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

Grant Agreement no. 250532

WP 3

Political and organisational aspects of geo-energy and mineral resources data management in
the participating countries

Report

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Annexes

1 INTRODUCTION

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 project has 11 work packages (WPs), the third one, WP3, is entitled “National political and organisational aspects of geo-energy and mineral resources data management”. WP3 started from the first month of the project and will last until its eighth month.

MAFI, as leader of WP3, was responsible for developing the methodology of data collecting and the form of the questionnaire and the partner Institutes and organisations should provide the necessary information by countries. The WP3 leader was responsible for editing the report as well.

2 OBJECTIVES AND METHODOLOGY

Countries have installed various kinds of institutional systems, to organize the collecting, storage and dissemination of geo-energy and mineral resources data. In some countries all the geo-resources data are stored in one central organisation appointed by the government (e.g. The Netherlands). In other countries the data collection, aggregation and dissemination are distributed between several governmental institutions (e.g. Estonia). Some countries do not have a centralised system for geo-resources data collection at all, thus their data are managed at either provincial or corporate level though the last situation is relatively rare nowadays.

The objective of this work package was to study in details the organisational and political aspects of geoenergy and mineral resources data management in the participating countries. The study will result in:

- i) inventory of the institutions responsible for data collection, storage and distribution,
- ii) analysis of relationships between data providers and end-users,
- iii) study of the reporting procedure from national levels to EC,
- iv) IPR issues of the data dissemination and use.

The work package leader prepared a question list that was distributed between the partners from different countries. The participating geological surveys collected the information regarding the organisation of geo-energy and mineral resources management in their countries and presented the structured information to the work package leader that compiled the final report. The collected information includes the list of national organisations responsible for the data collection, storage and dissemination. Since these are different institutions the relationships between them were assumed to be clearly identified. The coordination between institutions of different levels (e.g. national, provincial and local) was also concerned. The national web sites disseminating the data are listed as well. The final objective of this inventory is to make for an international end-user very clear where and how national geo-resource spatial data can be obtained at this moment. The existing national practices of data dissemination are also specified.

3 DATA STRUCTURE

The data structure of the actual questionnaire was based on well-established documents used in projects of similar subjects like in the eWater project (Grant Agreement ECP-2005-CULT-038214). It was distributed in XLS format made up of 7 worksheets including questions encompassing the whole range of activities of a specific organisation involved in a certain way in geo-energy and mineral resources data management. Consequently, several questionnaires were filled by countries in which several organisations are involved in the management of the related data like in Bulgaria, Estonia and Hungary. The relationship between the geo-energy and mineral resources data management on national and regional levels was studied within one country. Given that the participants of the project are mainly geological organisations but the concerned data are managed in ministries and individual mining authorities in certain countries the participants are not always or occasionally only partly competent for the related data management concerning especially the information on mining activities. The first two sets of questions concerns essentially administrative data of the organisation as well as eventually its co-operating regional organisation(s) with legal obligations followed by an enquiry concerning the data itself. On the basis of the type of exploration and inventory data geo-energy and mineral resources data were classified in three groups including borehole data, information on mining areas and related reserves and on geological maps specifying or indicating the occurrences of geo-energy and mineral resources. The enquiry is finished by the specification of metadata available of the resources and the future intentions of the organisation improving resource data management. In the following paragraphs the worksheet structure of the questionnaire and their objectives will be specified.

3.1 General information

It specifies the basic administrative information on the organisation involved in geo-energy and mineral resources data management concerning especially the task of the organisation related to the data management and the accessibility of contact persons responsible for the data.

3.2 Legal background

It enquires the legal acts, governmental decrees, ministerial orders regulating the reporting obligations of companies involved in the exploration and exploitation of geo-energy and mineral resources. It also specifies whether the type of data collection, storage and supplying system as well as the data collecting, storing and supplying organisation(s) are denoted in the legal regulation together with the main types of the collected, stored and supplied data. Administrative data of the national and regional organisations responsible for geo-energy and mineral resources management are also determined with the short description of the workflow concerning the management of geo-energy and mineral resources.

3.3 Boreholes, mining areas, maps

The structure of the enquiry concerning these thematic data sets is identical. It starts with the method and the responsible personnel of data collection, the exact location of the data within the specific organisation and the contact person(s) accessible for enquiries. The relationship between national and eventual regional data management is specified if it exists. The following part of the question list concerns the format, access, query capability, distribution, mode of eventual purchase, existing coding standards, ancillary data and eventual reports devoted to the description of the data structure on national level.

3.4 Metadata

The questions include meta data standards used at the specific organisation together with its format as well as the applications used for their access and edition.

3.5 Future

Some questions in the end of the enquiry are focused on the intentions of the given organisation to make improvements and developments in the storage, access and management of geo-energy and mineral resources data. The planned development of metadata management is also concerned with eventual changes in the database and in the structure of the managed data.

4 RESPONSIBLE INSTITUTIONS

The questionnaire distributed by the work package leader was filled and returned by the following countries and institutions:

| Country | Organisation | Short name |
|-----------------|--|------------|
| Belgium | Royal Belgian Institute of Natural Sciences-Geological Survey of Belgium | RBINS |
| Bulgaria | Ministry of Economy, Energy and Tourism | MEET |
| | Ministry of Environment and Water | MOEW |
| | Ministry of Regional Development and Public Works | MRRB |
| Estonia | Eesti Geoloogiakeskus OÜ / Geological Survey of Estonia | EGK |
| | Eesti Energia Kaevandused AS / Estonian Oil Shale Company | ENERG |
| | Eesti Keskkonnaministeerium, maapõue osakond / Ministry of the Environment, Land and Soil Department | ENVIR |
| | Tallinna Tehnikaülikooli Geoloogia Instituut / Institute of Geology at Tallinn University of Technology | TTÜ GI |
| | Environmental Board | EB |
| | Maa-amet / Estonian Land Board | ELB |
| Hungary | Magyar Állami Földtani Intézet / Geological Institute of Hungary | MAFI |
| | Magyar Bányászati és Földtani Hivatal / Hungarian Office for Mining and Geology | MBFH |
| Poland | Państwowy Instytut Geologiczny - Państwowy Instytut Badawczy / Polish Geological Institute-National Research Institute | PGI-NRI |
| Portugal | Laboratório Nacional de Energia e Geologia | LNEG |
| Romania | Institutul Geologic Romaniei | IGR |
| | National Agency for Mineral Resources | NARM |
| Slovenia | Geological Survey of Slovenia | GeoZS |
| The Netherlands | TNO Bouw en Ondergrond / Geological Survey of The Netherlands / DINO Department | TNO |

5 LEGAL BACKGROUND

We collected the answers in the next Table 1. The punctual codes of laws, decrees would be read in the concerned questionnaires.

Table 1 Legal background by countries

| Country | Type of legal background | | | | Organisation where the data are collected, stored and/or supplied | | |
|----------|--------------------------|---------------------|-------------------|-------|---|----------|-------|
| | Act | Governmental decree | Ministerial order | Other | National | Regional | Local |
| Belgium | - | + | - | | Geological Survey of Belgium | | |
| Bulgaria | + | + | - | | Ministry of Economy, Energy and Tourism | | |

6 BOREHOLE DATABASES

6.1 BELGIUM

The archives of the Geological Survey of Belgium (RBINS) formed the basis of the regional databases. All three are now managed and developed independently. However, data is exchanged between them in order to ensure that all are complete (for their territory).

The data at the Geological Survey of Belgium is digitally stored in different formats, including dBase, ascii, MS Excel and MS Access files. The data can internally be consulted through Mapinfo or Arcview applications or accessed directly. For external users it can be accessed in paper format or occasionally digital on demand. The data are available free of charge, only advice and service are charged. Users are encouraged to consult the DOV GIS portal (<https://dov.vlaanderen.be>, free of charge) when they request information on geological data for Flanders. For Wallonie: <http://Walloniecarto1.wallonie.be/soussol>.

6.2 BULGARIA

Borehole location data is collected in the National Geological Fund from the exploration and exploitation companies on national level. It is stored in MDB and MapInfo formats. For internal users it can be accessed and queried. For external users the data are available in paper or digitally for a fee according to the "Tariff for taxes collected in the system of Ministry of Environment and Water" and after signing a Confidentiality Agreement with the Ministry. For the time being no web-service is available.

6.3 ESTONIA

Borehole data collection and database construction proceeds in several institutions on national level as a result of geological mapping, investigation reports, and from catalogues. Two main organisations are involved, the Geological Survey of Estonia (EGK) and the Estonian Land Board (ELB). The collection is performed by EGK geologists and the data are entered uniformly in the "Borehole database of digital mapping at the scale of 1:50 000" managed by the ELB including core photos. Additionally, several, non-harmonised borehole databases exist in the EGK. The data formats include MDB, XLS, DBF, MapInfo. For internal users the data are available and they can be queried using ArcGIS and MySQL. For external users the database can be accessed in the geoportal of the ELB - <http://geoportaal.maaamet.ee/eng/>. The data can be acquired in any format supported by FME free of charge by written application. Borehole data are collected in the Institute of Geology at Tallinn University of Technology (TTÜ GI) managed by MySQL and Access applications. The data are free for non-commercial use. Some of the data are available in the web-site <http://sarv.gi.ee>. The Estonian Oil Shale Company (EOSC) also collects and manages borehole data assembled during drilling campaigns which are available in paper or in XLS. They can be distributed using the CREDO_GEO application and purchased by written application.

6.4 HUNGARY

Borehole data are collected from obligatory paper reports, the related borehole sequences are described by geologists or drilling masters. The Hungarian Mining and Geological Office is responsible for raw data collection and management proceeding actually with FoxPro application. Borehole registry data including a primary geological qualification of the penetrated sequences are available digitally,

whereas detailed specification of the borehole log are stored on paper. The related data are available free of charge except for printing and medium costs. Part of the borehole database with value-added borehole log description is managed by the Geological Institute of Hungary by Ms SQL Server application. The value-added data can be purchased by individual agreement; registry data are available in the site <http://mafi-loczy.mafi.hu/furas/> with obligatory registry. Internal users can query the database through a web application.

6.5 POLAND

In paper format borehole data are collected on borehole cards in the Central Geological Archive (CGA) and they are entered in the Central Geological Database (CBDG) of the Polish Geological Institute-National Research Institute (PGI-NRI). The spatial data are managed in ArcSDE + Oracle environment, whereas descriptive data in Oracle RDBMS and Ms SQL Server. The data can be accessed in paper format in the Central Geological Archive, whereas digitally in the CBDG geoportal <http://geoportal.pgi.gov.pl/portal/page/portal/cbdg/dane/otwory> which contains tools that enable the users to search for both textual (form) and spatial (GIS viewer) information. Moreover, it is possible to export the data to CSV and XML files. Borehole data are visualised using the CBDG GIS viewer <http://baza.pgi.gov.pl/website/cbdg>. There is also a WMS service available http://ikar2.pgi.gov.pl/services/CBDG_Otwory/MapServer/WMSServer. Concerning the purchase of the data textual data are distributed in CSV, TXT or other formats, whereas spatial data are distributed in SHP files. The price list is available on <http://baza.pgi.gov.pl> (Access to data). Payment proceeds by transfer.

6.6 PORTUGAL

Borehole data are collected in the National Laboratory of Energy and Geology (LNEG) and the Directorate of Energy and Geology (DGEG) as a result of ongoing exploration campaigns carried out by both state and private companies. The data are available actually on paper as well as digitally in MDB, XLS and SHP formats. Additionally, the data can be accessed in Ms SQL Server and ArcGis for internal users. The data can be queried in the Ms SQL Server environment. External users can acquire the data by request in a letter stating purpose. Distribution proceeds through a WMS application. The data can be purchased; costs are stipulated in an internal price list. Companies that sign an exploration contract with the Portuguese government have automatically access to available data. Apart from the location map, there is no other information available to the public through the SQL Server service.

6.7 ROMANIA

The information on borehole locations are based on topographic measurements carried out in local coordinate system (STEREO 1970). Since 1995 (for oil/gas) and 1998 (for mineral resources) the data have been transmitted to the National Agency for Mineral Resources (NAMR) on paper support; the spatial data on boreholes are loaded in an Oracle database. Other information on drill holes are stored (in printed format) in the archives administered by the NAMR (as reports of various companies) but there is no centralized database on these data. The personnel of NAMR may access the data depending on the position and work necessities and the data can be queried by some internal users, depending on their rank and type of work. Data are available for purchase only in printed format. The related prices are as follows: lithological columns in drill holes: 1-5 cents/m; borehole geophysics: 9-26 cents/m.

6.8 SLOVENIA

Borehole data are collected from expert reports in the Geological Survey of Slovenia (GeoZS) on national level in MDB and SHP formats. For internal users the data can be accessed and queried through an intranet GIS application. The data can be distributed on CD. For external users only basic data are accessible. The user must fill in the standard order form with additional statement and description of the purpose of the use of the data. The data are then delivered to the end user directly in the GeoZS or sent by mail.

6.9 THE NETHERLANDS

Operators have to supply the drilling data by law in the frame of daily drilling reports, borehole measurements and end of well reports. The data are collected in TNO - Geological Survey of the Netherlands (TNO). They are stored on paper in the archives, whereas they are available digitally in the Data and Information on The Netherlands Underground (DINO) database - <http://www.dinoloket.nl/>. The data are managed in Oracle RDBMS. The data can be searched by a GIS interface or directly through the NL Oil and Gas Portal www.nlog.nl.

A summary of the received answers are presented in the Table 2.

Table 2 BOREHOLE DATABASES by countries

| Country | Borehole data information | | | | Borehole data | | | | |
|-----------------|---|---------------------|-------------|---|---------------|-------|-------------|------|--------|
| | Data holder | Data level | Connections | Recent format | Access | Query | Distributed | Free | Coding |
| Belgium | Geological Survey of Belgium | regional / national | + | dBase / txt / MapInfo / Excel / Access | + | + | + | + | + |
| Bulgaria | National Geological Fund | national | - | Access, MapInfo | + | + | - | - | - |
| Estonia | Estonian Land Board | national | - | Access, Excel, dBase, Mapinfo; ArcGIS, MySQL | + | + | - | + | + |
| | Estonian Oil Shale Company | national | + | Excel | + | - | + | + | * |
| | Institute of Geology at Tallinn University of Technical | national | + | My SQL, Access, photos | + | + | + | + | - |
| | Geological Survey of Estonia | national | + | Access, Excel, dBase, MapInfo | + | - | - | + | - |
| Hungary | Hungarian Office for Mining and Geology | national | - | Paper -- whole documentation, FoxPro -- registry data | + | + | + | + | + |
| | Geological Institute of Hungary | national | + | MS SQL Server | + | + | + | + | + |
| Poland | Central Geological Archive | national | - | ArcSDE + RDBMS Oracle, MS SQL Server | + | + | + | - | + |
| Portugal | Directorate of Energy and Geology (DGEG) | regional / national | + | Access, Excel, MS SQL Server | + | + | + | + | - |
| | Laboratório Nacional de Energia e Geologia | | | | | | | | |
| Romania | National Agency for Mineral Resources | national | - | Oracle | + | + | + | - | - |
| Slovenia | Geological Survey of Slovenia | national | - | Access | + | + | + | + | + |
| The Netherlands | TNO-Geological Survey of The Netherlands | national | - | Oracle | + | + | + | + | + |

*= no answer

Connections + / - : connections between national and regional data management exist / do not exist

Access + / - : data are available / unavailable

Query + / - : data can be queried / cannot be queried

Distributed + / - : data are distributed / are not distributed

Free + / +/- / - : data are free / free with restrictions / for fee or not sold

Coded + / - : data are coded / are not coded

*= no answer

7 MINING DATABASES

7.1 BELGIUM

Data on subsurface and surface mining activities are available, but only partly in digital format. Increasing efforts are being made by both the Geological Survey of Belgium and the Regional authorities to increase the amount of digital information and to organise this information. The data are currently not distributed, with the exception of some pilot data in the Walloon Region (<http://carto1.wallonie.be/soussol> --> 'Minières de fer').

7.2 BULGARIA

Data of mining areas are collected at three ministries (Ministry of Economy, Energy and Tourism – MEET, Ministry of Environment and Water - MOEW and Ministry of Regional Development and Public Works – MRDP) on the basis of decrees and concession agreements. The data are managed in MapInfo and ArcGIS environments and they are available free for internal users with related query capabilities and services, whereas external users should pay a fee. The Concession register is available free of charge via Internet on the website of the Council of Ministers. The data can be purchased by bank transfer according to the "Tariff for taxes collected in the system of Ministry of Environment and Water" in MapInfo format.

7.3 ESTONIA

Collection and management of mining data is rather diversified in Estonia. Geologists of the Geological Survey of Estonia (EGK) collect the related data during the geological exploration of mineral resources which are loaded in the Environmental Register. Until 2005 it was managed by the EGK, from 2005 on it has been treated by the Estonian Land Board (ELB). The related data are also stored in the Depository of Manuscripts managed by the EGK. In the EGK the data are stored in XLS and MDB formats, they are accessible on paper and network. In the ELB where the data are actually managed they are on paper and in Oracle format available in the geoportal of the ELB (<http://geoportaal.maaamet.ee/eng/Maps-and-Data/Geological-data/Mineral-Deposits-p352.html>). Information in the database is public according to the Environmental Register Act. Records of mineral resources of the Environmental Register are available through the web-application [Data Application of Mineral Deposits](#). The data are distributed upon written application and they can be ordered in any format supported by FME on the afore-mentioned link <http://geoportaal.maaamet.ee/eng/Maps-and-Data/Geological-data/Mineral-Deposits-p352.html>, according to state fee. The Estonian Oil Shale Company (EOSC) manages oil shale mining areas; the data are collected from related geological reports. The data are on paper and in XLS format. They can be distributed in AutoCAD and purchased upon written application. Issued permits are managed in the Environmental Permit Management System of the Environmental Board (EB). Data can be accessed via network. There are different views of the system for internal and external users. Internal users can access more data and modify values depending on their rights. The data can be queried. Internal and external users have different views and rights.

7.4 HUNGARY

Data extracted from Mining Authority documents by the employees of the Hungarian Mining and Geological Office (MBFH) are loaded in the MBFH data archive managed in FoxPro and ArcGIS

applications. The data can be accessed through the Intranet for employees; they are serviced for external users, whereas the internet serves for orientation. The data can be queried with or without GIS interface; internal users may query on their own, external users should order queries. The cost of data service is confined to the price of medium and copying charges. Mining plot registry data are free, available in PDF and PMF formats in the MBFH web site (www.mbfh.hu).

7.5 POLAND

Decisions and documentation maps are stored in the archive of Register of Mining Areas in the Polish Geological Institute (PGI). Maps are vectorised and saved in the system MIDAS (Database of Mineral Deposits) in ArcGIS SDE (ArcGIS Server) application, information from decision (registration number of decision, name of Mining Area, registration number in archive etc.) is loaded into the database (related to the given thematic layer). The system MIDAS has been managed since the beginning of the 1990's. Concerning data access internal users have authorization for reviewing data and using editing functions, external users have the right only for reviewing data. Like the Central Geological Database (CBDG) the system MIDAS can also be accessed in the geoportal of the PGI through the link <http://geoportal.pgi.gov.pl/portal/page/portal/PIGMainExtranet> (there is not an English version yet). There is a web-application for making queries through the link <http://geoportal.pgi.gov.pl/portal/page/portal/MIDASGIS>. For the moment, external users can get coordinates of the selected Mining Area and save them in a text file, whereas internal users (with authorization for edition) can export selected areas to a shape file and generate reports containing attribute values. A related WMS application is under construction. Mining data are not sold generally, they are simply visualised on the web site.

7.6 PORTUGAL

Mining data derives from observations during the geologists' field-work and from exploration company reports collected by the associates of the National Laboratory of Energy and Geology (LNEG) and exploration companies, respectively. The related data are stored in LNEG and the General Directorate of Energy and Geology (DGEG). The data exist on national and regional levels as well. The data are available actually on paper as well as digitally in MDB, XLS and SHP formats. Additionally, the data can be accessed and queried in the Ms SQL Server and ArcGis environments for internal users. External users can acquire the data by request in a letter stating purpose. Distribution proceeds through a WMS application. The data can be purchased; costs are stipulated in an internal price list. Companies that sign an exploration contract with the Portuguese government have automatically access to available data. Apart from the location map, there is no other information available to the public through the SQL Server service.

7.7 ROMANIA

Mining data are managed by the National Agency for Mineral Resources (NAMR), a governmental agency for the administration of the geo-energy and mineral resources in Romania. It centralizes and manages the national fund of resources/reserves. Every perimeter with exploration, prospecting or mining license/permit is recorded in GIS at the NAMR at the time of concession application, and is updated yearly with any change of the geometry and the volume of exploited reserves or the new resources/reserves computed as a result of exploration. Data are collected by the Mining Book and Petroleum Book department of NAMR. All data on extraction and exploration activities conceded since 1998 were transmitted to NAMR where they were recorded in digital format. The older data are available only in printed format. The spatial data collected by NAMR are in Oracle format. Concerning data access, the spatial data on the location of the conceded perimeters are public. Data on

the resource/reserves are classified. The personnel of NAMR may access the data, depending on the position and work necessities. The data can be queried by some internal users, depending on their rank and type of work. The following types of data can be purchased in printed format: maps of mining works (25 cents/m); maps and geological sections of the areas with mineral resources □ isobaths □ isopachs, grades, reserves, scale 1:500 and less detailed (2-100 Eur, depending on the detail of information), results of laboratory analyses (0.7 Eur for each analysed parameter), studies and syntheses (300-1000 Eur).

Some data on mineral and energy resources are produced and stored by the Geological Institute of Romania (concerning especially the geological conditions of the deposits, mineralogy and geochemistry of the ore, relations with the gangue, age, genesis, etc.). These data are materialized on analogue or digital maps of mineral resources.

7.8 SLOVENIA

Mining data are collected of reporting forms of mineral resources and concession agreements by the Ministry of Economy of Republic of Slovenia, Directorate for Energy - Mining department (MG), the ministry competent for the management of mining data. They are also collected by the Geological Survey of Slovenia (GeoZS). The data are available in both the MG and GeoZS. Mining data are managed on national level in Ms SQL Server and SHP formats. An internet GIS application system is available for data management. The public user can access only registry data. The data are distributed on CD. Concerning the purchase of data the user must fill in the standardized order form with additional statement and description of the purpose of the use of the data. The data are delivered to the end user directly from GeoZS or sent by mail. The cadastre page of mineral deposits of Slovenia with concession can be accessed through the link <http://akvamarin.geo-zs.si/ms/>.

7.9 THE NETHERLANDS

Mining data are collected by TNO-Geological Survey of the Netherlands on behalf of the Ministry of Economic Affairs. This mainly concerns oil and gas fields. Production plans and production figures are (partly) publicly available, annual reserves figures are confidential. Other mineral resources concern rocksalt and coal. The latter has not been mined since 1968. Salt mines (solution mining) must have a production plan as well as monthly production figures. Information on construction quarries (sand, clay and marl) are not stored in a centralised database. Data can be viewed on www.nlog.nl. Data can be queried using predefined query builders (limited possibilities)

A summary of the received answers are presented in Table 3.

Table 3 MINING DATABASES by countries

| Country | Mining data information | | | | Mining data quality | | | | |
|-----------------|---|---------------------|-------------|--|---------------------|-------|-------------|------|--------|
| | Data holder | Data level | Connections | Recent format | Access | Query | Distributed | Free | Coding |
| Belgium | Geological Survey of Belgium | regional / national | - | Mapinfo (georeferenced TIF images and vectorised data) | + | - | - | + /- | - |
| Bulgaria | Natural Resources and Concessions Directorate | national | - | ArcGIS Shapefiles | + | + | * | + /- | - |
| | Ministry of the Environment and Water | national | - | MapInfo | + | + | - | + /- | - |
| | Ministry of Regional Development and Public Works - Concessions Directorate | national | - | MapInfo | + | + | - | + /- | - |
| Estonia | Estonian Land Board - Environmental Register | National | + | Excel, Access Oracle in ELB | + | + | + | + /- | + |
| | EGK - Depository of the Manuscripts | National | + | Excel, Access | + | + | + | + /- | + |
| | Estonian Oil Shale Company | national | * | Excel | + | + | + | + /- | * |
| | Environmental Board | national | + | * | + | + | + | * /- | * |
| Hungary | Hungarian Office for Mining and Geology | national | - | FoxPro, Shapefile | + | + | + | + /- | + |
| | Geological Institute of Hungary | national | + | Excel, Shapfile, DGN file | + | - | + | + /- | + |
| Poland | Register of Mining Area in PGI | national | - | Oracle | + | - | + | - /- | + |
| Portugal | Directorate of Energy and Geology (DGEG) | national / regional | + | Access, Excel, Shapefile, SQL Server and ArcGis | + | + | + | + /- | - |
| | Laboratório Nacional de Energia e Geologia | | | | | | | | |
| Romania | National Agency for Mineral Resources | national | - | Oracle | + | + | + | - /- | - |
| Slovenia | Ministry of Economy of Republic of Slovenia | national | - | MS SQL Server, shapefile | + | + | + | + /- | + |
| | Directorate for Energy - Mining department | | | | | | | | |
| | Geological Survey of Slovenia | | | | | | | | |
| The Netherlands | TNO-Geological Survey of the Netherlands | national | - | Oracle | + | + | + | + /- | + |

*= no answer
Connections + / - : connections between national and regional data management exist / do not exist
Access + / - : data are available / unavailable
Query + / - : data can be queried / cannot be queried
Distributed + / - : data are distributed / are not distributed
Free + / + / - / - : data are free / free with restrictions / for fee or not sold
Coded + / - : data are coded / are not coded

8 DIGITAL MAP DATABASES

8.1 BELGIUM

Digital maps compiled in the Geological Survey of Belgium on national level are collected and stored on the server of the Survey, like the digital geological maps of Belgium (1:40,000 scale-map) together with other thematic maps (<http://www.naturalsciences.be/geology>). They are available in MapInfo and ArcView systems and can be purchased for specific fees (e.g. the geological maps of Belgium in four packages in raster as well as in vector formats). On regional level the geological maps of Flanders and Wallonia are also available, the latter also on the regional environmental geoportal of Wallonia <http://environnement.wallonie.be/cartosig/cartegeologique>. Data on natural resources is not available in a compiled format.

8.2 BULGARIA

Location data of mining areas have been digitised in the Ministry of Environment and Water (MOEW). They are stored and managed in MapInfo and ArcGIS environments. They are available free for internal users with related query capabilities and services, whereas external users should pay a fee. The data can be purchased by bank transfer according to the "Tariff for taxes collected in the system of Ministry of Environment and Water" in MapInfo format.

8.3 ESTONIA

Data are collected by geologists of the Geological Survey of Estonia (EGK) during geological mapping (mapping of mineral resources revealing discoveries (point features), areas (without reserve calculation) and perspective areas (with calculated reserves, but not included in the environmental register) of the mineral resources) and through research made by geological exploration and mining companies (mineral deposits). The digital maps are stored and managed in the Estonian Land Board (ELB) by Oracle and ArcGIS applications. They are available in the geoportal of the ELB (<http://geoportaal.maaamet.ee/eng>). The data can be purchased in any format supported by FME free of charge by written application.

8.4 HUNGARY

Three series of maps are available in the Geological Institute of Hungary featuring mineral resources. The 1:500.000-scale map series of CH prediction reflects the potentially perspective CH parent rocks in Hungary. Another, 1:100.000-scale map series featuring the GIS-based geo-scientific database system for hydrocarbon prospecting closed for external users is also aimed at revealing perspective CH parent rocks on more detailed scale. The third group of thematic maps is the 1:100.000-scale non metallic raw material potential map series of Hungary. The first two map series are managed and stored in the ArcGIS – Ms SQL Server-, whereas the third one in the MicroStation environment. Apart from the 1:100.000-scale hydrocarbon prospecting maps the other ones can be purchased upon individual agreement.

8.5 POLAND

Documentations of deposits are stored in the Central Geological Archive in the Polish Geological Institute (PGI). Information from documentation about the deposits is written into the database

MIDAS (System of Management and Protecting of Polish Mineral Raw Materials). Documentation maps (which are part of documentations) are vectorised and saved in MIDAS. Vector-based data are on the GIS server (ArcGIS SDE (ArcGIS Server)), descriptive data in the Oracle RDBMS. The data are accessible (visible) on the link <http://geoportal.pgi.gov.pl/portal/page/portal/PIGMainExtranet> (there is not an English version yet). Internal users have authorization for reviewing data and to editing functions using Oracle Forms application, external users have authorization only for reviewing data. Exporting data (vector), with generating reports containing attributes are reserved only for internal users. A related WMS application is under construction. Data are not sold generally, they are simply visualised on the web site.

8.6 PORTUGAL

Mineral-resources-based digital maps are compiled as a result of field-work and exploration company reports. They are stored in the National Laboratory of Energy and Geology (LNEG) and the Directorate of Energy and Geology (DGEG). The data exist on national and regional levels as well. The data are available in MDB, XLS and SHP formats. Additionally, the data can be accessed in Ms SQL Server and ArcGis environments for internal users. The data can be queried in the SQL Server environment, also for internal users. Maps can be purchased through the site <http://e-geo.ineti.pt/default.htm>. Some of the geological maps can be purchased in digital format but most of them in paper format. Costs are price stipulated + delivery costs and VAT, COD.

8.7 ROMANIA

Digital maps are produced through scanning paper maps with subsequent georeferencing and vectorising in the Geological Institute of Romania (IGR). They are stored and managed in a GIS database in SHP or mdb format. They can be accessed for internal users via network, for external users on CD support. Internal users can make use of query capabilities. Apart from printed versions, the maps can be purchased in scanned raster format for the price up to 100 Eur; payments by bank transfer or cash. For vector data (GIS) the price has not yet been settled.

8.8 SLOVENIA

Digital maps related to mineral resources are compiled in the frame of reports on mineral resources and concession agreements. They are collected by the Ministry of Economy of the Republic of Slovenia, Directorate for Energy - Mining department (MERS DE MD), and the Geological Survey of Slovenia (GeoZS). The data are managed by MS SQL Server application and they are in SHP format. Internal users can access them via an internet GIS application, for external users only basic data are available. Distribution proceeds in CD. Concerning the purchase of data the user must fill in the standardized order form with additional statement and description of the purpose of the use of the data. The data is delivered to the end user directly in the GeoZS or sent by mail.

8.9 THE NETHERLANDS

The Geological Survey of the Netherlands publishes maps of oil and gas fields, gas storage fields and rocksalt mining locations. The collected data are in the DINO (Data and Information on the Netherlands Underground) database. It is managed with the ArcGIS application. It can be queried through a GIS interface. Concerning the rights there is no difference between internal and external users. Oil and gas data are distributed via WMS at www.nlog.nl. Except for Coal (which is not mined anymore, no other economic mineral deposits exist in the Netherlands).

A summary of the received answers are presented in Table 4.

Table 4 DIGITAL MAP DATABASES by countries

| Country | Digital map data information | | | | | Digital map data quality | | | | |
|-----------------|--|---------------------|-------------|---|--------|--------------------------|-------------|-----------|--------|--|
| | Data holder | Data level | Connections | Recent format | Access | Query | Distributed | Purchased | Coding | |
| Belgium | Geological Survey of Belgium | regional / national | - | Shape file | + | + | - | + | - | |
| Bulgaria | Ministry of Environment and Water | national | - | MapInfo, ArcGIS | + | + | - | - | - | |
| Estonia | EGK - Depository of the Manuscripts, Estonian Land Board | national | + | Excel, Access, MicroStation, ArcView | + | - | + | + | + | |
| | Estonian Oil Shale Company | national | * | Excel, Autocad | + | + | + | + | * | |
| | Estonian Land Board - Geological Base Map Database, EGK | national | + | ArcGIS , Oracle, MS SQL, PostGIS | + | + | + | + | + | |
| Hungary | Geological Institute of Hungary | national | + | MicroStation, MGE, Shape file, ArcGIS SDE | + | + | + | - | + | |
| Poland | Central Geological Archive in PGI – MIDAS database | national | - | ArcGIS SDE, Oracle | + | - | + | - | + | |
| Portugal | Directorate of Energy and Geology (DGEG) Laboratório Nacional de Energia e Geologia | national / regional | + | Access, Excell, Shape file, ArcGIS | + | + | + | - | - | |
| Romania | Institutul Geologic al Romaniei | national | - | Shape file, mdb | + | + | + | - | - | |
| Slovenia | Ministry of Economy of Republic of Slovenia | national | - | MS SQL Server, Shape file | + | + | + | - | + | |
| | Geological Survey of Slovenia | | | | | | | | | |
| The Netherlands | TNO-Geological Survey of The Netherlands – DINO database | national | * | ArcGIS | * | + | + | * | - | |

9 METADATA

Countries omitted from the list have not yet introduced metadata management.

9.1 BELGIUM

Metadata management exists at the Geological Survey of Belgium but no metadata standard is used. This system serves as a guide to all information that is digitally available at the Geological Survey of Belgium. The metadata are stored in HTML format and can be consulted through INGENIOUS, which is an in house application and not publicly accessible.

9.2 ESTONIA

Geological Survey of Estonia (EGK)

Metadata are stored in MDB and XLS files used for their editing. No standards are used. A GIS interface exists for metadata access.

Estonian Land Board

INSPIRE standard is used for metadata management. The metadata are stored in a database with web access used for their editing as well without GIS interface.

9.3 HUNGARY

Metadata management has been introduced in the Geological Institute of Hungary focused on the inventory of geological maps including those of potential geo-energy and mineral resources. ISO 19115 standard is applied and the metadata are stored in tabular and XML formats. Web services are available for their access, whereas MICKA (1G-E) and ArcExplorer are used for their editing.

9.4 POLAND

The Polish Geological Institute applies ISO and INSPIRE standards for metadata management. Metadata are stored in XML format, they are accessed through ArcGIS and they are edited using the MedaEd application.

9.5 PORTUGAL

Metadata management is operational in the National Laboratory of Energy and Geology (LNEG) with the application of INSPIRE standard. The metadata are stored in XML format with ArcGIS (SQL Server database) for access. Metadata editing proceeds applying MIG editor.

9.6 ROMANIA

Geological Institute of Romania

Metadata are stored and edited in XLS format. They can also be accessed through a GIS interface using QuantumGIS application.

National Agency for Mineral Resources

Metadata are stored and edited in an Oracle database. A GIS interface is available for metadata access.

9.7 SLOVENIA

Metadata management is operational in the Geological Survey of Slovenia. There is a three-level structure of standards applied as follows:

brief overview – Dublin Core specification,

basic overview – the ISO TC211 - metadata specification ISO 19115,

detailed overview – CEN/TC287 standard.

Metadata are stored in XML format. They can be accessed without GIS interface using the MPedit tool, applied also for their editing.

9.8 THE NETHERLANDS

Metadata management in the Geological Survey of the Netherlands is focused on describing maps and map layers. ISO 19115 standard is applied and the metadata are stored in a database with GeoSticker application for their edition. These data are not yet accessible by external users. A summary of the received answers are presented in Table 5.

Table 5 METADATA by countries

| Country | Metadata | | | | | |
|----------|---|---------------|--|----------------------------------|---------------------------|--|
| | Data holder | Standard used | Standard name | Form to store | Application to edit | Form to access |
| Belgium | Geological Survey of Belgium | - | | html | INGENIOUS | no GIS interface |
| Estonia | Geological Survey of Estonia | - | | tabular – Access and Excel files | Access, Excel | GIS interface |
| | Estonian Land Board | + | INSPIRE | database (web access) | web application | web application, without GIS interface |
| Hungary | Geological Institute of Hungary | + | ISO 19115 | tabular, xml | MICKA (1G-E), ArcExplorer | web services |
| Poland | Polish Geological Institute-National Research Institute | + | ISO, INSPIRE | xml | Medaed | web application ArcGIS |
| Portugal | Laboratório Nacional de Energia e Geologia | + | INSPIRE | xml | MIG editor | web application ArcGIS |
| Romania | National Agency for Mineral Resources | - | | database | Oracle | GIS interface |
| | Institutul Geologic al Romaniei | - | | Excel file | Excel | without GIS interface - Excel; with GIS interface - QuantumGIS |
| Slovenia | Geological Survey of Slovenia | + | three-level structure: brief overview – Dublin Core specification, basic overview – the ISO TC211 - metadata specification ISO 19115 detailed overview – CEN/TC287 | xml | MPedit tool | MPedit tool, without GIS interface |

| Country | Metadata | | | | | |
|-----------------|--------------------------------------|---------------|---------------|---------------|---------------------|----------------|
| | Data holder | Standard used | Standard name | Form to store | Application to edit | Form to access |
| | | | standard | | | |
| The Netherlands | Geological Survey of The Netherlands | + | ISO 19115 | database | GeoSticker | No |

10 PLANS FOR SHORT-TERM FUTURE

10.1 BELGIUM

The Geological Survey of Belgium plans direct connection to the database for the subsoil and soil of Flanders (DOV) in the future. It is also planning the development of a webGIS application with extended functionality for access to its data sets.

10.2 BULGARIA

In place of the present situation of the management of geo-energy and mineral resources data in three Ministries it is intended to integrate it within one organisation in the future. Metadata will be created and the databases will be updated regularly. These measures will result in more centralised management of the related data.

10.3 ESTONIA

Apart from adding supplementary data in the Estonian Oil Shale company (EOSC) and of the development of web-based technology in the Institute of Geology at Tallin University of Technology (TTÜ GI) wide-ranging measures for future developments are planned in the Estonian Land Board (ELB) including continuous data collection and quality control. Concerning metadata it will add a GIS interface with query possibilities. It is satisfied with the current state of the databases, it plans, however to start collecting borehole data from geological exploration and mining companies through a web interface and to introduce 3D geological mapping.

10.4 HUNGARY

Hungarian Mining and Geological Office

It intends to enhance the proportion of digitally available data. Concerning metadata management it will introduce INSPIRE standard. It will change from the current FoxPro to Ms SQL Server platform.

Geological Institute of Hungary

With regard to its borehole database geological sequences are identified actually as formations, members, etc. with a general description of their lithological content. The future filling of the database will be focused rather on lithological content holding more information on hydrogeological properties and raw materials as well.

Concerning the Raw material potential maps of Hungary they will be converted to the ArcGIS environment with metadata added and regular update of the data.

10.5 POLAND

No major changes are expected. The System of Management and Protecting of Polish Mineral Raw Materials (MIDAS) introduced in 1990 operates successfully satisfying the users' requirements.

10.6 PORTUGAL

Concerning the management of the available data the National Laboratory of Energy and Geology (LNEG) plans regular updating and restructuring according to INSPIRE Directive rules. An ArcGIS interface will also be implemented simplifying public access and viewing of the data.

10.7 ROMANIA

The National Agency for Mineral Resources will keep its system as it is, whereas the Geological Institute of Romania will have a number of initiatives as follows:
 updating the mineral resource and geo-energy databases; completing the databases with data in more detailed scales,
 completing the meta-databases and integrating them for web map services,
 integrating the geo-energy resource and mineral resource databases with geological and geophysical ones and developing web map services for their access and management,
 converting the geological maps stored formerly in non-GIS digital systems into GIS.

10.8 SLOVENIA

As a result of an anticipated new Mining Act there will be a register of mining plots "Book of mining data", administered by the Geological Survey of Slovenia (GeoZS). GeoZS is developing a metadata catalogue - Geonetwork, OpenLayers. Regarding the databases it is testing PostgreSQL/PostGIS and building an ArcGIS server application. It also elaborates Internet Reporting Forms of mineral resources.

10.9 THE NETHERLANDS

The Data and Information on The Netherlands Underground (DINO) system will become a Key Register. Data flows to and from DINO will be regulated by law. All data definitions for the Key Register will be nationally standardised using a conceptual information model in line with Observations & Measurements. The transition towards DINO as Key Register implies fundamental change in dataflow, database-model and overall system architecture as the system is fully webservice-based.

A summary of the received answers are presented in Table 6. Table 7 shows the internet links of the working databases.

Table 6 PLANS FOR SHORT-TERM FUTURE by countries

| Country | Organisation | Short term plan in development of | | | |
|----------|---|---|--------------------------|---|---|
| | | data | metadata | database | data organisation |
| Belgium | Geological Survey of Belgium | webGIS | none | connection to DOV | in function of webGIS |
| Bulgaria | Ministry of Economy, Energy and Tourism | Data will be collected in one governmental organization | Metadata will be created | Databases are updated on a regular basis. | Data organisation will become more centralised. |
| | Ministry of Environment and Water | | | | |
| | Ministry of Regional Development and Public Works | | | | |
| Estonia | Geological Survey of Estonia | | | | OGC WMS will be |

| Country | Organisation | Short term plan in development of | | | |
|----------|--|---|---|--|--|
| | | data | metadata | database | data organisation |
| | | | | | organised for disseminating geological maps |
| | Estonian Oil Shale Company | Supplementation of the databases | | Supplementation of the databases | |
| | Institute of Geology at Tallinn University of Technology | Development of electronic databases | | Development of WEB-based technology. | |
| | Estonian Land Board (ELB) | Continuous data collection and quality control | GIS interface with query possibilities will be added | ELB is satisfied with the current system and in the short-term future nothing but minor changes are expected | ELB is planning to start collecting borehole data from geological exploration and mining companies through web interface. We are also planning to introduce 3D geological mapping in the future. |
| Hungary | Hungarian Office for Mining and Geology | Increasing the portion of digitized/electronic data | Implementing INSPIRE | Platform change to Microsoft SQL Server | |
| | Geological Institute of Hungary | The future filling of the database will be focused rather on lithological content holding more information on raw materials as well | | | |
| Poland | Polish Geological Institute-National Research Institute | No changes. Project MIDAS is leading since 1990's. | | No changes. Project MIDAS is leading since 1990's. | No changes. Project MIDAS is leading since 1990's. |
| Portugal | Laboratório Nacional de Energia e Geologia | Regular data updates and restructuring of data according to INSPIRE Directive rules | | ArcGIS interface implementation to simplify public access and viewing. | Updates, translation and restructuring according to INSPIRE rules |
| Romania | National Agency for Mineral Resources | Keep the present system | | | |
| | Institutul Geologic al Romaniei | Updating of mineral resource and geo-energy databases; completing the databases with data at more detailed scales | Completing the metadata databases and integrating them for web map services | Integration of mineral and geo-energy resource databases with geological and geophysical databases and developing the web map services | Converting the geological maps stored in the past in other non-GIS digital systems into GIS |
| Slovenia | Geological Survey of Slovenia | New Mining Act, in this new law there will be a register of mining plots "Book of mining data", and GeoZS will | GeoZS is developing the metadata catalogue - Geonetwork, OpenLayers | We are testing PostgreSQL/PostGIS and building ArcGIS server application. | "Book of mining data", Internet Reporting forms of |

| Country | Organisation | Short term plan in development of | | | |
|-----------------|--------------------------------------|---|---|---|---|
| | | data | metadata | database | data organisation |
| | | administrating it. | | | mineral resources, ... |
| The Netherlands | Geological Survey of The Netherlands | DINO will become a Key Register. data flows to and from DINO will be regulated by law | All data definitions for the KEY Register will be nationally standardised using a conceptual information model in line with Observations & Measurements | The transition towards DINO as Key Register implies fundamentaal change in dataflow, databasemodel and overall system architecture as the system is fully webservice based. | The transition towards DINO as Key Register implies fundamentaal change in dataflow, databasemodel and overall system architecture as the system is fully webservice based. |

Table 7 WEB SITES by countries

| Country | Web site | Purpose | Operational | English |
|-----------------|---|---|-------------|----------------------------|
| | | | | |
| Belgium | www.naturalsciences.be/geology https://dov.vlaanderen.be/dovweb/html/engels.html http://environnement.wallonie.be http://environnement.wallonie.be/cartosig/carte_geologique | Web site of the Geological Survey of Belgium Database for the subsoil and soil of Flanders Regional environmental geoportal of Wallonia Geological map of Wallonia | + | + + FRENCH FRENCH |
| Bulgaria | www.mi.government.bg www.moew.government.bg www.mrrb.government.bg | Web site of the MEET Web site of the MOEW Web site of the MRDP | + | + + + |
| Estonia | www.egk.ee http://geoportal.maaamet.ee/eng www.energia.ee/en www.envir.ee www.gi.ee | Web site of the Geological Survey of Estonia Geoportal of the Estonian Land Board Web site of the Estonian Oil and Shale Company Web site of the ENVIR Web site of the TTÜ GI | + | + + + + + |
| Hungary | www.mbfh.hu www.mafi.hu | Web site of the Hungarian Min. and Geol. Office Web site of the Geological Institute of Hungary | + | HUN + |
| Poland | www.pgi.gov.pl http://geoportal.pgi.gov.pl/portal/page/portal/PIGMainExtranet http://geoportal.pgi.gov.pl/portal/page/portal/MIDASGIS/start | Web site of the Polish Geological Institute Geoportal of the Central Geological Database Geoportal of MIDAS | + | + + POL |
| Portugal | www.lneg.pt http://e-geo.ineti.pt http://www.dgge.pt | Web site of the LNEG Geoportal of geological databases Web site of the DGEG | + | POR POR POR |
| Romania | www.namr.ro www.igr.ro | Web site of the NAMR Web site of the Geological Institute of Romania | + | + RO |
| Slovenia | www.geo-zs.si http://akvamarin.geo-zs.si/ms/ | Web site of the Geological Survey of Slovenia Web application for mineral resources | + | + NO |
| The Netherlands | www.nlog.nl | The NL Oil and Gas Portal | + | + |



| | | | | |
|-------------|--|---|---|---|
| Netherlands | www.dinoloket.nl www.thermogis.nl | DINO Portal Geothermal Energy Portal | + | + |
|-------------|--|---|---|---|

11 Discussion and conclusions

During the last 7 months the WP3 working group elaborated the method of data collection, the questionnaire which was filled by the participating institutions and the owners of digital data by countries. In the frame of two sessions (in Ljubljana and in Budapest) the received answers were reviewed and the text of the report was prepared to be finalised in Lisbon in December 2010. It will be presented in the first public reporting session which is anticipated to be held in Budapest in March 2011.

The collected information includes the list of national organisations responsible for the data collection, storage and dissemination. The coordination between institutions of different levels (e.g. national, provincial and local) were also presented including the national web sites disseminating the data. The final objective of this inventory was to make for an international end-user very clear where and how national geo-resource spatial data can be obtained at this moment.

Intellectual property rights

In the field “Free” of Table 2, 3 and 4 we have made a summarising analysis of the nature in which the available data can be accessed and used in each country. Obviously, it is quite hard to provide an exact answer to this problem with only three different signs. It is therefore necessary to make some specifications concerning also the concept of intellectual property addressing the copyright issue. Even in the case when the required data are free of charge it is necessary to make a reference on the data source and the data holder invariably of what purpose the data will be used for. The most frequent sign occurring in Table 2, 3 and 4 under the heading “Free” is “+/-“ which means that the data are free with certain restrictions. It includes the following scenarios in the frame of this project:

- a) data of some pilot areas are only available which is the case of mining areas in Belgium.
- b) data of the coordinate register (bounding coordinates) of mining areas or plots can freely be accessed e.g. in Bulgaria, Romania, Hungary and Poland.
- c) only registry data (coordinates and some other administrative data) of boreholes and mining areas or plots can freely be accessed e.g. in Slovenia and Hungary. Anyway, it is not quite frequent that at least some production data can be accessed unrestricted, which is the case e.g. in the Netherlands.
- d) data are free for access only for non-commercial use which is quite frequently the case, in our context e.g. in Estonia.
- e) in Portugal users can have free access to the data upon contract which in itself means already that the data are not completely free.

In the majority of the participating countries geological maps and maps indicating geo-energy and mineral resources occurrences are available against a certain fee with the exception of the maps published on the web. In certain countries these specific maps can only be used by professionals for they are not even sold for the public, like in Poland.

Notwithstanding in what level and detail the related data are available they stay invariably the intellectual property of the mostly state-owned organisations which collected and manage them.

Relation with EU policies

Concerning data dissemination, the requirements derived from relevant EU policies, including INSPIRE put a great emphasis on:

- a) metadata management
- b) the interoperability of spatial data sets and services
- c) network services

d) data and service sharing policy

During the study it became obvious that the content and structure of raw material research data differs substantially in each country. It is further complicated by the fact that the data can be acquired in several different institutions and at different levels of processing.

Given that the palette of countries participating in the project is quite variable ranging from EU founding members to just recently joined states their technological level of development and potential are also quite versatile which is a determining factor in how they can comply with the related requirements.

Metadata management is addressed separately in chapter 9 and Table 3. At this point it has only to be noted that metadata with the application of ISO and INSPIRE standards are widely used e.g. in Estonia, Poland, Portugal, Slovenia and the Netherlands, whereas in some of the participating countries it has not even been introduced yet. This very project provides also an incentive to these countries to close the gap and we can see in chapter 10 that they are really dedicated to this issue furthering their technological development and a harmonised compatibility with EU standards requirements.

Concerning points b), c) and d) of the above list, quite improved web-based services have been developed in a number of the participating countries of which the geoportals of the Central Geological Database and the MIDAS of the Polish Geological Institute, de DOV site of Flanders and the DINO site of the Netherlands have to be emphasised. Last, but not at all least the geoportal of the Estonian Land Board has to be stressed as an outstanding example of the interoperability of different spatial data sets through a web-based application.

In summary, Bulgaria, Hungary and Romania are working on implementing the requirements of relevant EU policies concerning data dissemination. Belgium, Poland, Portugal and Slovenia are already on a quite advanced level of implementation. Estonia and the Netherlands are just short of full compliance. However none of the countries possesses a system that could be regarded as an example for setting up the harmonised database of the EuroGeoSource project not even in a meta database level. Consequently, a new system and its portal has to be implemented based on the EU regulations. It will be prepared in the frame of WP4 and the subsequent work packages.