• Mapping the interest for the classification: 2016
• What do we mean on the harmonization?
• EuroGeoSurveys facts and news (MREG)
• EU funded projects dealing with the classification
• National project (MFGI-Hungary), case studies
  • Non-metallic mineral resources
  • Coals
  • Hydrocarbons
  • Geothermal energy
• Summary and conclusions – recent position
Introduction: mapping the interest

Message on national and international levels: The importance of the classification-harmonization between national systems and international standards and the UNFC-2009 framework is increasing, based on UNECE EGRC data.

Sári és Horváth (2016)
What do we mean on the harmonization?

International standards for reporting and classification framework

Inventories are developing by reports of contractors with experts

national registration

due to related legislation, methodology

national expert

national reporting

national classification

exploration outcomes methodology

Role of Competent Persons in validation of data

UP TO DATE MINERAL RESOURCE CLASSIFICATION & INVENTORY

EU information framework

uniform earth -scientific, economic, technological, environmental, social data (AHWG 2014)
Europe: ongoing harmonization affecting mineral resources

**INSPIRE:** Geological Surveys are working on the implementation of this concerning data on minerals as well. Responsible authorities have to register mineral resources, reserves or endowments with the indication of the reporting codes, classification systems. The relevant content (classification/reporting) is heterogenous.

- This infrastructure will enable the sharing of environmental spatial information among public sector organisations, facilitate public access to spatial information across Europe and assist in policy-making across boundaries.
- Based on the infrastructures for spatial information established and operated by the Member States of the European Union.

---

<table>
<thead>
<tr>
<th>Infrastructure data..</th>
<th>Environment data…</th>
<th>Social data (population)</th>
<th>Land Use Data..</th>
<th>Mineral resources</th>
</tr>
</thead>
</table>


The most important topics of earth resources in the joint strategy (2014) of the community of National Geological Surveys in Europe (EuroGeoSurveys/EGS) can contribute to the development of sustainable resource management system (including minerals).

EGS Members depending on access to data on different types of resources can contribute to the development of sustainable resource management system (including minerals).

www.eurogeosurveys.org
EU funded projects in the EuroGeoSurveys

dealing with the importance and need the joint language for mineral resources and reserves and with the raw material data management

- **MINVENTORY**: EU raw materials statistics on resources and reserves. www.minventory.eu
- **MINERALS4EU**: Minerals Intelligence Network for Europe. www.minerals4eu.eu
- **MICA**: Mineral Intelligence Capacity Analysis
- **EURARE**: www.eurare.eu. An ongoing project inventing of studying REE mineral systems in Europe
- **MINATURA2020**: Mineral Deposits of Public importance. www.minatura2020.eu (led by MINPOL, Austria)
- **SNAP SEE**: Sustainable Aggregates Planning in South East Europe. www.snapsee.eu
- **FORAM**: World Forum for Raw Materials (www.foramproject.net)

**Other projects** submitted to the European Union H2020 program:
- Optimizing quality of information on Raw Materials
- Linking land use planning policies to national mineral policies
- International network for training centres on mineral resources

All EU projects having data in INSPIRE compliant environment will be integrated into the Raw Material Information System that is developed by the Joint Research Centre (Ispra).
Relationship between legislation and reporting in Europe

- Heterogenity by national and regional conditions
- Applications do not necessarily belong to the existence or the lack of the relevant legislation

Based on:

EuroGeoSurveys and Members of this Network participate regularly on the UNECE EGRC and EFG meetings dealing with classification
Relationship between the joint language and mineral safeguarding

- Heterogeneity by national and regional conditions
- The use of international standards or the UNFC-2009 may facilitate the mineral safeguarding but there is no strong correlation between them. However comprehensive, sustainable mineral resource management systems on EU and MS levels require the joint language primary and secondary resources as well.

Based on:
EGS MREG Meetings:
New results in the Hungarian project on the harmonization

Hungarian Office for Mining and Geology (MBFH)
Geological and Geophysical Institute of Hungary (MFGI)
Hungarian Geological Society (MFT)
Hungarian Mining Association (MBSZ)

Modernization of the National Mineral and Geothermal Energy Resources Inventory based on national mineral resource classification (traditional) by the concept and elements of international reporting standards, codes (CRIRSCO family and SPE-PRMS) and UNFC-2009, since 2013

2. **Bridging between** CRIRSCO family, SPE-PRMS, Geothermal codes and UNFC-2009
3. **Stakeholder consultations**: authority, experts, entrepeneureurs
4. **Recommendation** based on tests and demonstration for the harmonization
5. A guideline is progress, **results were published on national level** (English summaries)
Bulletin of Hungarian Geological Society
http://epa.oszk.hu/01600/01635/00452/pdf/

• Cs. Baksa, T. Fancsik, G. Katona: Preface to the special volume dealing with the national and international practice of the mineral resource inventories.

• Z. Horváth, K. Sári, B. Fodor: Overview of the international mineral resource classification framework and the reporting standards for solid minerals

• A. Nádor: An overview of the international classification and reporting systems for geothermal energy and the first attempts to bring Hungarian practice in line with these systems

• Zs. Kovács: Domestic practice with reference to the hydrocarbon inventory of Hungary and the uniform interpretation and correlation of classification, in line with international systems

• Z. Horváth, K. Sári: The modernisation of the Hungarian non-metallic mineral resource inventory based on the international mineral classification framework and reporting standards

• Z. Püspöki, Mrs Hámor M. Vidó, K. Sári, R. Szeiler, T. Fancsik: Facilities for, and deficiencies of the registry of Hungarian coal resources

• Gy. Falus, Á. Szamosfalvi: Overview of international systems for the registration of carbon dioxide geological storage potential
### Harmonization tool: UNFC-2009

#### Recent classification

<table>
<thead>
<tr>
<th>Recent classification</th>
<th>UNFC G</th>
<th>Possible UNFC G sub-categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>G1.1</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>G1.2</td>
</tr>
<tr>
<td>1st, 2nd, and 3rd complexity groups of C1</td>
<td>1</td>
<td>G1.3</td>
</tr>
<tr>
<td>4th complexity group of C1</td>
<td>2</td>
<td>G2.1</td>
</tr>
<tr>
<td>C2</td>
<td>2</td>
<td>G2.2</td>
</tr>
<tr>
<td>D1 (not included in mineral resource inventory)</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Non-metallic solid minerals – based on the inventory

<table>
<thead>
<tr>
<th>The status of the mine</th>
<th>UNFC F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 On Production</td>
<td>1</td>
</tr>
<tr>
<td>2 On Hold</td>
<td>2.2</td>
</tr>
<tr>
<td>3 Closed</td>
<td>2.3</td>
</tr>
<tr>
<td>0 Exploration Area</td>
<td>3</td>
</tr>
</tbody>
</table>

**Modifying factors**

- Based on **UNFC-2009** incorporating Specifications for its Application and **FGU GKZ - CRIRSCO (2010)**

**Hungarian (Russian)**

- Exploitation Reserves in fully explored deposits **(No reserves in the Hungarian system)**
- Exploitation Reserves in estimated deposits
- Resources of category **C1** in deposits of 1st, 2nd, and 3rd complexity groups and categories **A and B**
- Resources of category **C2** in deposits of all complexity groups and category **C1** in deposits of the 4th complexity group
- **D1**

**Exploration project**

- Exploration Results

**Potentially commercial project**

- Measured Resources

**Commercial project**

- Indicated Resources

**Commercial project**

- Inferred Resources

**Exploration project**

- No data collection for „E“, „only“ indirect information (in operation: E1)
Case study: Northeast Hungary

Non-metallic mineral resources of 4 counties
- Young sediments: mainly Pleistocene,
- Construction stones are mainly Miocene volcanics
- Complexity is estimated
Conversion: Hydrocarbons (Zsolt Kovács)

<table>
<thead>
<tr>
<th>UNFC Classification</th>
<th>Hungarian inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E category</strong></td>
<td><strong>F category</strong></td>
</tr>
<tr>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Commercial Projects</td>
<td>On Production</td>
</tr>
<tr>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Justified for Development/ undeveloped non-producing</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Potentially Commercial Projects</td>
<td>Development On Hold or Unclarified</td>
</tr>
<tr>
<td>2</td>
<td>2.2-2.3</td>
</tr>
<tr>
<td>Non Commercial Projects</td>
<td>2.2- 2.3</td>
</tr>
</tbody>
</table>

**Szeged-Kiskunság subbasin**

**Great Hungarian Plain**

G1+G2 quantity data distribution based on reservoir and field production and HC quality analysis

*Sum recoverable oil = 100%, sum recoverable gases = 100%*
Conversion: Geothermal energy (Annamária Nádor)

**Szentes (South East Hungary)**
- Árpád-Agrár Zrt. large agriculture company
- 14 production wells
- Upper Miocene porous reservoir
- no reinjection
- heating of 30 ha greenhouses and plastic tents, 35 000 m² of poultry yards and stables + crop drying

<table>
<thead>
<tr>
<th>Input parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>Reservoir area (km²)</td>
</tr>
<tr>
<td>Calculated parameters</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>Total volume (km³)</td>
</tr>
<tr>
<td>Calculation formula</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>A*B</td>
</tr>
</tbody>
</table>

**Min**
- 45
- 0.135
- 0.05
- 103
- 0.1

**Max**
- 57
- 0.255
- 0.07
- 132
- 0.2

**"p90"**
- 45.9
- 0.137
- 0.054
- 104
- 0.11

**"p50"**
- 51
- 0.195
- 0.06
- 117
- 0.15

**"p10"**
- 56.2
- 0.251
- 0.067
- 130
- 0.19

**Min**
- 6.89
- 0.405
- 142
- 19.26

**Max**
- 9.9
- 0.59
- 213
- 31.29

**"p90"**
- 13.08
- 0.8
- 299
- 48
Cate- Category | UNFC-2009 Definition | Reasoning for classification
--- | --- | ---
E.1. | Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions | • existing heat market
• all production licenses available and guaranteed within reasonable timeframe
• very positive and quantified effects on the reduction of gas consumption and decreased \( \text{CO}_2 \) emission, as well as reduced heating costs

F.1. | Extraction is currently taking place. | • project has been operating for some years
• technically feasible use (individual space heating - agriculture), good thermal efficiency

G.1. | Quantities associated with a known deposit that can be estimated with a high level of confidence (*High confidence / low estimate*) | A volumetric Monte Carlo assessment has indicated a 90% probability of 19,26 PJ of recoverable geothermal energy

G.2. | Quantities associated with a known deposit that can be estimated with a moderate level of confidence (*Moderate confidence / best estimate, incremental to G1*) | A volumetric Monte Carlo assessment has indicated a 50% probability of 31,29 PJ of recoverable geothermal energy. Therefore G2 is 12,03 PJ

G.3. | Quantities associated with a known deposit that can be estimated with a low level of confidence (*Low confidence / high estimate, incremental to G2*) | A volumetric Monte Carlo assessment has indicated a 10% probability of 48 PJ of recoverable geothermal energy. Therefore G3 is 35,97 PJ

---

**Detailed technical and non-technical data owned by the project company are needed for the classification - often not available for an independent evaluator.**
Selection of a coal project
Improvement of the status of the selected project

Characterisation of volume calculation blocks
*thickness*, *calorific value*, *ash content*, *sulphur content*, *volatiles*

Isopach maps for mine planning

Mining plan and pre-estimation of mining costs

Identification of optimal Clean Coal Technologies and accessorial possibilities (e.g. agriculture, REE elements)

Based mostly on archives

Based on recent activities
Summary and Conclusions

• Harmonization can be done if additional data service (e.g. complexity) is realized. Due to the fact of the heterogenity of legislation, practice and data management in European countries, the harmonization by classification – reporting – inventory point of views, it can be done only by competent surveys or authorities that have appropriate information and data for mineral resources.

• By the contribution of national experts national mineral resource inventories can support the national mineral resource management. On international level data may only be informative without the contribution of Competent Persons. This fact may require the integration of Competent Persons into the harmonization.

• Stakeholder consultations have important role in the development of the concept, to avoid potential conflicts during the harmonization in both the bottom-up and in the top-down approach.

• Concerning Hungary the harmonization between the National Inventory and SPE-PRMS has been implemented and the related legilsation is in progress.
Summary and Conclusions

- Synergies between scientific approach, modernization of inventory and harmonization are important. Guidelines for EU and global levels would be very useful. The results of EU-funded projects (e.g. H2020) with the participation of the network of EuroGeoSurveys will contribute to the concept of the data harmonization for mineral resources.

- The implementation of harmonization may also depend on the declaration of the importance of primary and secondary raw materials in the frame of developing mineral policies and appropriate position in the existing or new mineral strategies are also important.

- National Geological Surveys should develop the concept of harmonization and support collaboration projects. Terminology for harmonization of “resources” and “reserves” should be adopted from international standards.

- The EGS MREG is in favour of collaboration with the UNECE-EGRC to promote the transfer of knowledge and speak for the interests of the National Geological Surveys and other key stakeholders in the mineral resources community.
THANK YOU FOR YOUR ATTENTION!

40 Years Listening to the Beat of the Earth

EuroGeoSurveys, Brussels

Geological and Geophysical Institute of Hungary, Budapest