



GSEU

GEOLOGICAL SERVICE | FOR EUROPE

Zbyněk Gabriel
Czech Geological Survey

Duška Rokavec
GeoZS Slovenia

Sebastian Pflaiderer
GeoSphere Austria

Zoltán Horváth
SARA Hungary

www.geologicalservice.eu

Bridging methodology

Ljubljana, May 14-15, 2024



Funded by
the European Union



Bridging Methodology

- **General Principles of Bridging**
- **Bridging the Czech National System to UNFC**
- Bridging the ABC System to UNFC
- Bridging the Austrian National System to UNFC



Bridging between National Classification Systems and UNFC

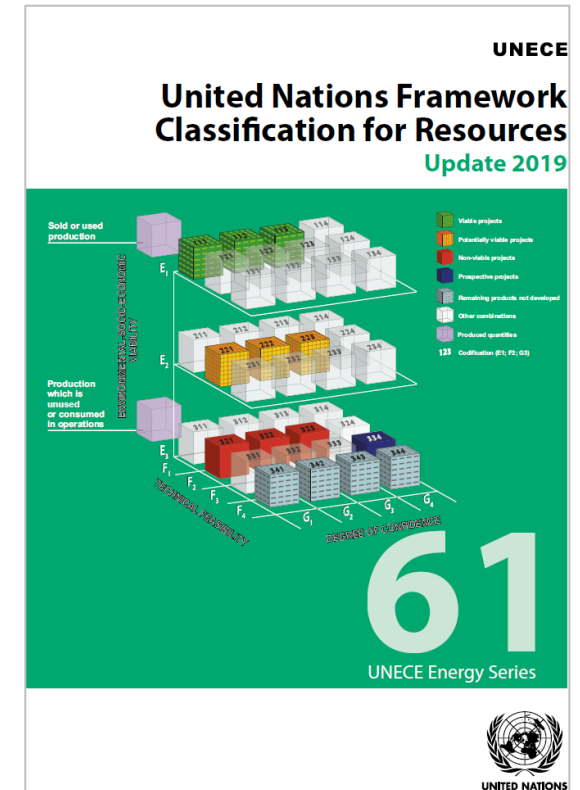
Mapping

To generate a **Mapping Document** by comparing the definitions and specifications of each Category/Class of one classification system to the definitions and specification of each of the Categories/Classes in another system in order to **identify the similarities and differences between them.**

Harmonization

... and then, if necessary, to **adjust definitions** and/or specifications of one system so that they lead to **comparable results.**

A system that is harmonized with UNFC can become an **Aligned System** through the development and **endorsement** (by the EGRM) of a **Bridging Document.**

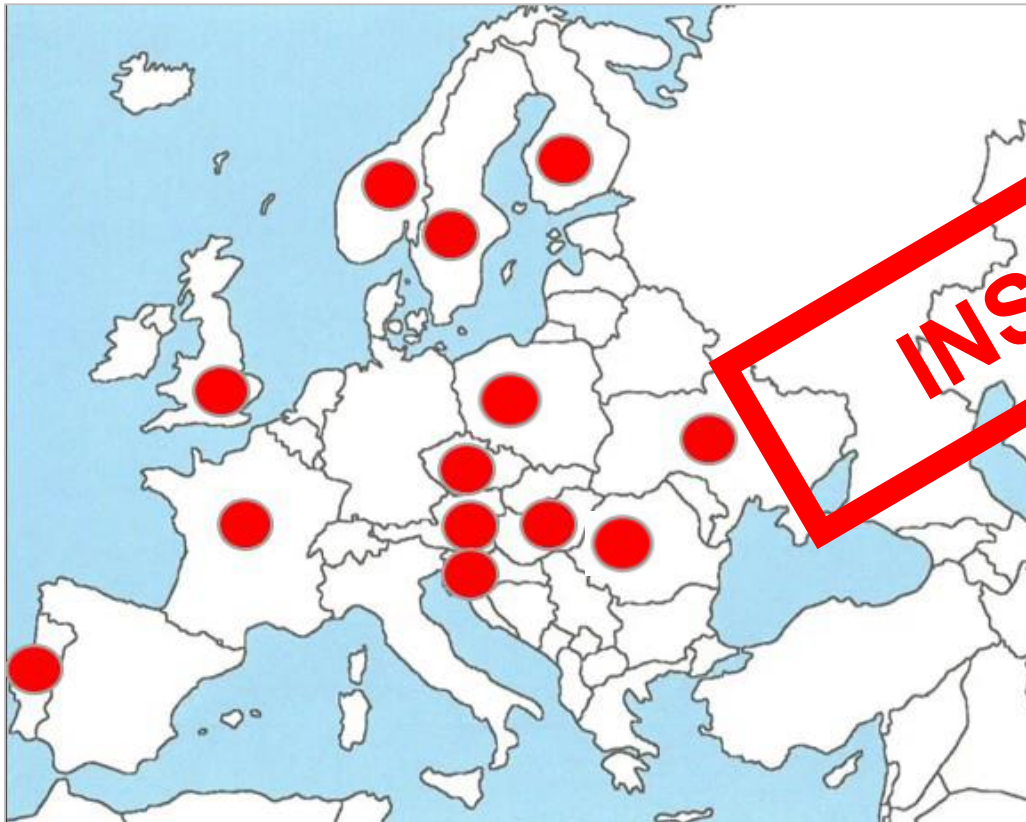


UNFC Update 2019, Part II



Different situations in each country

Many countries have guidance documents



Adapted from: Horváth, Z. et al. (2023): GSEU WP2 T2.4. Report on methodology and guidance for EU-level data harmonization with UNFC v2.

INSPIRATION

The screenshot shows the UNECE website's 'UNFC Documents' section. It features a navigation bar with 'About UNECE', 'Our work', 'Themes', 'SDGs', 'Open UNECE', 'Events', 'Publications', and 'Media'. Below the navigation, there are tabs for 'SUSTAINABLE ENERGY' and 'SUSTAINABLE RESOURCE MANAGEMENT / UNFC DOCUMENTS'. The main content area is titled 'UNFC Documents' and includes a search bar, a document icon, and a list of documents. A large red 'INSPIRATION' stamp is overlaid on the page.

Specifications	
Bridging to CRIRSCO Template (Revised 1 May 2015)	ENG
Bridging to PRMS (updated 28 April 2023)	ENG FRE RUS
Bridging to NEA/IAEA 'Red Book'	ENG FRE RUS
Bridging to Russian Federation Oil & Gas (updated 28 April 2023)	ENG FRE RUS
Updated Chinese Minerals Bridging Document October 2022 in Chinese, English, French and Russian	
Updated Chinese Petroleum Bridging Document October 2022 in Chinese, English, French and Russian	
Case Study available here	
Chinese Solid Minerals	ENG/CHI
As approved by the Committee on Sustainable Energy, 27 th Session, September 2018	ENG FRE RUS
Chinese Petroleum	ENG/CHI
As approved by the Committee on Sustainable Energy, 27 th Session, September 2018	ENG FRE RUS

Link to official Bridging Documents of Aligned Systems:
https://unece.org/sustainable-energy/sustainable-resource-management/unfc-documents#accordion_1



Different situations in each country

Countries with UNFC incorporated in their legislation

- Mostly with original ABC system
- Guiding document existing

Countries without UNFC included in their legislation

- Countries with no national classification system
- Countries with ex-soviet based ABC system
- Countries with other classification system



Steps in preparing a Mapping Document

Preparation phase

Every country with existing national system has different definitions of their categories and different arrangement of the relevant authorities and level of data availability.

- List of definitions of the national system categories
- Identified sources of data for UNFC E, F and G axis

Mapping phase

Find the best fit between definitions

- Compare definitions
- Identify thresholds between categories that fit the UNFC



Looking for best fit between definitions

Ročník 2008

SBÍRKA ZÁKONŮ
ČESKÁ REPUBLIKA

Částka 85 Rozeslána dne 18. července 2008 Cena Kč 22,-

OBSAH:

265. Nálež. Ústavního soudu ze dne 22. ledna 2008 ve věci návrhu na zrušení části ustanovení § 37 odst. 5 zákona č. 44/1988 Sb., o ochraně a využití nerostného bohatství (horní zákon), ve znění zákona č. 386/2009 Sb., kterým se mění zákon č. 44/1988 Sb., o ochraně a využití nerostného bohatství (horní zákon), ve znění pozdějších předpisů, a zákon č. 61/1988 Sb., o hornické činnosti, výbušninách a o státní báňské správě, ve znění pozdějších předpisů

National legislation framework



United Nations
Economic and Social Council
Economic Commission for Europe
CRIRSCO

United Nations Framework Classification for Resources
Update 2019

Supplementary Specifications
for the Application of
United Nations Framework Classification for Resources to Minerals

Guidance Note on
the use of the Bridging Document between
the CRIRSCO Template and UNFC

Bridging Document
between the
United Nations Framework Classification for Resources
and the
European Resource Management System
and the
United Nations Framework Classification for Resources
2023 Update

UNFC GUIDANCE EUROPE
for the Application of the United Nations
Framework Classification for Resources (UNFC) for
and Anthropogenic Resources in Europe

Methodology for the implementation of the UNFC
system in the legislative framework of the Czech
Republic.

Project leader: RNDr. Zbyněk Gabriel, CSc.

Česká geologická služba/ Czech Geological Survey
Klárov 131/3, 118 21 Praha 1
Geologická 6, 152 00 Praha 5
Kasárna 26, 170 00 Praha 7
Loketova 22, 602 00 Brno
Dačického náměstí 11, 284 01 Kuřim Hora
IČO 00025798, DIČ CZ 00025798
www.geology.cz

15. 12. 2023

Within the hierarchy, documents at higher levels consistently **override** those at lower levels.



Example: P₂ category of the ABC system

ABC system definition includes: „Prognosticated resources based on positive evaluation of deposit indications and anomalies observed during mapping and geophysical, geochemical and other work...

UNFC Update 2019

Category	Sub-Category	Sub-Cat
F3	F3.1	Site-specific studies have identified sufficient confidence to warrant further work.
	F3.2	Local studies indicate the potential area but requires more data and work to have sufficient confidence to warrant further work.
	F3.3	At the earliest stage of studies potential development in an area is identified.

Minimum UNFC Categories	INSPIRE Code Name (Exploration Activity)	INSPIRE Code (Exploration Activity)	INSPIRE Code List Description
E3.2 F3 G4	not operating	notOperating	A mine is not operating.
F3.2	detailed surface exploration	detailedSurfaceExploration	Detailed surface exploration to delineate anomalies and describe occurrences in their refined geological context.
	detailed geology	detailedGeology	Detailed geological mapping of the area(s) of interest.
	detailed geochemistry	detailedGeochemistry	Detailed surveys (often on a grid) with the most appropriate method, to confirm and better delineate and characterize geochemical anomalies identified during the previous phase.
	detailed geophysics	detailedGeophysics	Detailed surveys (often on a grid) with the most appropriate method, to confirm and better delineate and characterize geophysical anomalies identified during the previous phase.
	detailed heavy mineral sampling	detailedHeavyMineralSampling	Detail prospecting in a local scale with a hand-held washing tool, usually shaped like a plate or a flat cone, at the bottom of which the densest fractions of a soil, a stream sediment is collected.

Guidance Europe



Countries with no obligatory national classification system

No obligatory classification. However, obligatory system of authorizations, permits and practices.

Facilitation of direct application of UNFC through guidance documents to ensure compatibility.

Application using decision trees. With caution could be used for national systems guidelines.



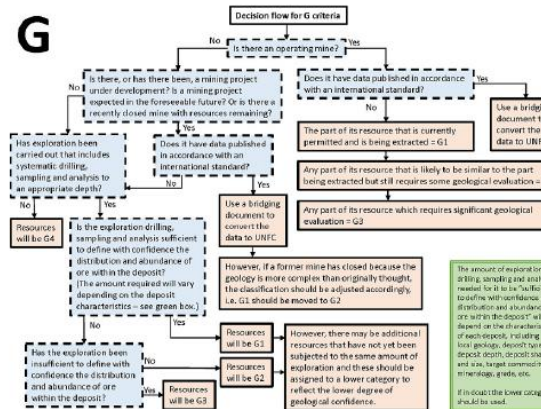
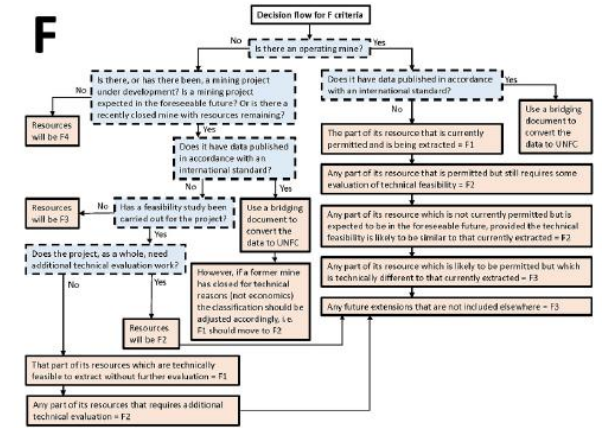
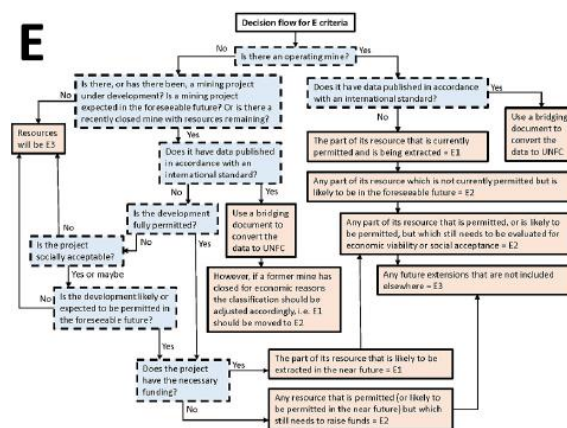
Countries with no obligatory national classification system

No obligatory classification. However, obligatory system of authorizations, permits and practices.

Facilitation of direct application of UNFC through guidance documents to ensure compatibility.

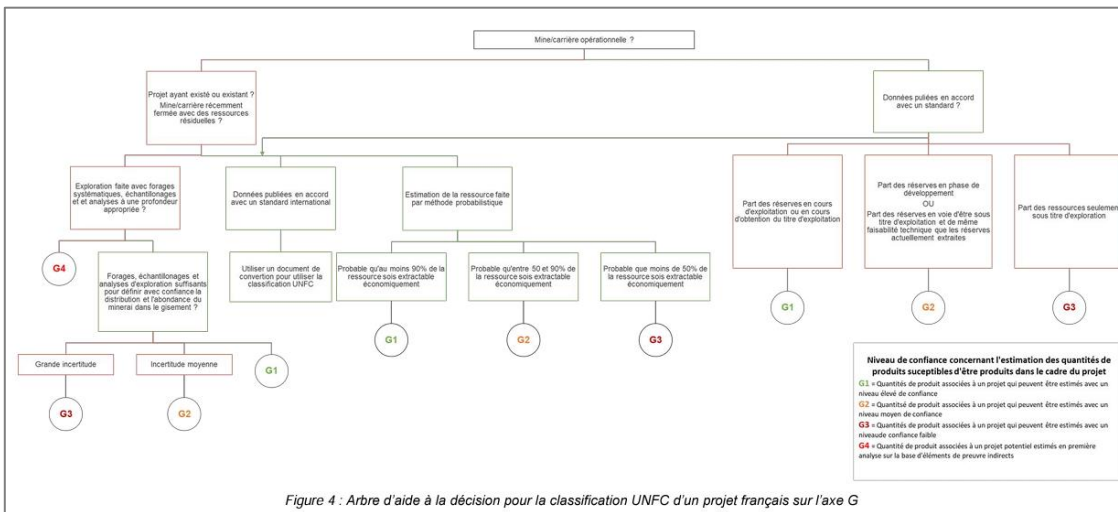
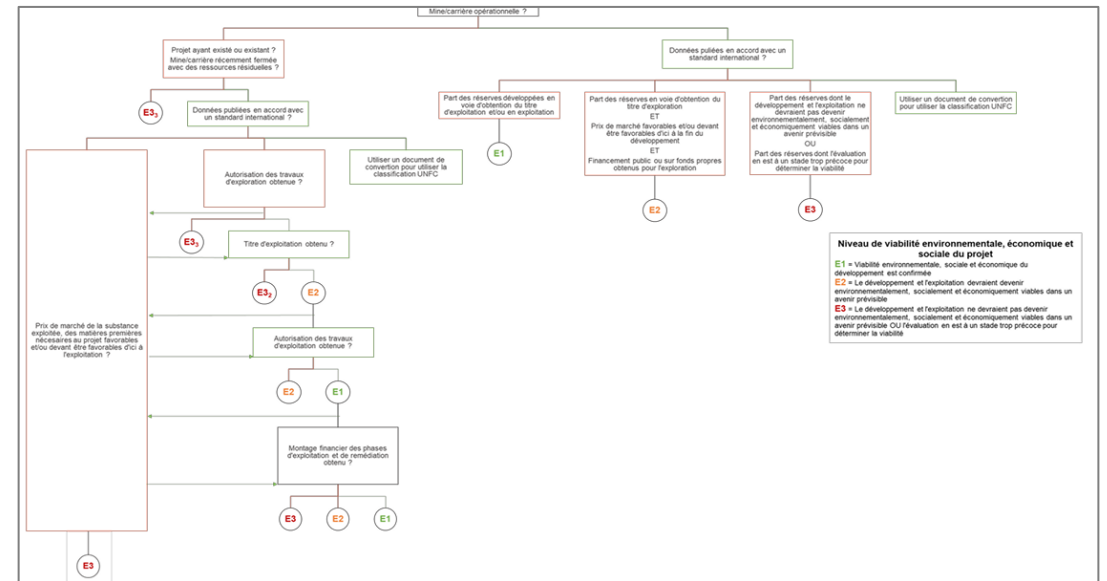
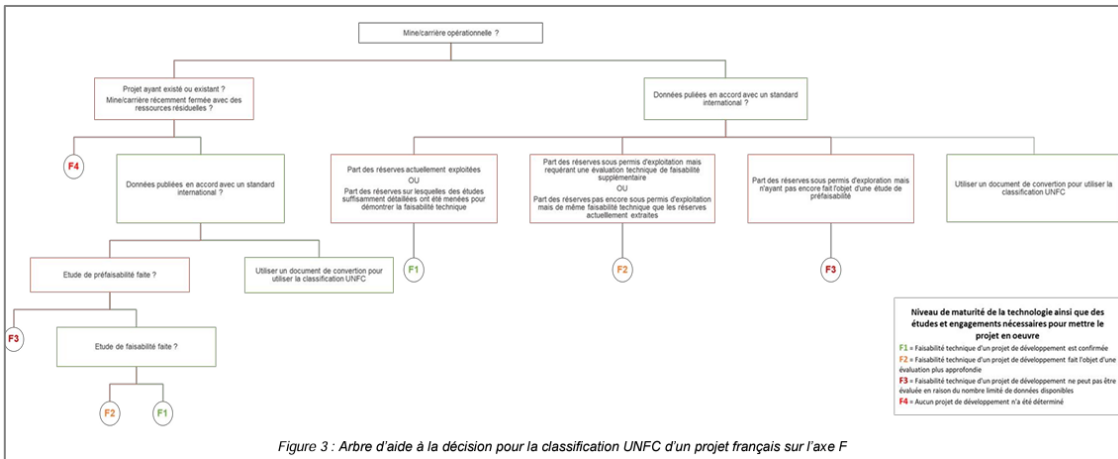
Application using decision trees. With caution could be used for national systems guidelines.

10





Countries with no obligatory national classification system





Countries with non-compatible national classification system

Countries with obligatory national system of mineral deposit classification which is non-compatible with any other system





Example from the Czech mapping

	RESERVES				PROGNOSTICATED RESOURCES	
	EXPLORED		PROSPECTED		P	Q
	Free	Restricted	Free	Restricted		
ECONOMIC						
POTENTIALLY ECONOMIC						

Potentially Economic Prospected Free Reserves

Active project

Parts of deposit that are currently not further developed due to its sub-economical nature



Potentially Economic Reserves – E and F Categories

Czech Mining Act Category

Mining Act Section 14 (2b): „Potentially Economic Reserves are **reserves which are presently unusable** because they do not meet existing technical and economic conditions of use, but which are **expected to be usable in the future** in view of expected technical and economic developments.”

UNFC Category

E3.2: "Environmental and socio-economic viability **cannot yet be determined** due to insufficient information."

E3.3 "On the basis of realistic assumptions of future conditions, it is currently considered that there are **not reasonable prospects for environmental-socio economic viability in the foreseeable future.**"

F2.2: "Project activities are on hold and/or where justification as a development may be subject to **significant delay.**„

F2.3: "There are no plans to develop or to acquire additional data at the current time due to **limited potential.**"



Potentially Economic Reserves – E and F Categories

Czech Mining Act Category

Mining Act Section 14 (2b): „Potentially Economic Reserves are **reserves which are presently unusable** because they do not meet certain technical and economic conditions and are **expected to be used** in the future if the expected technical and economic conditions are met.

UNFC Category

F2.1: „Project activities are on hold and/or where justification as a development may be subject to **significant delay**.,, **There are no plans to develop or to acquire additional data at the current time due to limited potential.**“

There will always be certain level of freedom in the category usage. Mapping document would thus mostly have a character of guidance for Qualified Expert in their decision-making.



Prospected Reserves – G Category

Czech Mining Act Category

Mining Act Section 14 (2a) „In reserve calculations, **reserves of a reserved deposit are classified according to the degree of exploration** of the reserved deposit and knowledge of its geological conditions or part thereof, the quality and technological characteristics of the minerals and mining-technical conditions **into prospected and explored reserves.**

No other specification exists.

CRIRSCO/UNFC Category

Decision by the Czech UNFC Bridging Expert Group:

„**Prospected reserves**“ are in practice used in a similar way as **Inferred Resources**:

CRIRSCO: „An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling....“

„An Inferred Resource has a lower level of confidence than that applying to an Indicated Mineral Resource...“

Inferred Resources: G3



Potentially Economic Prospected Free Reserves

E3.2 F2.2 G3
Development Unclarified



All selected categories need to have a reasoning

Czech Mining Law Categories	UNFC Category	UNFC Sub-category	Reasoning
Approved Mineable Reserves <i>Approved Commissioning, Development and Mining Plan</i> <i>In operation</i>	111, 112	E1.1 F1.1 G1,2	Mineable Reserves at an operated deposit that has all necessary approvals for mining activities. Czech Mining Law definition of "Mineable Reserves" is approximate to CRIRSCO definition of "Reserves". In UNFC the CRIRSCO Reserves are E1F1G1,2.
Approved Mineable Reserves <i>Approved Commissioning, Development and Mining Plan</i> <i>In development</i>	111, 112	E1.1 F1.2 G1,2	Mineable Reserves at a deposit in commissioning/development that has all necessary approvals for mining activities. Czech Mining Law definition of "Mineable Reserves" is approximate to CRIRSCO definition of "Reserves". In UNFC the CRIRSCO Reserves are E1F1G1,2.
Approved Mineable Reserves <i>Approved Commissioning, Development and Mining Plan</i> <i>Currently not operating</i>	111, 112	E1.1 F1.3 G1,2	Mineable Reserves at a deposit that has all necessary approvals for mining activities which is active but currently not operated. Czech Mining Law definition of "Mineable Reserves" is approximate to CRIRSCO definition of "Reserves". In UNFC the CRIRSCO Reserves are E1F1G1,2.
Mineable Reserves <i>Commissioning, Development and Mining Plan not approved</i> <i>Currently not operating</i>	221, 222	E2 F2.1 G1,2	Active projects that do not have approved Commissioning, Development and Mining Plan, but have already calculated "Mineable Reserves". E2: "Development and operation are expected to become environmentally-socially-economically viable in the foreseeable future." F2.1: "Project activities are ongoing to justify development in the foreseeable future." G1 and G2 are acknowledged in the CRIRSCO template for Reserves and Measured and Indicated Resources.
Economic Explored Free Reserves <i>Established Mining Area</i>	221, 222	E2 F2.1 G1,2	Active projects that have Established Mining Area, but do not have approved Commissioning, Development and Mining Plan. E2: "Development and operation are expected to become environmentally-socially-economically viable in the foreseeable future." F2.1: "Project activities are ongoing to justify development in the foreseeable future." "Explored Reserves"



Defining thresholds

Czech Mining Law Categories	UNFC Category	UNFC Sub-category	Reasoning
Approved Mineable Reserves <i>Approved Commissioning, Development and Mining Plan</i> <i>In operation</i>	111, 112	E1.1 F1.1 G1,2	Mineable Reserves at an operated deposit that has all necessary approvals for mining activities. Czech Mining Law definition of "Mineable Reserves" is approximate to CRIRSCO definition of "Reserves". In UNFC the CRIRSCO Reserves are E1F1G1,2.
Approved Mineable Reserves <i>Approved Commissioning, Development and Mining Plan</i> <i>In development</i>	111, 112	E1.1 F1.2 G1,2	Mineable Reserves at a deposit in commissioning/development that has all necessary approvals for mining activities. Czech Mining Law definition of "Mineable Reserves" is approximate to CRIRSCO definition of "Reserves". In UNFC the CRIRSCO Reserves are E1F1G1,2.
Approved Mineable Reserves <i>Approved Commissioning, Development and Mining Plan</i> <i>Currently not operating</i>	111, 112	E1.1 F1.3 G1,2	Mineable Reserves at a deposit that has all necessary approvals for mining activities which is active but currently not operated. Czech Mining Law definition of "Mineable Reserves" is approximate to CRIRSCO definition of "Reserves". In UNFC the CRIRSCO Reserves are E1F1G1,2.
Mineable Reserves <i>Commissioning, Development and Mining Plan not approved</i> <i>Currently not operating</i>	221, 222	E2 F2.1 G1,2	Active projects that do not have approved Commissioning, Development and Mining Plan, but have already calculated "Mineable Reserves". Project activities are ongoing and are expected to become environmentally-socially-economically viable in the foreseeable future." F2.1: "Project activities are ongoing and are expected to become environmentally-socially-economically viable in the foreseeable future." G1 and G2 are also expected to become environmentally-socially-economically viable in the foreseeable future. "Indicated Resources."
Economic Explored Free Reserves <i>Established Mining Area</i>	221, 222	E2 F2.1 G1,2	Active projects that have Established Mining Area, but do not have approved Commissioning, Development and Mining Plan. E2: "Development and operation are expected to become environmentally-socially-economically viable in the foreseeable future." F2.1: "Project activities are ongoing to justify development in the foreseeable future." "Explored Reserves"

POPD APPROVED

POPD NOT APPROVED



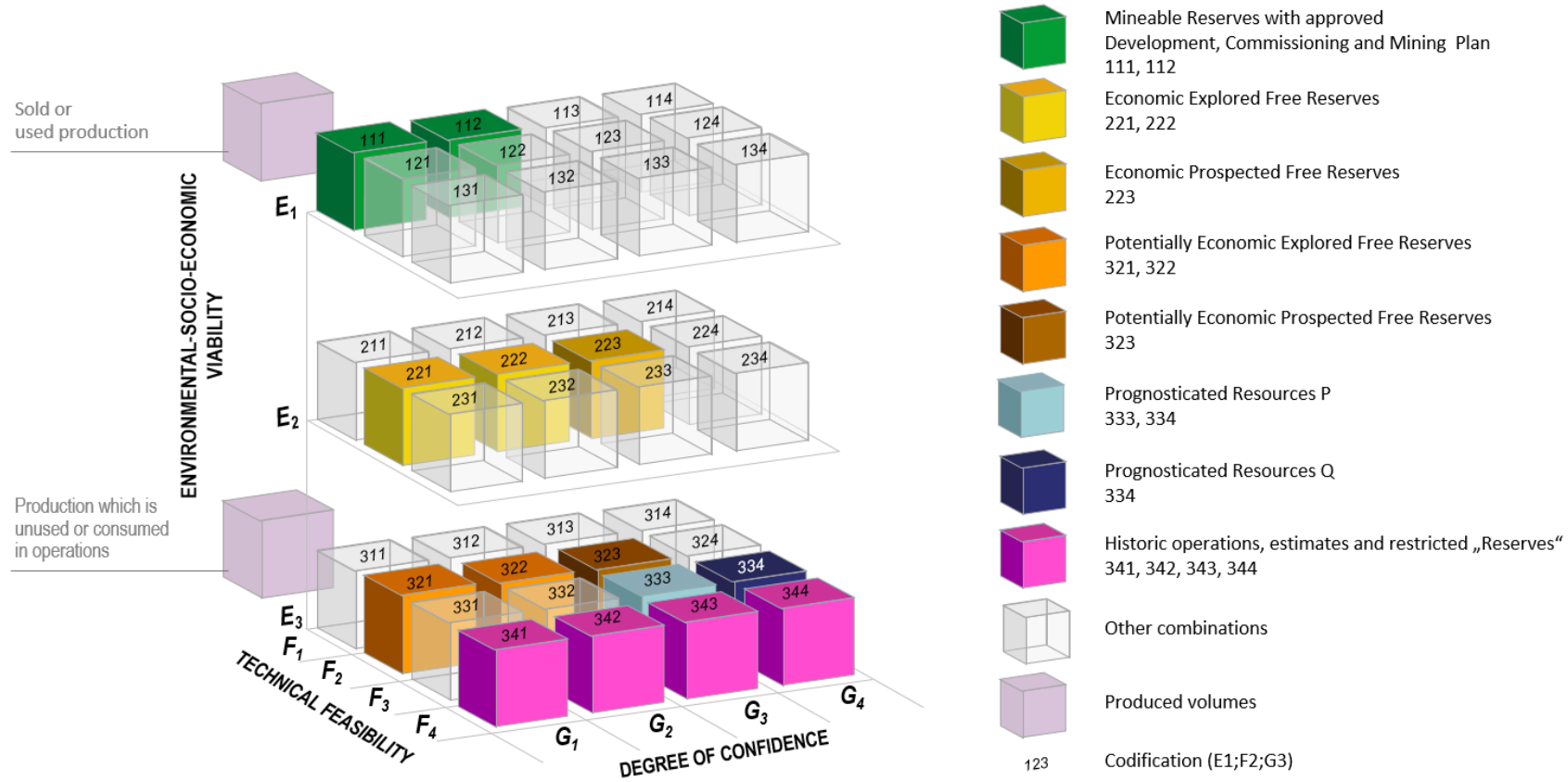
2D plot E x F (G in brackets) is useful

UNFC	F1.1	F1.2	F1.3	F2.1	F2.2	F2.3	F3.1	F3.2	F3.3
E1.1	"Approved Mineable Reserves" <i>Approved "POPD"</i> On Production G1,2	"Approved Mineable Reserves" <i>Approved "POPD"</i> Approved for Development G1,2	"Approved Mineable Reserves" <i>Approved "POPD", currently not operating</i> Justified for Operation G1,2						
E1.2									
E2				"Mineable Reserves" <i>"POPD" not approved</i> Development Pending G1,2 "Economic Free Reserves" <i>Established Mining Area</i> Development Pending "Economic Explored Free Reserves" G(1),2 "Economic Prospected Free Reserves" G3					
E3.1				Non-economic reserves in Economic Reserve blocks G1,2,3					
E3.2				"Economic Free Reserves" <i>Without Established Mining Area or Preliminary Approval to Establishing Mining Area</i> Development Unclassified "Economic Explored Free Reserves"	"Potentially Economic Free Reserves" <i>Established/Without Mining Area</i> Development Unclassified "Potentially Economic Explored Free Reserves" G(1),2		"Prognosticated Resources P" <i>Subsurface exploration works</i> Prospective Projects	"Prognosticated Resources Q" <i>Detailed surface exploration</i> Prospective Projects	"Prognosticated Resources Q" <i>Regional exploration</i> Prospective Projects





National 3D matrix





The ABC system

The ex-Soviet ABC₁C₂ System of mineral deposit classification is common to most Eastern European countries.

Mapping and Guidance documents have been done in Hungary, Slovenia, Ukraine, Romania and Poland. Some countries have included UNFC into their legislation.

The mapping methodology was slightly different in every country

2
2





GSEU

GEOLOGICAL SERVICE | FOR EUROPE

Financial support through the project „Rock Environment and Natural Resource RENS” (SS02030023) is gratefully acknowledged.

Thank you for your attention

**Zbyněk Gabriel
Czech Geological Survey**

www.geologicalservice.eu



**Funded by
the European Union**



EU IC SRM

