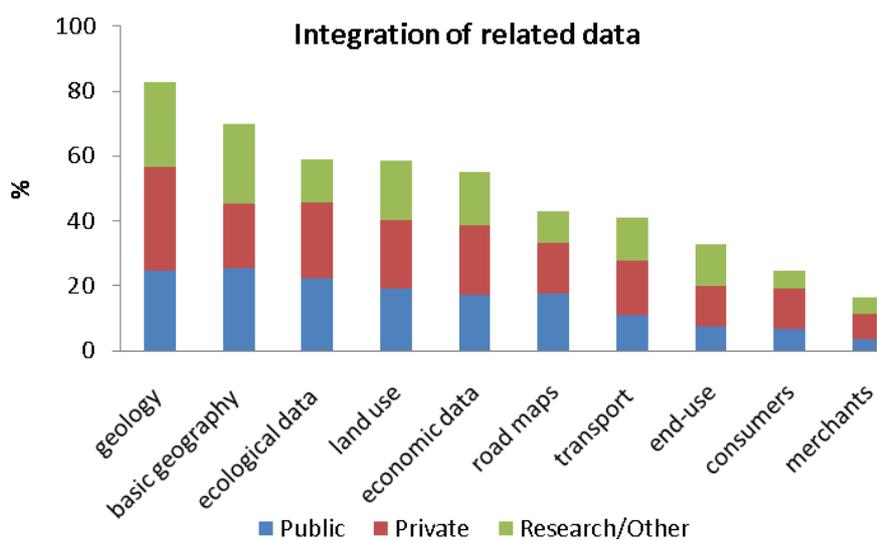

Figure 4.27 - Percentage of participants, at European level, who selected the indicated data for which they expect a possibility of combination with the data from the EuroGeoSource portal (n=187). The different colours indicate the part of each kind of institute.
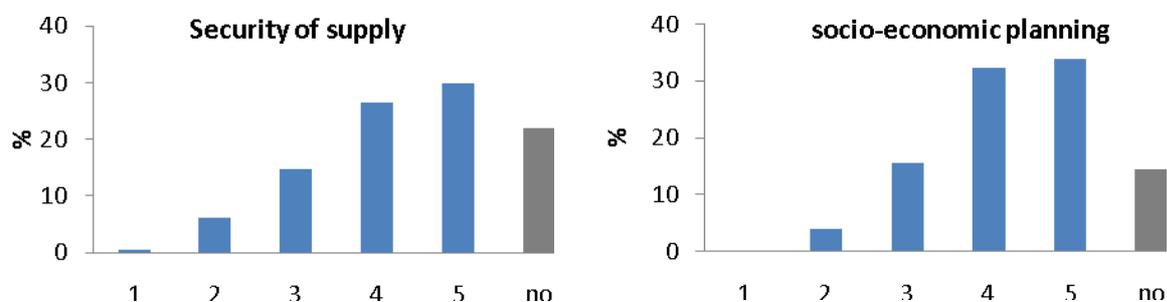
Figure 4.28 - Percentage of participants at European level who selected 1 to 5 to answer to the question :"The EuroGeoSource portal should allow to address: issues of security of supply, issues of socio-economic planning, crisis management" 1 = completely disagree, 5= completely agree, "no" means no opinion. (n=181). The average are 4.01 for the security of supply, 4.12 for the socio-economic planning and 4.07 for the crisis-managment.
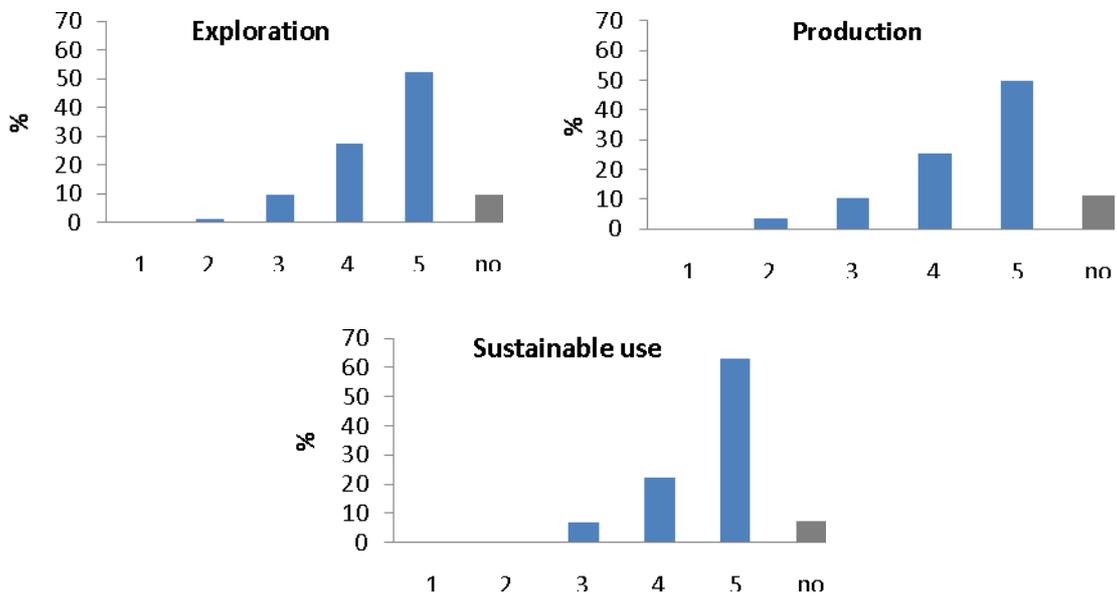

Figure 4.29 - Percentage of participants at European level who selected 1 to 5 to answer to the question :"The EuroGeoSource portal should pay attention to increase: the exploration, the production and the sustainable use of mineral resources in Europe". 1 = completely disagree, 5= completely agree, "no" means no opinion. (n=180). The average are 4.44 for the exploration, 4.36 for the production and 4.60 for the sustainable use.

Figure 4.30 - Percentage of participants at European level who selected 1 to 5 to answer to the following question :"When consulting data on the EuroGeoSource portal, I would like to search the data: by location, by keywords, using a wizards, by performing specific request (e.g. with a SQL language)". 1 = not important, 5= very important, "no" means no opinion. (n=180). Averages are indicated by the red lines.
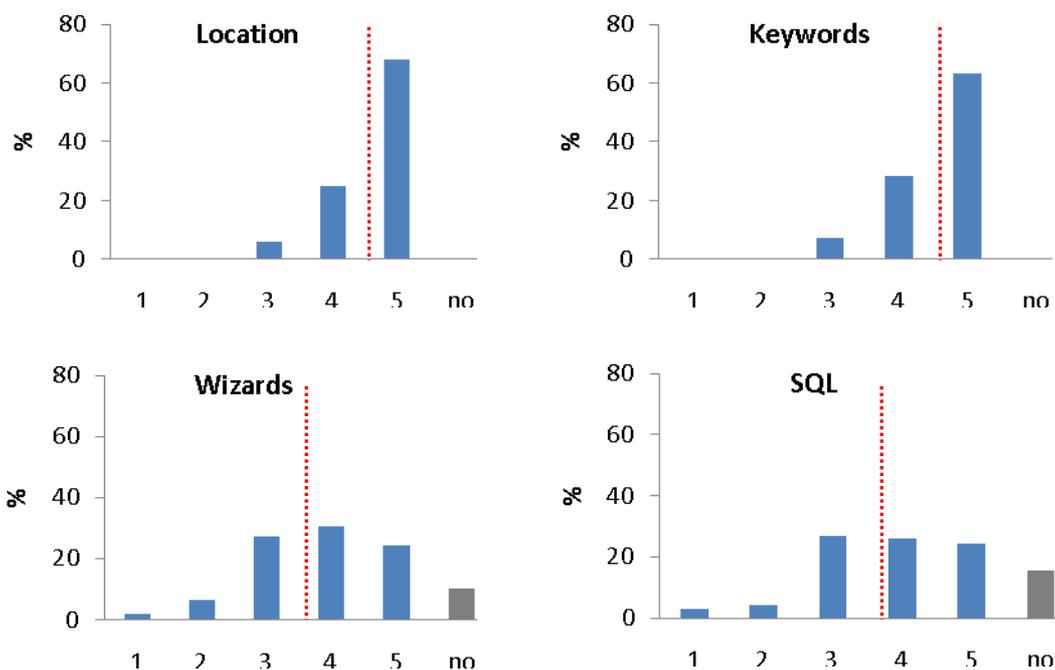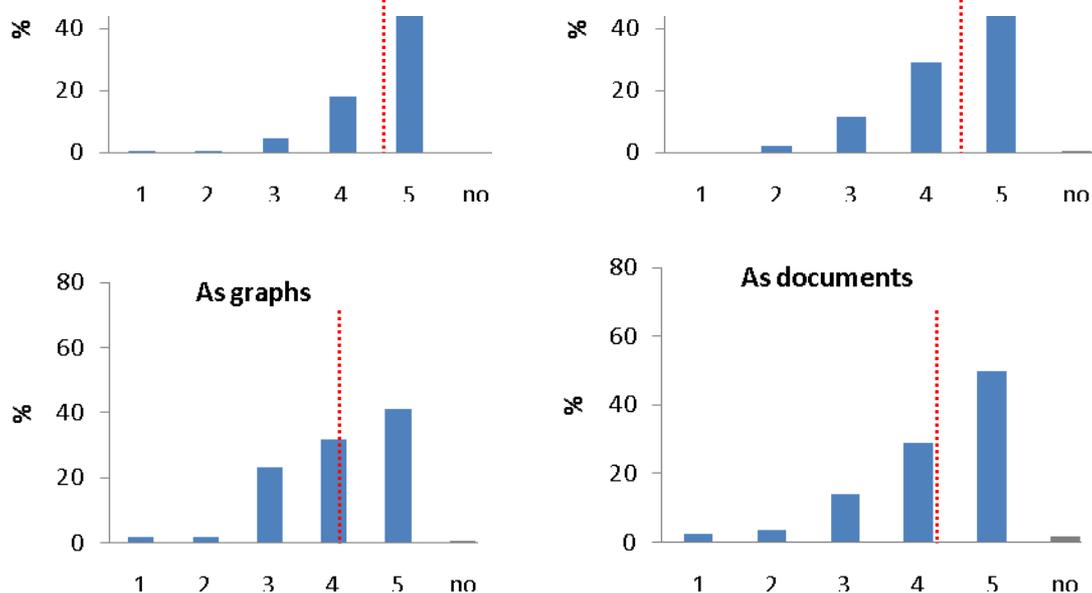

Figure 4.31 - Percentage of participants at European level who selected 1 to 5 to answer to the following question :"When consulting data on the EuroGeoSource portal, I would like to view the data: on maps, in tables, as graphs or as documents". 1 = not important, 5= very important, "no" means no opinion. (n=180). Averages are indicated by the red lines.
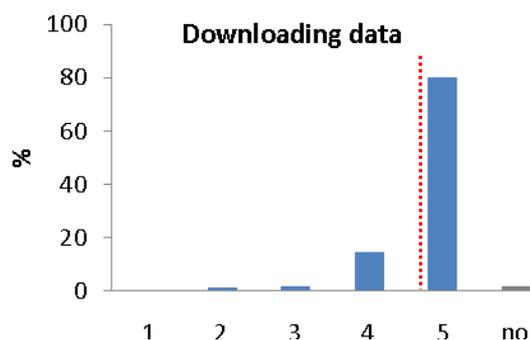
Figure 4.32 - Percentage of participants at European level who selected 1 to 5 to answer to the question : "When consulting data on the EuroGeoSource portal, I would like to download the data from the search results". 1 = not important, 5 = very important, "no" means no opinion (n=180). The average is indicated by the red line.

Figure 5.1 – Percentage of participants, at European level, who selected 0 to 8 different needs of data. The different colours indicate the part of each kind of institute. The right axis concerns the cumulative curve (n=187).
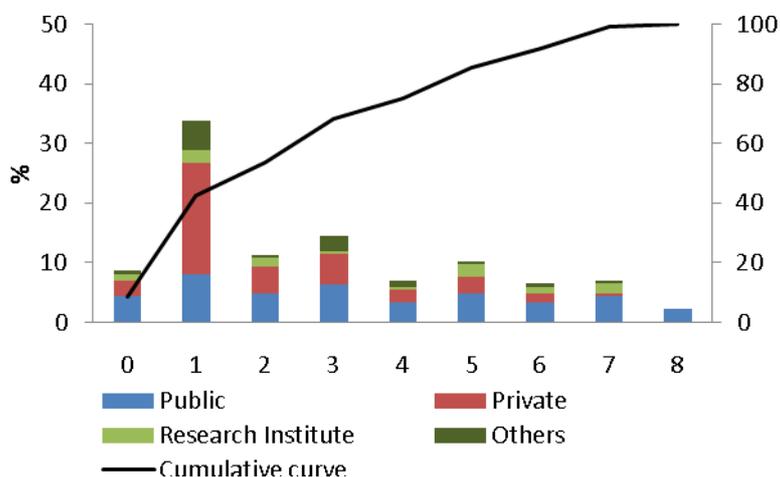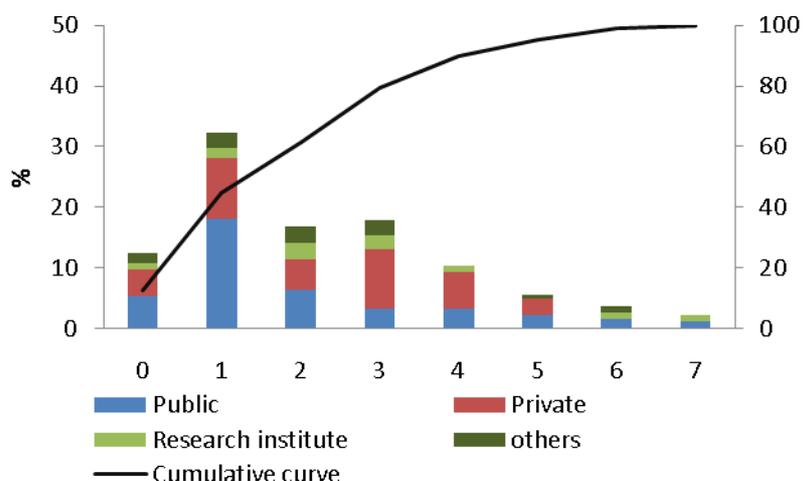

Figure 5.2 - Percentage of participants, at European level, who selected 0 to 7 different use of data. The different colours indicate the part of each kind of institute. The right axis concerns the cumulative curve (n=187).
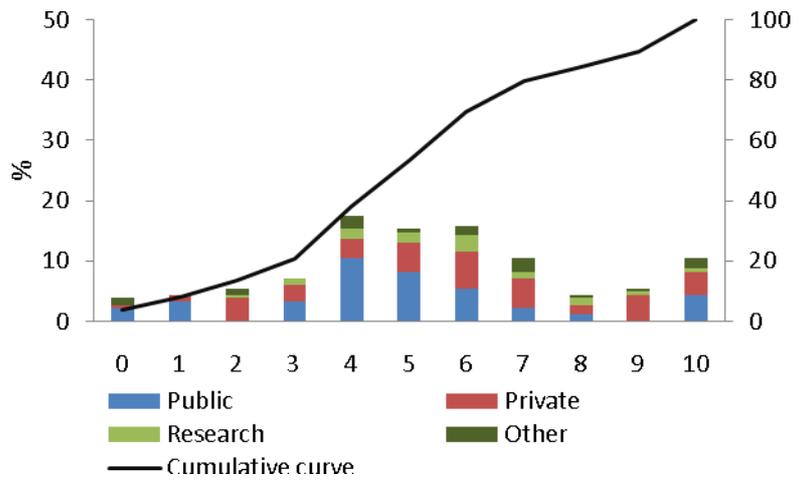
Figure 5.3 - Percentage of participants, at European level, who selected 0 to 10 different kind of data with which they expect a possibility of combination. The different colours indicate the part of each kind of institute. The right axis concerns the cumulative curve (n=187).
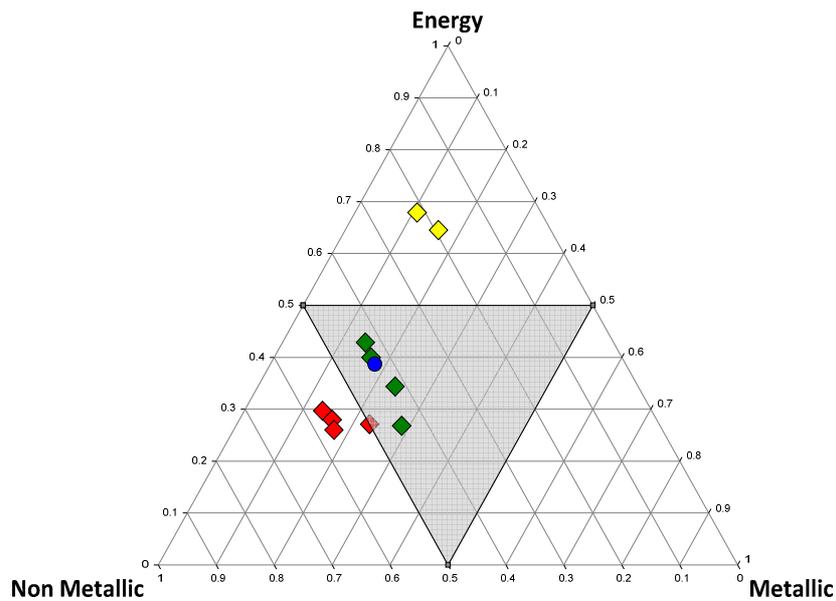
Figure 5.4 - Triangular diagram of the interest regarding the general data needs of all countries and international institutions. In yellow, the countries with specific interest for energetic resources (the Netherlands and the international institutions), in red, countries with a specific interest for the non metallic resources (Estonia, Poland, Portugal and Belgium) and in green, countries with divers needs of data (Bulgaria, Romania, Slovenia and Hungary). The blue circle is the European average. The grey triangle delimits the zone of the interest for divers resources (namely all interests below 50%).
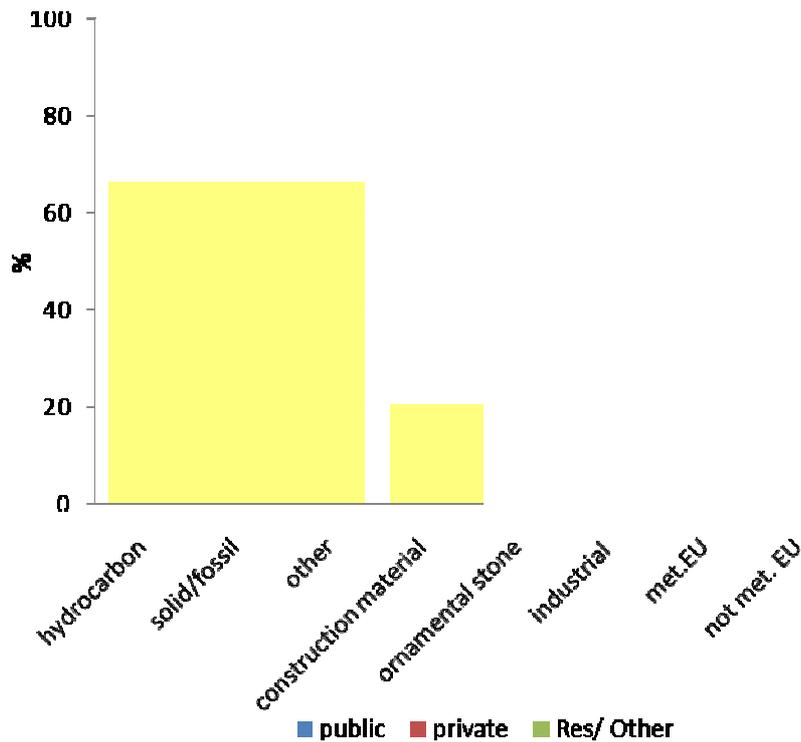
Figure 5.5 - General data needs of the countries with a specific interest for the energetic resources (average of the results of the international institution and the Netherland). The yellow boxes represent the general interest in: energetic mineral resources (right), in non metallic resources (middle) and metallic resources (left). The small boxes represent the detailed needs and the different colours are the part of the different institutes.
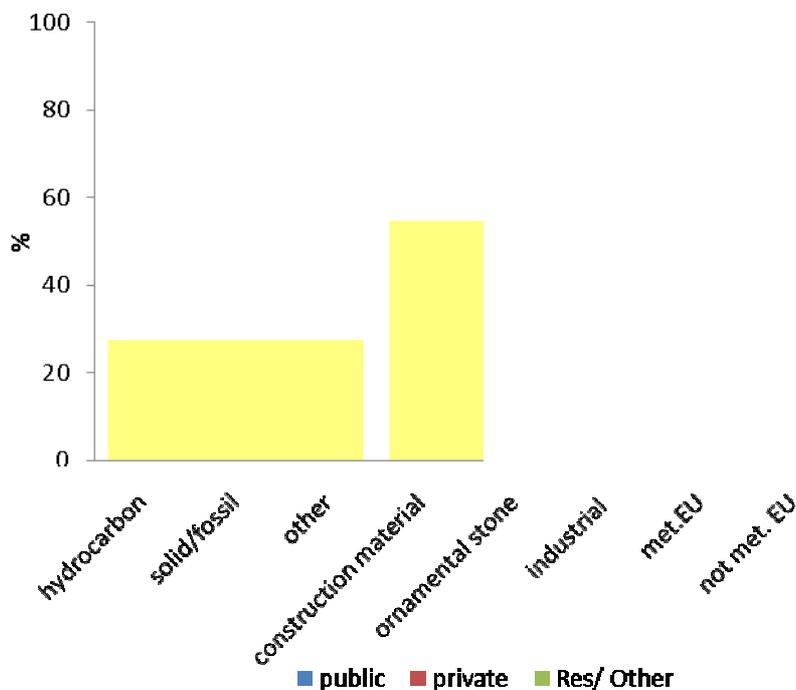
Figure 5.6 - General data needs of the countries with a specific interest for the non metallic mineral resources (average of the results of Estonia, Poland, Portugal and Belgium). The yellow boxes represent the general interest in: energetic mineral resources (right), in non metallic resources (middle) and metallic resources (left). The small boxes represent the detailed needs and the different colours are the part of the different institutes.

Figure 5.7 - General data needs of the countries with a general data interest (average of the results of Slovenia, Romania, Hungary and Bulgaria). The yellow boxes represent the general interest in: energetic mineral resources (right), in non metallic resources (middle) and metallic resources (left). The small boxes represent the detailed needs and the different colours are the part of the different institutes.
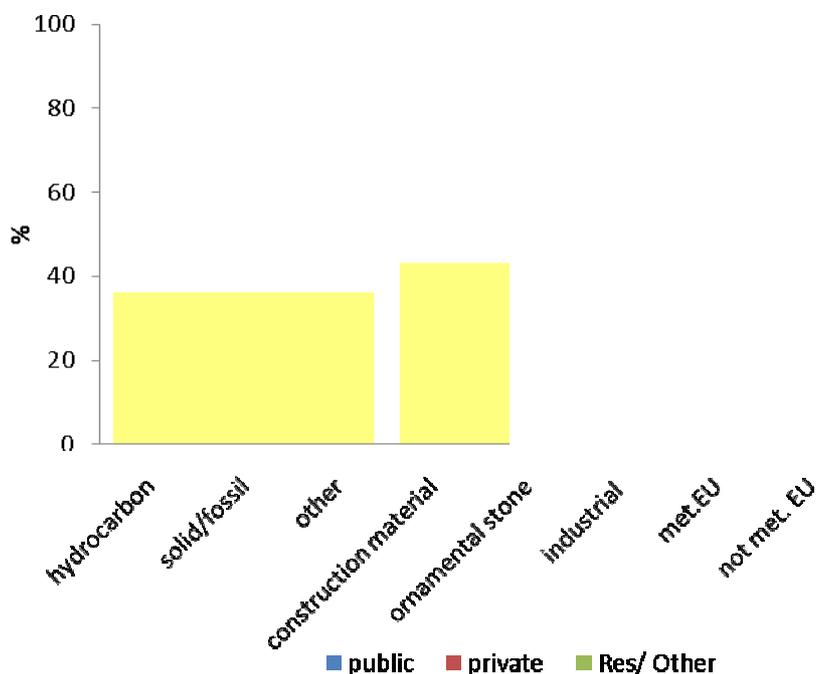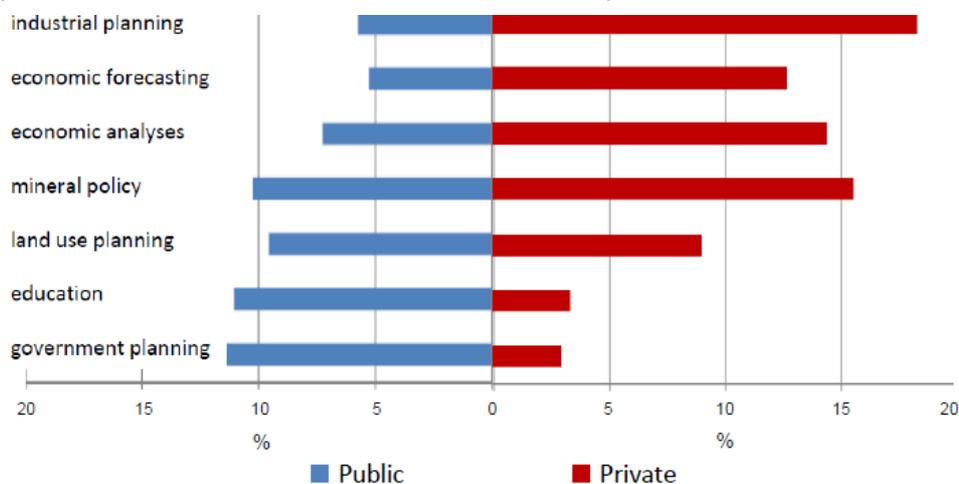

Figure 5.8 – Comparison between the use of data for the public institutes and the private institutes at European level.
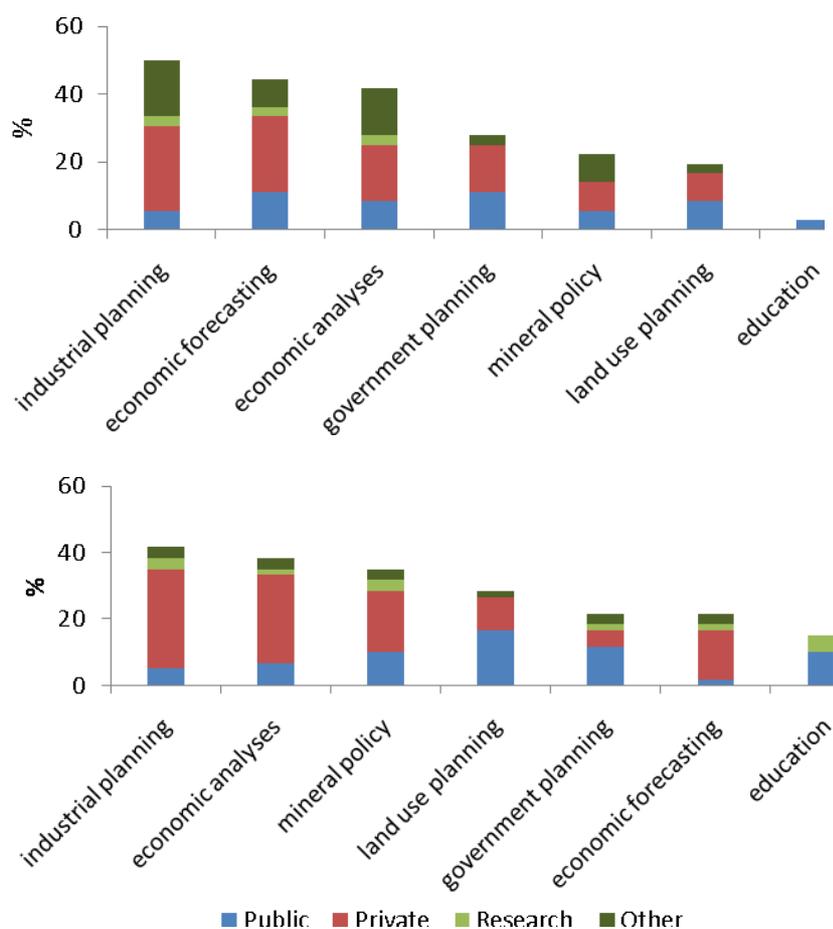
Figure 5.9 – Use of data for the participant who selected the energetic resources (above, n=36) and for the participants who selected the non energetic resources (below, n=59)

	industrial planning	Government planning	land use planning	mineral policy	education	economic analyses	economic forecasting
energetic	0.500	0.435	0.292	0.250	0.100	0.417	0.536
non energetic	0.581	0.565	0.708	0.750	0.900	0.605	0.464

Table 5.1 – Counting analyse between the use of data and the data needs (energetic and non energetic) (n=95). The colour scale indicated the level of 'correlation'. The education wasn't considered for the interpretation because of the low number of selection (n=10).

	security of supply	socio-eco. Planning	crisis management	exploration	production	sustainable use
Security of supply	1.00	0.58	0.49	0.50	0.41	0.49
Socio-economic planning	0.58	1.00	0.71	0.45	0.50	0.59
Crisis management	0.49	0.71	1.00	0.44	0.42	0.55

exploration	0.50	0.45	0.44	1.00	0.80	0.73
Production	0.41	0.50	0.42	0.80	1.00	0.70
Sustainable use	0.49	0.59	0.55	0.73	0.70	1.00

Table 5.2 – correlation factors between the 6 questions regarding the scope of the EuroGeoSource portal (n=180).). The colour scale indicated the level of 'correlation'

9   References

Commission of the European Communities (2008), The raw materials initiative – meeting our critical needs for growth and jobs in Europe {COM(2008)699}.

Morgan M.G. & Keith D.W. 2008. Improving the way we think about projecting future energy use and emissions of carbon dioxide. Climatic Change, 90:189-215.

Annexes

Annex 1 –Participants' list

	company name	status
International	European Commission – DG Industry and Entrepreneurship	Public
	European Commission - DG Environment	Public
	European Federation of Geologists	other
	EGEC – European Geothermal Energy Council	Private
	EuroGeoSurveys *(Advisory board)*	Other
	European Commission - DG Energy	Public
	OMYA	Private
	European Commision - Institute for Energy, JRC *(Advisory board)*	Research Inst.
	European Commission - JRC	Public
	European Commission - DG Energy (2)	Public
	European Commission – DG MOVE (IT unit)	Public
	United Nation Economic Commision for Europe *(Advisory board)*	other
Belgium	Dienst Natuurlijke Rijkdommen (2)	Public
	Federal Service Public of Economy	Public
	Vlaamse Instelling voor Technologische Onderzoek	Research Inst.
	Institut Géographique National	Public
	Flemish Agency for Geographical Information	Public
	Liege University - Gembloux Agro-Bio Tech	Public
	Université de Mons	Public
	University of Liege	Public
	Ghent University	Research Inst.
	KULeuven University	Public
	Carrière Emond sa	Private
	Carrière de Vinalmont	Private
	Ressources Naturelles Développement	other
	Federal public service of Economy (2)	Public
	University of Liege (2)	Public
Bulgaria	Balkan and Black Sea Petroleum Association	NGO
	Dundee Precious Metals INC.	Private
	"ABSD engineering" Ltd.	Private
	Aurelian Oil and Gas/Balkan Explorers(Bulgaria) Limited	Private
	BT-Engineering Ltd.	Private
	BULGARTRANSGAZ *(Advisory board)*	other
	BUMAR AD	Private
	CGS consulting Ltd.	Private
	Institute of Mineralogy and Crystallography, Bulgarian Academy of Sciences	Research Inst.
	Devnya Cement AD	Private

	Dionyssomarble Bulgaria	Private
	Direct Petroleum Bulgariq Ltd.	Private
	EurOmax Resources Limited (EurOmax)	Private
	Geodent Sole Trader	Private
	Geological Institute of Bulgarian Academy of Sciences	Research Inst.
	GeoMarine Ltd.	Private
	Kaolin	Private
	INTERMINERAL LTD	Private
	Jes E ltd	Private
	Kamira Ldt	Private
	Melrose Resources	Private
	N&N Minerali	Private
	Overgas Inc	Private
	Oil and Gas Exploration and Production PLC	Private
	REXIMseis Ltd.	Private
	Bulgarian Research and Service Group Ltd	Private
Bulgaria	Sofia University	Public
	University of mining and geology -Research Laboratory of Energy and Georesources department	Research Inst.
	University of mining and geology - Open pit and blasting department	Research Inst.
	University of mining and geology -Geology and Palaeontology department	Public
	Caracal Cambridge Bulgaria EAD	Private
	Institute of Oceanology – BAS, Varna	Research Inst.
	Ministry of Environment and Water	Public
	Ministry of Economy, Energy and Tourism	Public
	Ministry of Regional Development and Public Works	Public
	Bulgarian Antarctic Institute	Research Inst.
	Geological Institute, Bulgarian Academy of Sciences - Regional Geology and Geotectonics	Research Inst.
	Geological Institute, Bulgarian Academy of Sciences – Seismotectonics	Research Inst.
	Ministry of environment and water	Public
	Geological Institute, Bulgarian Academy of Sciences - Hydrogeological Department	Research Inst.
	Geology and geophisics JSC	Private
	Evrotest Control JSC	Private
	Balkan Mineral and Mining EAD	Private
Estonia	Estonian Land Board	Public
	Eesti Keskkonnaamet	Public
	Eesti Energia Kaevandused AS	Private
	Kunda Nordic Tsement LLC	Private
	Paekivitoodete Tehas LLC	Private
	Mäebüroo Nord OÜ	Private
	Inseneribüroo Steiger Ltd.	other

	Eesti Geoloogiakeskus OÜ	other
	Institute of Geology at Tallinn University of Technology	Research Inst.
	Estonain Association of Mining Enterprises *(Advisory board)*	NGO
Hungary	Eötvös Lorand Geophysical Institute of Hungary	Research Inst.
	Hungarian Office for Mining and Geology *(Advisory board)*	Public
	MOL Plc.	Private
	University of Miskolc - Institute of Mineralogy and Geology	Private
	Geological Institute of Hungary	Research Inst.
Netherland	GDF SUEZ E&P Nederland	Private
	Wintershall Noordzee BV	other
	Staatstoezicht op de Mijnen	Public
	DHV BV	Private
	State supervision of mines	other
	GasTerra BV	other
	Petroleum Economist magazine	Private
	Shell	Private
	Markscheiderisch-Geotechnisches Consulting	Private
	Well Engineering Partners	Private
	Gas Transport Services	other
	Energie Beheer Nederland	other
	IHS Inc.	Public
Poland	Polish Geological Institute	Public
	KWB "Konin" S.A.	other
	Lafarge	Private
	Pinczowskie Zaklady Kamienia Budowlanego S.A. (I)	Private
	KRUSZGEO S.A.	Private
	Tarmac Wrocławskie Kopalnie Surowców Mineralnych S.A.	Private
	Mineral & Energy Economy Research Inst.	Research Inst.
	Wyższy Urząd Górniczy	Public
	PGE Górnictwo i Energetyka Konwencjonalna S. A.	Public
	Szczeciñskie Kopalnie Surowców Mineralnych SA	Private
Portugal	Direcção Geral de Energia e Geologia	Public
	Direcção Regional da Economia do Algarve	Public
	Comissão de Coordenação e Desenvolvimento Regional do Alentejo	Public
	Comissão de Coordenação e Desenvolvimento Regional de Lisboa e Vale do Tejo	Public
	Instituto da Conservação da Natureza e da Biodiversidade	Public
	Agência Portuguesa do Ambiente	Public
	Empresa de desenvolvimento mineiro, S.A.	Private
	Fundação Serrão Martins	other
	Direcção Geral Actividades Económicas	Public
	Procesl - Engenharia Hidráulica e Ambiental, Lda	Private

	DHV Portugal	Private
	ECOSERVIÇOS - Gestão de Sistemas Ecológicos, Lda.	Research Inst.
	Tecneira, Tecnologias energéticas, S.A.	Private
	Geoplano Consultores, SA	Private
	Universidade de Trás-os-Montes e Alto Douro, Escola de Ciências da Vida e Ambiente	Public
	Faculdade de Engenharia da Universidade do Porto	Public
	Faculdade de Ciências da Universidade do Porto	Public
	Faculdade de Ciências e Tecnologia da Universidade de Coimbra	Public
	Universidade de Aveiro - Department of Geosciences	Public
Portugal	Câmara Municipal de Águeda	Public
	Câmara Municipal de Alcanena	Public
	Câmara Municipal de Cascais	Public
	Câmara Municipal de Castanheira de Pera	Public
	Câmara Municipal de Faro	Public
	Câmara Municipal de Ferreira do Zêzere	Public
	Câmara Municipal de Guimarães	Public
	Câmara Municipal de Lagos	Public
	Câmara Municipal da Marinha Grande	Public
	Câmara Municipal de Mirandela	Public
	Câmara Municipal da Nazaré	Public
	Câmara Municipal de Nisa	Public
	Câmara Municipal de Óbidos	Public
	Câmara Municipal de Palmela	Public
Portugal	Câmara Municipal de Penalva do Castelo	Public
	Câmara Municipal de Portimão	Public
	Câmara Municipal de Porto de Mós	Public
	Câmara Municipal de Povoação	Public
	Câmara Municipal de Santarém	Public
	Câmara Municipal de Serpa	Public
	Câmara Municipal de Sintra	Public
	Câmara Municipal de Vagos	Public
	Câmara Municipal de Valença	Public
	Câmara Municipal de Vila do Bispo	other
	Câmara Municipal de Vila Franca de Xira	Public
	Câmara Municipal de Vila Nova de Poiares	Public
	Sibelco Portuguesa, Lda	Private
	Somincor-Soc. Min. Neves-Corvo, SA	Private
	Granitos de Maceira, S.A.	Private
	Solancis - Sociedade Exploradora de Pedreiras, S.A.	Private
	Iberobrita-Produtora De Agregados, SA.	Private
	Marmores do Poço Bravo, Lda.	Private
	VAC - Vitaliano Adrião Casinhas,Lda	Private

	Campos Silva SA.	Private
	Omya- Mineral Portuguesa, Lda.	Private
	Sinese - Consultoria, Lda.	Private
	University of Coimbra - Department of Earth Sciences	Research Inst.
Romania	Geological Institute of Romania	Research Inst.
	Geological Institute of Romania (2)	Research Inst.
	National Agency for Mineral Resources *(Advisory board)*	Public
	SC Carmeuse Holding SRL	Private
	OMV Petrom SA	Private
	LAFARGE AGREGATE BETOANE SA	Private
	National Company for Copper, Gold and Iron	other
	University of Bucharest, Faculty of Geology and Geophysics	Public
	University Babes-Bolyai – Geology department	Public
	University "Alexandru Ioan Cuza" of Iasi – Geology department	Public
	BELEVION IMPEX	Private
	University of Bucharest - Faculty of Geology and Geophysics, Department of Mineralogy	Public
	S.C. Rosia Montana Gold Corporation S.A.	Private
	Barrick Gold Romania	Private
Slovenia	Slovenian association of surface exploitation	Public
	Slovenian association of engineers and technicians	NGO
	Coal Mine Velenje	other
	Ascent Slovenia Limited	Public
	Geological Survey of Slovenia	other
	©olski center Velenje	Public
	Salonit Anhovo, Building Materials, Joint-Stock Co.	Private
	MINISTRY OF TRANSPORT, SLOVENE ROADS AGENCY	Public

Annex 2 - Completed resources' list

1. Energetic mineral resources
   - Hydrocarbon
     - Oil
     - Gas
   - Solid/Fossil
     - coal
     - Lignite
     - Anthracite
   - Other
     - Geothermal energy
     - Uranium
     - Other

2. Non energetic mineral resources
   - Construction minerals
     - Chert
     - Clay
     - Crushed stone, aggregates
     - Industrial limestones/dolostones
     - Granite
     - Gravel
     - Marl
     - Phosphorite
     - Quartz sand
     - Sand
     - Other
   - Ornamental stones

- o Granite
- o Limestone
- o Marble
- o Other
- **Metallic minerals mined in Europa**
  - o Arsenic
  - o Bauxite
  - o Beryl
  - o Borom
  - o Cadmium
  - o Chromium/chrome
  - o Cobalt
  - o Copper
  - o Gold
  - o Iron/iron ore
  - o Lead
  - o Lithium
  - o Magnesite
  - o Manganese
  - o Mercury
  - o Molybdenum
  - o Nickel
  - o Selenium
  - o Silver
  - o Strontium
  - o Tin
  - o Tungsten
  - o Wolfram
  - o Zinc
  - o Other
- **Metallic minerals not mined in Europa**
  - o Antimony
  - o Beryllium
  - o Bismuth
  - o Boron (boron oxide)
  - o Cobalt
  - o Molybdenum
  - o Niobium
  - o Platinum group
  - o Rare earth elements
  - o Rhenium
  - o Tantalum
  - o Tellurium
  - o Titanium (ilmenite)
  - o Titanium (rutile)
  - o Vanadium
  - o Other
- **Industrial minerals**
  - o Alabaster
  - o Anhydrite
  - o Aragonite
  - o Asbestos
  - o Ball clay
  - o Barite
  - o Barytine
  - o Bentonite
  - o Bromine
  - o Brucite
  - o Calcite
  - o Celestine
  - o Chalk
  - o Diatomite
  - o Feldspar
  - o Fluorspar
  - o Fuller's earth
  - o Graphite
  - o Gypsum
  - o Kaoline
  - o Kyanite
  - o Magnesite
  - o Mica
  - o Muscovite
  - o Perlite
  - o Phosphate rocks
  - o Potash salts
  - o Pure quartz sand
  - o Pyrite
  - o Pyrophyllite
  - o Quartz
  - o Salt
  - o Sillimanite minerals
  - o Sulphur and pyrites
  - o Talc
  - o Witherite
  - o Wollastonite
  - o Zeolites
  - o Other

Annex 3 - <u>Completed use of data list</u>

- Industrial planning
    - Reserve estimation
    - Exploration
    - Investment decisions
    - Location/relocation
- Government planning
    - Consumption patterns
    - Import dependency
    - Transport infrastructure
    - Transit operations
- Land-use planning
    - Regional
    - Local
    - National
    - international
- Mineral policy
    - Regional
    - Local
    - National

- international
- Education
    - General
    - Junior school level
    - High school level
    - University level
    - Post graduate level
- Research and consultancy
- Economic analyses
    - Import/export balances
    - Sector performance
    - Competitiveness
- Economic forecasting
    - Macro-economic
    - National
    - international
- Other

Annex 4 - <u>Literature overview</u>

References	Level	Comments
Direction Générale des Ressources Naturelles et de l'Environnement (MRW) (2005), **l'exploitation des ressources minerales**. Etat de l'environnement wallon : tableau de bord	Belgium	Overview of the mineral resources exploitation in Wallonia
Gérald GOSSELIN (2007), **L'exploitation des ressources minérales du sous-sol**. Rapport analytique 2006-2007 EEW Wallonie	Belgium	Overview of the mineral resources exploitation in Wallonia
Florence Brévers, Denis Cocle, Yves Van de Casteele (2007) **Notes de Recherche, Les zones d'extraction**. Conférence Permanente du Développement Territorial Région wallonne	Belgium	Overview of the land use related to the extractive activity in Wallonia. State of play and perspectives.
J.P. Heirman (2010), **Mineral Resources in Flanders.** Flemish authorities, Departement Leefmilieu, Natuur en Energie.	Belgium	Overview of the mineral resources exploitation in Flanders
Georgiev G. (1996), **Outlook of Petroleum exploration and production in Bulgaria**. Geology and mineral resources 7, 3-10.	Bulgaria	Petroleum production in Bulgaria
Põldvere, A., Bauert, H. (toim) (2007) **Georesources and public policy: research, management, environment**. Geological Society of Estonia, Tallinn, 65.	Estonia	Distribution and reserves of mineral resources
Raukas, A., Teedumäe, A. (toim.) (1997), **Geology and mineral resources of Estonia.** Mineral resources, Institute of Geology, Tallinn, 313–374.	Estonia	Exhaustive review of the mineral reserves and resources of Estonia, discussed by different aspects
Hungarian Geological Survey (2006), **Raw material wealth of Hungary**. Report of the Hungarian Geological Survey, Department of Raw materials, in CD	Hungary	Distribution of mineral resources and geo energy
Barátossy K., Budai T., Csirik Gy., Jámbor Á., Knauer J., Müller P., Nádor A., Pelikán P., Pentelényi L., Radócz Gy., Raincsák Gy. & Simon A. (2000), **Raw materials of Hungary.** Report of the Geological Institute of Hungary Department of Raw Material Potencial, Manuscript,107 p.	Hungary	National review of the raw material and geo energy bearing formations in order of geological time and geographical units

Juhász E., Kummer I., Budai T., Müller P., Hámorné Vidó M., Jámbor Á., Jocháné Edelényi E., Nádor A., Tóthné Makk Á., Korpás L.., Vető I., Fodor B., Sebestyén I.& Szőts A. (1995), **CH potential of Hungary**. Report of the Geological Institute of Hungary, the Geophysical Institute of Hungary and the Hungarian Geological Survey, Manuscript, 371 p.	Hungary	National review of the potential of natural oil and gas in Hungary
Ministry of Economic affairs - TNO (annual), **Natural resources and geothermal energy in the Netherlands, Annual report**. report of the Ministry of economic affairs NL	The Netherland	reserves , production, storage figures
T. Smakowski (2009), **Minerals Yearbook of Poland**. Mineral and Energy Economy Research Institute, Polish Academy of Sciences	Poland	Information on mineral reserves (mineral reserves and mining output)
Martins, L., Borralho, V., Moreira, J., Magno, C., Inverno, C., Oliveira, V., Torres, L., Matos, J., e Oliveira, D. (1998) **Mineral Potential of Portugal**. Publication of Instituto Geológico de Portugal, 60p	Portugal	Potential and distribution of the main portuguese mineral deposits
GeoZS-Mineral resources department (annual). **Bulletin Mineral resources 2005-2009.**	Slovenia	Mineral resources management, spatial and mineral resources policy, exploration and exploitation of mineral resources, mining activities
ROKAVEC, Duška, HRIBERNIK, Katarina, POGAČNIK, Željko (2007) **Mineral deposit management and mineral processing supported by GIS**. V: ANASTASSAKIS, Georgios N. (ur.). Proceedings of the XII Balkan Mineral Processing Congress (BMPC 2007) : 10-14 June 2007, Delphi, Greece. Athens: National Technical University of Athens (NTUA), 2007, str. 707-711	Slovenia	Mineral deposit management
HRIBERNIK, Katarina, ŠINIGOJ, Jasna, ROKAVEC, Duška (2004), **Relational database as a part of the geological information system (example ofthe database of the non metalic mineral deposits of Slovenia).** V: 32nd International Geological Congress, Florence, Italy, August 20-28, 2004 : abstracts. [Florence: Org. odb., 2004], str. 178.	Slovenia	Mineral resources management
Commission of the European Communities (2008), **The raw materials initiative – meeting our critical needs for growth and jobs in Europe {COM(2008)699}.**	Europe	Communication from the commission to the European parliament and the council

the European Aggregates Association - University of Leoben, Austria (2010), **Planning Policies and Permitting Procedures to Ensure the Sustainable Supply of Aggregates in Europe**	Europe	Analysis Minerals Policies across Europe specifically Aggregates Planning Policies in the Member States.
European Technology Platform on Sustainable Mineral Resources (2007), **Implementation Plan**	Europe	Modernise and reshape the European extracting and processing sector of energy and non-energy minerals.
European Comission (2010), **EC Guidance on undertaking new non-energy extractive activities in accordance with Natura 2000 requirements**	Europe	Guidance on how best to ensure that NEEI developments are compatible with the provisions of the Natura 2000 Directive.
European Commission Enterprise Directorate General under Contract n° ETD/FIF 2003 0781 (2004), **Minerals Planning Policies and Supply Practices in Europe**	Europe	Analysis of the extractive industry in Europe at different level
Economic Commission for Europe (2009), **United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009**. United Nations Publication ECE ENERGY SERIES No.39	Europe	International classification and reporting of fossil energy and mineral reserves and resources.

Annex 5 – Portal proposed

https://dov.vlaanderen.be/dov/DOVInternet/startup.jsp http://www.ngi.be/topomapviewer/	Belgium
http://geobank.sa.cprm.gov.br/	Bulgaria
http://www.geoportail.fr/ BRGM France for geological maps	France
http://www.npd.no/en/	Norway
http://geoportal.pgi.gov.pl/portal/page/portal/cbdg/dane/otwory http://www.psh.gov.pl/bankhydro.html) http://ikar2.pgi.gov.pl/cms/ http://geoportal.pgi.gov.pl/portal/page/portal/MIDASGIS/	Poland
http://e-geo.ineti.pt/ http://www.igeo.pt/ http://www.insulas.org/insulas/inicio.html http//insaar.inag.pt	Portugal

http://geoportal.mityc.es/hidrocarburos/eess/ http://www.geoportal-idec.cat/geoportal/cat/	Spain
http://www.geoportal.ch/	Switzerland
http://www.nlog.nl/en/home/NLOGPortal.html http://www.dinoloket.nl/	The Netherland
http://eswww.rhul.ac.uk/geode/dbase.html	UK
http://www.inspire-geoportal.eu/ http://www.onegeology.org/ http://eunis.eea.europa.eu/index.jsp http://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/ http://www.eearth.eu/ http://www.ewater.eu/ http://www.geomind.eu/	Europe
http://minerals.usgs.gov/minerals/ http://climate.nasa.gov/ http://www.google.org/egs/ http://www.infomine.com/ http://wikimapps.com/index.php/a/disastermap/show Some of the European Geological Surveys' ones, like BRGM, BGS, SGU and following the Inspire Directive. Google Earth Wikipedia Euromine	International